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REAL-TIME AUTOMATIC FRUIT SORTING BASED ON THE INTEGRATION OF COMPUTER VISION METHODS AND ARTIFICIAL INTELLIGENCE MODELS

Abstract: *This paper presents image processing methods and artificial intelligence models for automatic fruit sorting in industrial environments. A system based on computer vision and deep learning technologies is proposed, enabling real-time classification of fruits according to color and quality characteristics. Image preprocessing, segmentation, and feature extraction algorithms are developed, and a convolutional neural network model is applied to improve classification accuracy. Experimental results demonstrate the effectiveness of the proposed approach, ensuring stable system performance and high recognition accuracy. The obtained results can be applied in automated production lines to improve product quality and reduce operational costs.*

Keywords: *computer vision, artificial intelligence, image processing, fruit classification, convolutional neural networks, automatic sorting, deep learning*

Introduction

The rapid development of digital technologies has significantly influenced the modernization of agricultural production systems. In particular, the automation of fruit sorting processes has become an essential task aimed at improving product quality, reducing labor costs, and increasing overall efficiency. Traditional manual sorting methods are often characterized by subjectivity, inconsistency, and limited productivity, which makes them unsuitable for large-scale industrial applications [1,2].

The application of computer vision and artificial intelligence technologies offers new opportunities for addressing these challenges. Image processing algorithms enable the extraction and analysis of important visual features such as color, shape, and surface condition of fruits. These characteristics serve as key indicators for classification and grading processes in automated systems [2,3]. Deep learning approaches, especially convolutional neural networks (CNNs), have shown high effectiveness in solving object detection and classification problems. These models are capable of learning complex patterns from image data and can be integrated into real-time systems operating on conveyor-based sorting lines. As

a result, they provide improved accuracy and reliability compared to traditional methods [4,6].

Despite these advancements, several challenges still exist. Variations in illumination, background noise, and differences in fruit size and appearance can negatively affect system performance. Therefore, it is necessary to develop robust image processing algorithms and mathematical models that ensure stable operation under varying environmental conditions [7,9].

The aim of this research is to develop a mathematical model and image processing algorithms for an automatic fruit sorting system based on artificial intelligence, ensuring high accuracy, efficiency, and real-time performance.

Materials and methods: The proposed automatic fruit sorting system is based on the integration of computer vision techniques and artificial intelligence models. The system is designed to operate in real-time on a conveyor-based platform, where fruits are continuously captured and analyzed using a vision sensor. The general structure of the system includes image acquisition, preprocessing, segmentation, feature extraction, and classification stages.

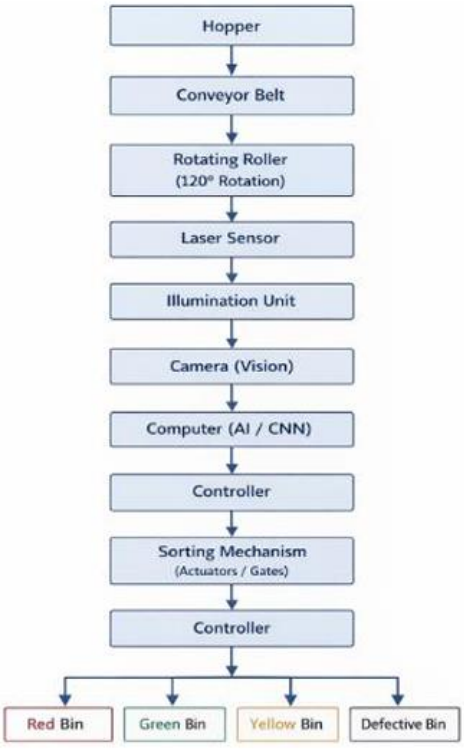

Fig 1. General block diagram of the computer vision-based fruit sorting system

At the image acquisition stage, a high-resolution camera is used to capture fruit images under controlled lighting conditions. Proper illumination ensures stable color representation and reduces the impact of shadows and reflections. The captured images are then transferred to the processing unit for further analysis [1,2]. In the preprocessing stage, image enhancement techniques are applied to improve data quality. Gaussian filtering is used to reduce noise, while contrast adjustment improves visibility of important features. These operations are essential for increasing the accuracy of subsequent image processing steps [2,3].

Segmentation is performed to separate the fruit object from the background. This is achieved using thresholding methods and contour detection

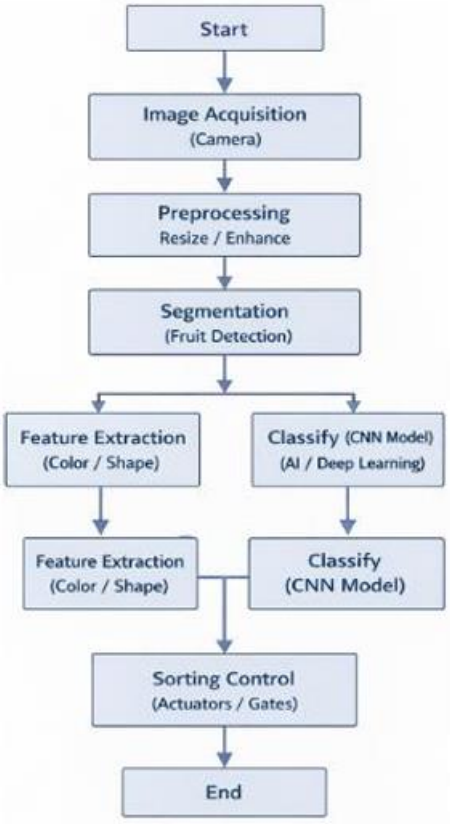

Figure 2. Image processing algorithm flowchart

Table 1. Main technical parameters of the system

Parameter	Value
Fruit types	Apples, oranges
Camera resolution	1920×1080 pixels
Conveyor belt speed	0.35 m/s
Rotation angle of roller	120°
Laser sensor type	Laser triangulation sensor
Illumination source	LED lights
AI model	Convolutional Neural Network (CNN)

algorithms. As a result, the region of interest is extracted, allowing the system to focus only on relevant image areas. Feature extraction is then carried out by analyzing color components (RGB), geometric properties, and surface characteristics of the fruit [4,5]. For classification, convolutional neural networks (CNNs) are employed due to their ability to learn complex patterns from image data. The trained model categorizes fruits into predefined classes based on their visual features. The use of deep learning models improves classification accuracy and enables real-time performance in industrial environments [6,7]. The overall system architecture is illustrated in **Figure 1,** which presents the general block diagram of the computer vision system. The sequence of image processing operations is shown in **Figure 2,** representing the algorithm flowchart. To evaluate system performance, several parameters were analyzed, including processing speed, classification accuracy, and operational efficiency. The main technical parameters of the system are presented in **Table 1,** while sorting accuracy indicators are summarized in **Table 2.**

Results: The proposed automatic fruit sorting system was tested under simulated industrial conditions using a conveyor-based setup. The system demonstrated stable performance in real-time processing, successfully detecting and classifying fruits based on their visual characteristics. The developed image processing algorithm effectively extracted relevant features such as color components, shape parameters, and surface properties. The segmentation stage provided accurate separation of fruits from the backg round, which significantly improved the overall classification performance. The use of preprocessing techniques contributed to noise reduction and enhanced image clarity.

Table 2. Evaluation metrics for sorting accuracy

Metric	Definition
Precision	The ratio of correctly sorted fruits of a particular class to the total fruits predicted as belonging to that class.
Recall	The ratio of correctly sorted fruits of a particular class to the total actual fruits in that class.
F1-Score	The harmonic mean of precision and recall, providing a single metric for evaluating the sorting accuracy.

The classification model based on convolutional neural networks showed high accuracy in distinguishing between different categories of fruits. The system was able to correctly classify fruits according to predefined classes, including variations in color and surface quality. The results confirm that deep learning methods are suitable for real-time sorting tasks in industrial environments.

The system also demonstrated efficient processing speed, allowing continuous operation without delays. This makes it applicable for high-throughput production lines. The experimental results presented in Table 2 indicate a high level of classification accuracy and system reliability. The general operation of the system and its structural components are illustrated in Figure 1, while the sequence of image processing stages is shown in Figure 2. These results confirm the effectiveness of the proposed approach for automated fruit sorting.

Discussion: The obtained results demonstrate that the proposed system provides a reliable and efficient solution for automatic fruit sorting in industrial environments. The integration of image processing techniques with artificial intelligence algorithms significantly improves the accuracy and speed of classification compared to traditional methods. One of the key advantages of the system is its ability to operate in real-time conditions while maintaining high stability. The use of preprocessing and segmentation methods ensures that the system can effectively handle noise and background variations. In addition, the application of convolutional neural networks allows the model to adapt to different fruit characteristics, including variations in color, size, and surface quality.

However, certain limitations were observed during the experiments. Changes in lighting conditions and overlapping objects on the conveyor can affect the accuracy of detection and classification. These factors indicate the need for further improvement of adaptive algorithms and optimization of system parameters.

Overall, the proposed approach demonstrates strong potential for practical implementation in agricultural and industrial applications, particularly in automated sorting systems.

Conclusion: In this study, a mathematical model and image processing algorithms for automatic fruit sorting based on artificial intelligence were developed. The proposed system integrates computer vision techniques with deep learning methods to achieve accurate and real-time classification of fruits. The experimental results confirm that the system provides high classification accuracy, stable performance, and efficient processing speed. The use of convolutional neural networks enhances the system’s ability to recognize complex visual patterns and improves overall reliability.

The developed approach can be effectively applied in industrial conveyor systems, contributing to increased productivity, reduced labor costs, and improved product quality. Future research will focus on improving system adaptability to varying environmental conditions and expanding the range of detectable fruit categories.

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O‘RMON TAKSATSIYASI VA MANZARALI BOG‘DORCHILIKDA INVENTARIZATSIYA JARAYONLARININ G ILMIY ASOSLARI VA INNOVATSION RIVOJLANISH YO‘NALISHLARI

Annotatsiya: *Maqolada O‘rmon taksatsiyasi hamda manzarali bog‘dorchilikda inventarizatsiya jarayonlarining ilmiy-nazariy poydevori qayta ko‘rib chiqilib, ularning amaliy qo‘llanish doirasi zamonaviy texnologiyalar bilan uyg‘un holda tahlil qilindi. Tadqiqot davomida raqamli monitoring, geoinformatsion tizimlar va masofaviy zondlash vositalarining o‘rmon resurslarini baholashdagi ustunliklari ochib berildi.*

Kalit so‘zlar: *o‘rmon inventarizatsiyasi, dendrometrik tahlil, biomassa bahosi, GIS texnologiyalar, urban ekologiya, yashil infratuzilma.*

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SCIENTIFIC FOUNDATIONS AND INNOVATIVE DEVELOPMENT DIRECTIONS OF INVENTORY PROCESSES IN FOREST TAXATION AND DECORATIVE GARDENING

Abstract: *The scientific and theoretical foundations of forest taxation and inventory processes in ornamental gardening have been revised, and their scope of practical application has been analyzed in harmony with modern technologies.*

The study revealed the advantages of digital monitoring, geographic information systems, and remote sensing tools in assessing forest resources.

Keywords: *forest inventory, dendrometric analysis, biomass assessment, GIS technologies, urban ecology, green infrastructure.*

Kirish

O‘rmon taksatsiyasi nafaqat o‘rmon zaxiralarini hisobga olish, balki ularning sifat holatini kompleks baholash imkonini beruvchi ilmiy-amaliy yo‘nalish sifatida qaraladi. Shu bilan birga, shahar hududlarida yashil zonalarni boshqarishda ham inventarizatsiya muhim rol o‘ynaydi. O‘rmon taksatsiyasi o‘rmon ekotizimining strukturaviy va funksional holatini ifodalovchi ko‘rsatkichlarni aniqlashga qaratilgan tizimli jarayon hisoblanadi. Uning asosiy maqsadi - mavjud resurslarni aniqlash bilan cheklanmay, balki ularning dinamikasini prognozlash va boshqaruv qarorlarini ilmiy asoslashdir. Taksatsiya jarayonlari quyidagi vazifalarni o‘z ichiga oladi: o‘rmon tarkibini aniqlash va tasniflash, zaxira va biomassani hisoblash, ekologik barqarorlik darajasini baholash, antropogen ta’sirlarni aniqlashdir.

1-jadval.

Dendrometrik ko‘rsatkichlarning zamonaviy talqini

№	Ko‘rsatkich nomi	An’anaviy talqin	Zamonaviy talqin (innovatsion yondashuv)	O‘lchash usullari
1	Daraxt balandligi	Daraxtning yer yuzasidan uchigacha bo‘lgan balandligi	3D model asosida aniq vertikal strukturani aniqlash, o‘sish dinamikasini monitoring qilish	Lazer skaneri (LiDAR), dronlar, gipsonometr
2	Diametr (ko‘krak balandligida, DBH)	1.3 m balandlikda o‘lchangan diametr	Avtomatlashtirilgan sensorlar orqali real vaqt monitoringi, o‘sish tezligini baholash	Elektron shтангенциркуль, LiDAR
3	Daraxt hajmi	Formulalar orqali taxminiy hisob	3D rekonstruksiya orqali yuqori aniqlikdagi hajm modeli	GIS + LiDAR, fotogrammetriya
4	Daraxt yoshi	Halqalarni sanash orqali aniqlash	O‘sish modellariga asoslangan prognoz va masofaviy baholash	Inkrement burg‘usi, model tahlili
5	Zaxira (biomassa)	Yog‘och hajmi asosida hisob	Uglerod zaxirasi va ekologik xizmatlarni baholash bilan integratsiya	Masofaviy zondlash, AI modellari
6	Toj kengligi	Ko‘z bilan yoki oddiy o‘lchov	Tojning 3D strukturasini va fotosintez samaradorligini tahlil qilish	Dron tasvirlari, LiDAR
7	O‘rmon zichligi	Maydondagi daraxtlar soni	Fazoviy tahlil va raqamli xaritalash orqali strukturaviy zichlikni baholash	GIS, sun’iy yo‘ldosh tasvirlari
8	Bonitet (sifat darajasi)	Tuproq va o‘sish sharoitiga asoslangan klassifikatsiya	Kompleks ekologik indekslar (iqlim, tuproq, suv) asosida baholash	Big Data, ekologik modellash
9	O‘sish zaxirasi	Yillik o‘sish miqdori	Dinamik monitoring va prognozlash (machine learning)	Uzluksiz kuzatuv tizimlari
10	Inventarizatsiya ko‘rsatkichlari	Qo‘lda yig‘ilgan statistik ma’lumotlar	Raqamli o‘rmon inventarizatsiyasi, real vaqt ma’lumot bazalari	GIS platformalar, mobil ilovalar

Dendrometrik ko‘rsatkichlar: Dendrometry doirasida daraxt va o‘rmonlarning asosiy parametrlarini aniqlashga xizmat qiladi. Zamonaviy yondashuvlarda bu ko‘rsatkichlar an’anaviy o‘lchash usullaridan farqli ravishda raqamli texnologiyalar bilan boyitilgan.

Birinchidan, daraxt balandligi an’anaviy tarzda yer yuzasidan uchigacha bo‘lgan masofa sifatida aniqlangan bo‘lsa, hozirgi kunda u 3D modellashtirish orqali yanada aniq hisoblanadi va vaqt bo‘yicha o‘sish dinamikasi ham kuzatiladi. Bunda LiDAR va dron texnologiyalaridan foydalanish keng tarqalgan.

Ikkinchidan, diametr (DBH) ilgari 1,3 metr balandlikda oddiy o‘lchov asboblari bilan aniqlangan. Zamonaviy yondashuvda esa elektron qurilmalar va lazer texnologiyalari yordamida bu ko‘rsatkichni avtomatik tarzda kuzatish va o‘sish tezligini tahlil qilish mumkin.

Uchinchidan, daraxt hajmi avvallari matematik formulalar asosida taxminiy hisoblangan bo‘lsa, hozirda 3D rekonstruksiya usullari orqali ancha aniqlik bilan baholanadi. Bu esa o‘rmon resurslarini samarali boshqarishga yordam beradi.

To‘rtinchidan, daraxt yoshi an’anaviy tarzda yillik halqalarni sanash orqali aniqlangan. Zamonaviy usullarda esa o‘sish modellari va masofaviy tahlil asosida yoshni aniqlash va hatto prognoz qilish imkoniyati mavjud.

Beshinchidan, biomassa yoki zaxira oldin faqat yog‘och hajmi bilan bog‘langan bo‘lsa, bugungi kunda u uglerod zaxirasi va ekologik xizmatlar bilan birgalikda baholanadi. Bu iqlim o‘zgarishi masalalarida juda muhim ahamiyatga ega. Shuningdek, toj kengligi oddiy ko‘z bilan baholangan bo‘lsa, hozirda dron tasvirlari yordamida tojning 3D tuzilishi va fotosintez samaradorligi aniqlanadi. O‘rmon zichligi esa oddiy daraxtlar soni emas, balki fazoviy tahlil orqali kompleks strukturaviy ko‘rsatkich sifatida qaraladi.

Ilmiy adabiyotlarda, xususan T.E.Avery va H.E.Burkhart tomonidan o‘rmon o‘lchovlari tizimi mukammal ishlab chiqilgan bo‘lib, unda daraxt diametri, balandligi, hajmi va zaxirasini aniqlash metodlari asoslab berilgan.

B.Husch tadqiqotlarida ko‘rsatilishicha, o‘lchash natijalarining ishonchliligi quyidagi omillar bilan belgilanadi:

- namunalar soni va ularning joylashuvi
- o‘lchash asboblarining aniqligi
- inson omili bilan bog‘liq xatoliklar
- statistik ishlov berish usullari

Zamonaviy metodologiyada sistematik va tasodifiy tanlash usullari keng qo‘llaniladi. Bundan tashqari, allometrik tenglamalar yordamida daraxt biomassa va hajmi aniqlanadi. Statistik tahlilda xatoliklarning dispersiyasi va ishonch oralig‘i hisobga olinadi. Shunday qilib, inventarizatsiya jarayonlari ilmiy jihatdan asoslangan, takrorlanadigan va yuqori aniqlikka ega bo‘lgan tizimga aylanadi. Bu esa o‘rmon resurslari to‘g‘risida ishonchli ma’lumotlar olish imkonini beradi.

Zamonaviy innovatsion yondashuvlar va texnologiyalar hozirgi davrda o‘rmon taksatsiyasi va inventarizatsiyasi jarayonlari sezilarli darajada raqamlashtirilgan. Food and Agriculture Organization ma’lumotlariga ko‘ra, global miqyosda o‘rmonlarni monitoring qilish tizimlari zamonaviy axborot

texnologiyalariga asoslanadi. Xususan, Geographic Information Systems, masofaviy zondlash, sun'iy yo'ldosh tasvirlari va dron texnologiyalari keng qo'llanilmoqda. Ushbu texnologiyalar katta hududlarni qisqa vaqt ichida o'rganish va yuqori aniqlikdagi ma'lumotlar olish imkonini beradi. P.W.West tomonidan ta'kidlanganidek, lazerli skanerlash (LiDAR) texnologiyasi daraxtlarning uch o'lchamli (3D) modelini yaratish imkonini beradi. Bu esa o'rmon strukturasini chuqur tahlil qilish va resurslarni aniq baholashga xizmat qiladi.

Bu yondashuv o'rmon resurslaridan oqilona foydalanish, ekologik barqarorlikni ta'minlash va boshqaruv samaradorligini oshirishga xizmat qiladi.

Xulosa

Tahlillar shuni ko'rsatadiki, o'rmon taksatsiyasi va manzarali bog'dorchilikda inventarizatsiya tizimlari zamonaviy texnologiyalar bilan integratsiyalashgan holda rivojlanmoqda. Ayniqsa, raqamli vositalarning joriy etilishi ushbu sohaning samaradorligini sezilarli darajada oshirmoqda. O'zbekiston sharoitida bu yo'nalishni rivojlantirish ekologik barqarorlikni ta'minlashda muhim strategik ahamiyatga ega.

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O‘RMON TAKSATSIYASI UCHUN ODDIY ISH QUROLLARI

Annotatsiya: *Maqolada o‘rmon taksatsiyasi jarayonida qo‘llaniladigan oddiy ish qurollari, ularning vazifalari va amaliy ahamiyati yoritiladi. O‘rmon fondini baholashda daraxtlarning diametri, balandligi, yoshi va zichligini aniqlash muhim bo‘lib, bu jarayonda ruletka, diametr o‘lchagich (kluppa), balandlik o‘lchagich (gipsometr), kompas, o‘lchov tayoqchalari kabi oddiy asboblardan foydalaniladi.*

Kalit so‘zlar: *o‘rmon taksatsiyasi, o‘lchov asboblari, diametr o‘lchagich, balandlik o‘lchagich, ruletka, kompas, o‘rmon monitoringi, inventarizatsiya.*

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SIMPLE TOOLS FOR FOREST TAXATION

Abstract: *This article highlights the simple tools used in the forest taxation process, their functions, and practical significance. When assessing the forest fund, it is important to determine the diameter, height, age, and density of trees; in this process, simple tools such as a tape measure, a diametric gauge (klupp), a height gauge (gypsometer), a compass, and measuring sticks are used.*

Keywords: *forest taxation, measuring instruments, diameter gauge, altimeter, tape measure, compass, forest monitoring, inventory.*

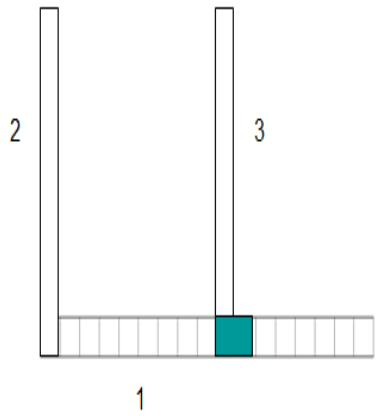
Kirish

Mamlakatimizda barcha sohalar qatori o‘rmon xo‘jaligini rivojantirishga ham katta e’tibor qaratilmoqda. O‘rmon xo‘jaligining moddiy texnika bazasini

rivojlantirish, ularni malakali kadrlar bilan mustaxkamlash uchun Prezidentimiz tomonidan aniq chora tadbirlar belgilab berilgan.

Ushbu chora-tadbirlarning amalga oshirilishi, o‘rmon xo‘jaliklari ishlab chiqarish faoliyatini yahshilashda hisoblash ishlarini aniq olib borish asosiy vazifalardan biri hisoblanadi. O‘rmon xo‘jaligida hisoblash va aniqlash ishlarini o‘rmon taksatsiyasi fani olib boradi. O‘rmon taksatsiyasi o‘rmonlarning sifat va miqdor jihatidan o‘zgarishlarini baholaydi va daraxtlarning o‘sib rivojlanishini aniqlab boradi. Keyingi paytlarda fan va texnikaning taraqqiy etishi bilan o‘rmon taksatsiyasiga ham murakkab asbob-uskunalar, kompyuter texnologiyalari kirib kelmoqda.

Jumladan, HAGLOF markali daraxt diametrini o‘lchagichlar, VERTEX markali masofa va balandlik o‘lchagichlar, MASSER markali kompyuterli mernoy chizgichlar shular jumlasidandir. Bu asboblar yordamida taksator daraxtlarning zarur ko‘rsatkichlarini aniq va qulay tarzda o‘lchab olishi mumkin. Lekin, bizning sharoitimizda hozircha bu asboblardan foydalanish imkoniga ega emasmiz. Shu sababli biz daraxtlarning taksatsion ko‘rsatkichlarini hisoblash uchun oddiy ish qurollaridan foydalanishni taklif qilamiz. Bunday asboblarni o‘z kuchimiz bilan tayyorladik va foydalanib kelmoqdamiz. Ulardan biri daraxt diametrini o‘lchovchi asbob (uni diamer deb atadik).



Asbob 3 qismdan iborat.

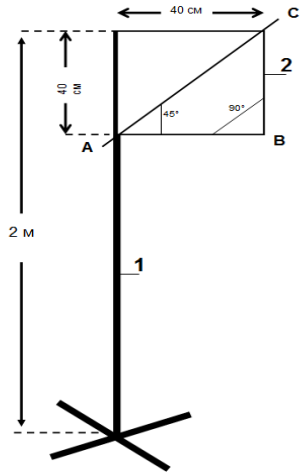
1-qo‘zg‘almas asos, u santimetrlarga bo‘lingan, uzunligi 80 sm.

2-qo‘zg‘almas tomon, uzunligi 40 sm.

3-suruluvchan tomon, uzunligi 40 sm, o‘ng va chap tomonga surish mumkin.

Asbobni ishlatish: 2-3-tomonlarni daraxtga perpendikulyar holatda olib borib, 1-qo‘zg‘almas asos daraxtga tekkiziladi, 3-suruluvchan tomonni daraxt tanasiga surib, yon tomondan daraxtga tekkiziladi, birinchi asosdagi 3-tomonning chap tomondagi santimetr ko‘rsatkichi daraxt diametrini bildiradi.

Ikkinchi asbob bilan daraxt balandligini o‘lchash mumkin (uni balandmer deb atadik). Ma’lumki, tik turgan daraxt balandligini o‘lchash ancha murakkab, ushbu asbob bilan daraxt balandigini osongina o‘lchash mumkin.



Asbob 2 qismdan iborat:

1-tayanch qism, uning bo‘yi 2 metrga teng.

2-tomonlari 40 smdan iborat to‘g‘ri to‘rtburchak.

O‘lchash tartibi: asbobni bo‘yi o‘lchanadigan daraxt yoniga olib borib, taxminan bo‘yicha teng masofaga qo‘yiladi. Keyin uni daraxtga yaqinlashtirib yoki uzoqlashtirib, A nuqtadan qarab, S nuqtani hayoliy to‘g‘ri chiziq bilan daraxt uchiga to‘g‘rilanadi.

O‘sha joydan daraxtgacha bo‘lgan masofa ruletka bilan o‘lchanib, 1,60 metr qo‘shiladi, natija daraxtning balandigini bildiradi.

Ushbu o‘lchash usuli uchburchak qonunlariga asoslangan. Bu qonunlarga asosan, to‘g‘ri burchakli uchburchakning qolgan 2 ta burchagi 45° dan bo‘lsa uchburchak katetlarining uzunligi bir-biriga teng bo‘ladi. Shunga ko‘ra asbobning AS va AV tomonlari hayoliy chiziq bilan davom ettirilsa daraxt bilan to‘g‘ri burchakli katetlari teng uchburchak hosil bo‘ladi, demak, asbobdan daraxtgacha o‘lchangan masofa daraxt balandligiga teng bo‘ladi (unga asbobning bo‘yi 1,60 metr qo‘shiladi).

Xulosa qilib aytish mumkinki, yuqorida keltirilgan oddiy ish qurollari yordamida daraxtlarining taksatsion ko‘rsatkichlarini va ularning o‘sishi, rivojlanishi xaqidagi ma’lumotlarini aniqlash mumkin.

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KESHU YONG'OG'I *(ANACARDIUM OCCIDENTALE)* - SOG'LIK UCHUN TABIIY MANBADIR

Annotatsiya: *Ushbu maqolada Keshu yong'og'ining kimyoviy tarkibi, biologik faol xususiyatlari, sog'liq uchun foydalari va zamonaviy tibbiyot hamda ovqatlanish amaliyotidagi ahamiyati keng yoritiladi. Shu bilan birga, uning kundalik ovqatlanishdagi o'rni, iste'mol me'yorlari va salomatlikka ta'sir ko'rsatish mexanizmlari ilmiy asosda tahlil etiladi.*

Kalit so'zlar: *Keshu, dorivor, salomatlik, tibbiyot, oziq-ovqat, eksport.*

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KESHU NUT (*ANACARDIUM OCCIDENTALE*) IS A NATURAL SOURCE FOR HEALTH

Abstract: *This article extensively covers the chemical composition, biologically active properties, health benefits, and significance of Keshu nut in modern medical and nutritional practices. At the same time, its role in daily nutrition, consumption norms, and mechanisms of impact on health are analyzed on a scientific basis.*

Keywords: *Keshu, medicinal, health, medicine, food, export.*

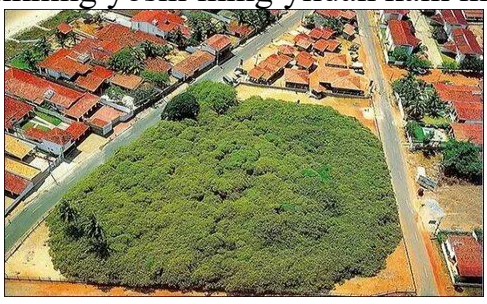
Kirish

Keshu yong'og'i (*Anacardium occidentale*) bugungi kunda dunyo miqyosida eng qadrlanadigan oziqaviy mahsulotlardan biri sifatida e'tirof etilmoqda. Tropik mintaqalarda o'sadigan ushbu o'simlik yuqori energiya qiymati, antioksidantlarga boy yong'og'i, shuningdek, foydali minerallar bilan

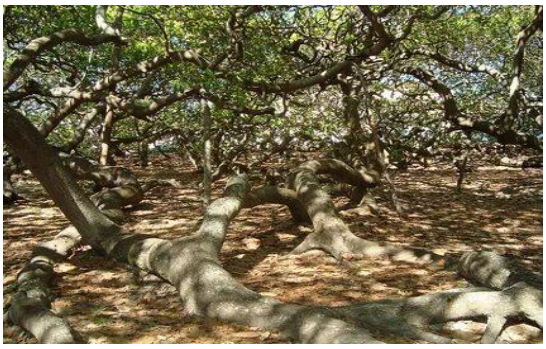
to‘yinganligi tufayli global oziq-ovqat xavfsizligi va aholining sog‘lom ovqatlanishi yo‘nalishlaridagi asosiy tabiiy manbalardan biri sifatida qaralmoqda. Keshu tarkibida yuqori sifatli o‘simlik yog‘lari, oqsillar, polifenollar, E vitamini, B guruhi vitaminlari, magniy, temir, fosfor va rux kabi muhim mikroelementlar mavjud. Ushbu moddalar yurak-qon tomir tizimini qo‘llab-quvvatlash, immunitetni mustahkamlash, asab tizimi faoliyatini yaxshilash va metabolik jarayonlarni me’yorlashtirishda muhim ahamiyatga ega.

Shu sababli FAO tomonidan Keshu, bodom, makadamiya singari tropik yong‘oqlar “strategik ekinlar” sifatida belgilangan bo‘lib, ularni barqaror yetishtirish bo‘yicha dasturlar jadal amalga oshirilmoqda. Misol uchun Kot-d’Ivuar, Vetnam, Hindiston, Tanzaniya kabi davlatlarda keshu yong‘og‘ini mahalliy sharoitda
qayta ishlashni kengaytirish va eksport qiymatini oshirish bo‘yicha milliy
dasturlar qabul qilingan. O‘zbekiston, Qozog‘iston va Qirg‘izistonda aholi sog‘lig‘ini mustahkamlashga qaratilgan davlat dasturlarida yuqori ozuqaviy qiymatga ega yong‘oqmevali mahsulotlarini ko‘proq iste’mol qilish targ‘ib etilmoqda. O‘rta Osiyo davlatlari yani Vetnam, Hindiston va bir qator Afrika mamlakatlaridan Keshu yong‘og‘i importini yildan-yilga oshirmoqda.

Bizning mamlakatimizda 2023-2024 yillarda qayta ishlash korxonalari uchun bojxona imtiyozlari berilib, Keshu yong‘og‘ini qadoqlash, qovurish va eksportga tayyorlash imkoniyatlari kengaydi. Keshu (inglischa cashew, portugalcha caju so‘zidan) yoki g‘arbiy anakardiy (lotincha Anacardium occidentale) so‘zlaridan olingan bo‘lib - mevasi oddiy oziq-ovqat va dorivor xususiyatga ega bo‘lgan daraxt. Sumaxdoshlar oilasiga mansub Anacardium turkumining bir turi. Vatani Braziliya, tropik mamlakatlarda o’stiriladi. Braziliyada Rio Grande do Norte shtati bor. Unda esa Piranji (Pirangi) shaharchasi bor. Bu shaharchada keshyu daraxti o‘sadi. Afsonaga ko‘ra, uni 1888-yilda mahalliy baliqchi ekkan, keyinchalik u 93 yoshida shu daraxt soyasida vafot etgan. To‘g‘ri, dendrologlarning fikricha, o‘simlikning yoshi ming yildan kam mas.



U yiliga 60 mingdan ortiq meva beradi va butun Braziliyadan yuz minglab sayyohlarni jalb qiladi. Aylana uzunligi 500 metrga yaqin bo‘lgan bu daraxt
8400 m^2 maydonni egallaydi. Og‘irlik va gravitatsiya shoxlarni yerga egilishga majbur qiladi va ular tuproqqa tegganda, yangi ildizlar shakllana boshlaydi va ulkan organizm o‘sishda davom etadi. Hozir dastlabki tanani daraxtning qolgan qismidan ajratib olish deyarli mumkin emas.



Mevasi yong‘oqsimon, mag‘zi yeyiladigan, po‘chog‘idan meditsina va texnikada ishlatiladigan moy-kaju (kardoyl) olinadi. Nok shaklida o‘sgan meva bandi ovqatga ishlatiladi (olma-kaju deb ataladi). “Keshyu olmalari” shirali nordon eti tufayli, to‘g‘ridan-to‘g‘ri iste’mol qilishdan tashqari, murabbo, jele, kompotlar, “Catni” souslari va spirtli ichimliklar tayyorlash uchun xam ishlatiladi. U keshyu mevalarining bijg‘igan sharbatidan bir necha marta haydash orqali tayyorlanadi, natijada o‘ziga xos ta’m va hidga ega bo‘lgan juda kuchli (40 darajagacha) ichimlik hosil bo‘ladi. Ko‘pgina mamlakatlarda keshyu yong‘oqlari afzal ko‘riladi. Boshqalarga nisbatan keshyu yong‘og‘i allergiya holatlarini ancha kamroq keltirib chiqaradi. Keshyu oqsil va uglevodlarga, A, B^2, B^1 vitaminlari va temirga boy, tarkibida rux, fosfor, kalsiy bor. Bu yong‘oqlar yordamchi vosita sifatida psoriaz, distrofiya, almashinuv jarayonlarining buzilishi, anemiyalarda iste’mol qilinadi.

1 g keshyuning energetik quvvati - 5,5 kkal atrofida (uning 70 foizi yog‘larga to‘g‘ri keladi) - bodom, yeryong‘oq yoki yong‘oqnikidan kam. Keshyu yong‘oqlaridan turli xil souslar tayyorlanadi.

Suv yuqtirmaslik xususiyatiga ega bo‘lganligi uchun fenilamin kemasozlikda va kemalarni ta’mirlashda palubalararo to‘shamalarning epoksid qoplamalarini tayyorlashda ishlatiladi. Tropik mamlakatlar xalq tabobatida va termitlarga qarshi kurashda ishlatiladi. Rossiya va Yaqin xorij mamlakatlarida do‘kon peshtaxtalarida xom yoki qovurilgan keshyuni uchratish mumkin. Yaxlit holda ham, 2 bo‘lakka bo‘lingan holda ham sotilishi mumkin (nokonditsiya). Taxminan 6 foiz odamlarda keshyu hayot uchun xavfli bo‘lishi mumkin bo‘lgan asoratlar yoki allergik reaksiyalarni keltirib chiqarishi mumkin. Bu allergiyalarni daraxt yong‘og‘i tarkibidagi oqsillar keltirib chiqaradi va keshyu tayyorlanganda bu oqsillar yo‘qolmaydi.

Keshu yong‘og‘i tarkibida inson organizmi uchun zarur bo‘lgan ko‘plab bioaktiv moddalar mavjud: bular A (ko‘rish qobiliyatini mustahkamlaydi), B guruh vitaminlari (B^1, B^2, B^6 - asab tizimi uchun muhim), E (kuchli antioksidant), K (qon ivish jarayonida ishtirok etadi) vitaminlari, Minerallar: Magniy (mushak va yurak faoliyatini tartibga solidi), rux (immunitetni mustahkamlaydi), temir (kamqonlikning oldini oladi), fosfor (suyak va tishlarni mustahkamlaydi), mis (qon ishlab chiqarishni yaxshilaydi), foydali yog‘lar: o‘simlik yog‘larining 60-70% i to‘yinmagan yog‘ kislotalaridan iborat, qon tomir faoliyati uchun foydali

bo‘lgan olein kislota va linol kislotalari mavjud, oqsillar yong‘oq tarkibida 18-20% oqsil bo‘lib, u organizmda hujayra tiklanishida muhim ahamiyatga ega.

Keshu yong‘og‘ining xalq tabobatida xam keng qo’llaniladi. Masalan yong‘oq ichidagi moy revmatizm**,** mushak og‘riqlari, bo‘g‘im og‘riqlarini yengillashtiradi, daraxt po‘sti mikrobga qarshi va yallig‘lanishga qarshi xususiyatlarga ega, meva sharbati oshqozon faoliyatini yaxshilaydi**,** ichaklarni tozalaydi, barglari qaynatmasi - diabetning dastlabki bosqichida qo‘llanadi**.** Bugungi kunda jahon bozoriga keshu xomashyosining Vetnam (960,8 ming tonna), Nigeriya (594 ming tonna), Hindiston (460 ming tonna), Braziliya (147,630 tonna), Indoneziya (122 ming tonna) asosiy yetkazib beruvchilari xisoblanadi. Hindiston o’z mahsulotlarining nisbatan past sifatiga qaramay, keshu iste’moli bo’yicha etakchi hisoblanadi. Bu mamlakatlar umumiy hisobda jahon keshu eksportining 90% dan ortig'ini tashkil qiladi.

Markaziy Osiyoda xam so‘nggi yillarda issiqxona va tajriba maydonlarida keshu yetishtirish bo‘yicha loyihalar amalga oshirilmoqda. Qozog‘iston, O‘zbekistonning janubiy hududlarida tajriba sifatida ekilmoqda. Yaxshi agrotexnika sharoitida o‘simlik yaxshi moslashishi kuzatilgan.

Xulosa qilib atganda Keshu yong‘og‘i - o‘z tarkibi, shifobaxsh xususiyatlari va iqtisodiy qiymati jihatidan inson salomatligi va oziq-ovqat xavfsizligi uchun juda muhim o‘simlikdir. Uning tarkibidagi boy vitaminlar, minerallar, antioksidantlar va to‘yinmagan yog‘ kislotalari yurak, asab, suyak, immun tizimi faoliyatini yaxshilaydi. Keshu yong‘og‘i nafaqat oziqaviy qiymati, balki xalq tabobatida, farmatsevtika va sanoatda keng qo‘llanishi bilan ham e’tiborga loyiq. Markaziy Osiyo sharoitida uni yetishtirish bo‘yicha olib borilayotgan tajribalar ijobiy natija bermoqda. Kelajakda keshu yong‘og‘ini ko‘proq ekish, qayta ishlash va eksport qilish O‘zbekistonning iqtisodiy imkoniyatlarini kengaytirishi mumkin.

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METASEKVOYA (METASEQUOIA GLYPTOSTROBOIDES) - QADIMIY VA NOYOB DARAXTNING BIOEKOLOGIK XUSUSIYATLARI

Annotatsiya: *Mazkur maqolada Metasekvoiya (Metasequoia glyptostroboides) ning bioekologik xususiyatlari, tarqalish areali, morfologik va fiziologik belgilarini o‘rganish natijalari bayon etilgan. Ushbu qadimiy relikt daraxt turi Xitoy hududidan kelib chiqqan bo‘lib, hozirgi kunda turli iqlim sharoitlariga moslashish xususiyatlari bilan ajralib turadi. Maqolada o‘simlikning ontogenez bosqichlari, o‘sish dinamikasi, ekologik omillarga (harorat, namlik, tuproq tarkibi) bo‘lgan talablari hamda introduksiya sharoitida rivojlanish xususiyatlari tahlil qilingan. Shuningdek, metasekvoiyaning landshaft dizayni, o‘rmon xo‘jaligi va ekologik barqarorlikni ta’minlashdagi ahamiyati yoritilgan.*

Kalit so‘zlar: *Metasekvoiya, relikt daraxt, bioekologiya, ekologik omillar, o‘sish dinamikasi, landshaft dizayni, iqlimga moslashuvchanlik, o‘rmon xo‘jaligi.*

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METASEQUOIA (METASEQUOIA GLYPTOSTROBOIDES) - BIOECOLOGICAL FEATURES OF AN ANCIENT AND RARE TREE

Annotation: *This article presents the results of studying the bioecological characteristics, distribution area, and morphological and physiological features of Metasequoia glyptostroboides (dawn redwood). This ancient relict tree species originates from China and is distinguished by its ability to adapt to various climatic conditions. The paper analyzes the ontogenetic stages of the plant, growth dynamics, and its requirements for environmental factors such as temperature,*

moisture, and soil composition, as well as its development under introduction conditions. In addition, the importance of metasequoia in landscape design, forestry, and maintaining ecological stability is highlighted.

Keywords: *metasequoia, relict tree, bioecology, environmental factors, growth dynamics, landscape design, climate adaptability, forestry.*

Metasekvoya (*Metasequoia glyptostroboides*) nomi ilmiy jihatdan uning tashqi ko‘rinishi va evolyutsion yaqinligini ifodalaydi: “*Meta*” (lotincha - “o‘xshash” yoki “keyingi”) hamda “*Sequoia*” so‘zlarining birikmasidan hosil bo‘lib, mashhur sekvoya daraxtlariga o‘xshashligini bildiradi. “*Glyptostroboides*” esa ushbu tur barglari va umumiy morfologik tuzilishi jihatidan boshqa bir ignabargli daraxt - *Glyptostrobus* (Xitoy botqoqlik sarvi) ga yaqinligini anglatadi.

Paleobotaniklar ma’lumotlarga ko‘ra, metasekvoya bundan taxminan 65-100 million yil avval, ya’ni bo‘r davrida, Shimoliy yarim shar hududlarida - Sibir, Shimoliy Amerika va Grenlandiyada keng tarqalgan. U dinozavrlar bilan bir davrda yashagan qadimiy relikt o‘simliklardan biri hisoblanadi. Hozirgi kunda o‘simlik tabiiy holda faqat Xitoyning markaziy va janubiy-markaziy hududlarida, xususan Xubey (Hubei) hamda Sichuan provinsiyalari tutashgan, borish qiyin bo‘lgan tog‘li vodiylarda saqlanib qolgan. Ushbu noyob daraxtning eng yirik tabiiy populyatsiyasi aynan Shuishaba vodiysida joylashgan bo‘lib, bu hudud metasekvoyaning genofondini saqlash va o‘rganishda muhim ahamiyat kasb etadi.

Dinozavrlar davrida, ya’ni Mezozoy va Kaynozoy eralarida metasekvoya (*Metasequoia glyptostroboides*) Shimoliy yarim shar bo‘ylab keng tarqalgan. Uning toshga aylangan qoldiqlari (fosillari) Shimoliy Amerika (jumladan Kanada Arktikasi va AQShning Oregon shtati), Yevropa, Grenlandiya, Sibir hamda Yaponiya hududlaridan topilgan. Bu esa metasekvoyaning o‘sha davrda hatto qutb doirasiga yaqin hududlarda ham keng o‘rmonlar hosil qilganini ko‘rsatadi.

Millionlab yillar davomida iqlimning sovishi va qurg‘oqchilik kuchayishi natijasida ushbu daraxtning tabiiy areali keskin qisqarib ketgan. Natijada metasekvoya hozirgi kunda faqat Markaziy Xitoyning juda cheklangan hududlarida tabiiy holda saqlanib qolgan noyob relikt tur hisoblanadi.

Metasekvoyaning qayta kashf etilishi ilm-fan tarixida muhim voqea bo‘ldi. 1941-yilda xitoylik botanik Zhan Wang Sichuan provinsiyasidagi Siche qishlog‘ida ilgari noma’lum bo‘lgan ulkan daraxtga duch keladi. Biroq Ikkinchi jahon urushi sababli tadqiqot ishlari vaqtincha to‘xtab qoladi. Shu bilan birga, yapon paleobotanigi Shigeru Miki qazilma materiallarni o‘rganib, bu o‘simlikni oddiy sekvoyadan ajratadi va unga “Metasequoia” nomini beradi.

1944–1946-yillarga kelib, olimlar ushbu “noma’lum” daraxt aslida ilgari faqat qazilma holatda ma’lum bo‘lgan va qirilib ketgan deb hisoblangan metasekvoya ekanini aniqlashadi. 1948-yilda Arnold Arboretum (Harvard universiteti qoshida) homiyligida Xitoyga maxsus ekspeditsiya uyushtirilib, daraxt urug‘lari yig‘ib olinadi va ilmiy muassasalarga tarqatiladi.

Natijada metasekvoya qisqa vaqt ichida dunyo bo‘ylab botanika bog‘lari va introduksiya maydonlariga keng yoyildi. Bugungi kunda u 50 dan ortiq

mamlakatlarda muvaffaqiyatli yetishtirilmoqda. Tabiiy areali esa asosan Xubey (Hubei) provinsiyasi, shuningdek unga tutash hududlar - Xunan provinsiyasining shimoli-g‘arbiy qismi va Chunsin (Chongqing) munitsipalitetining sharqiy hududlari bilan chegaralangan. Hozirgi vaqtda tabiatda taxminan 5 400 ga yaqin yirik “ona daraxtlar” (tabiiy genetik fondni tashkil etuvchi asosiy daraxtlar) ro‘yxatga olingan bo‘lib, ular metasekvoyaning saqlanishi va ilmiy o‘rganilishi uchun muhim biologik manba hisoblanadi.

AQSh va Yevropa mamlakatlarida metasekvoya (*Metasequoia glyptostroboides*) qisqa vaqt ichida arboretumlar va dendroparklarning eng mashhur manzarali daraxtlaridan biriga aylandi. Uning tez o‘sishi, mavsumiy rang o‘zgarishi (kuzda barglarining sarg‘ish-qizg‘ish tusga kirishi) hamda to‘g‘ri, baland bo‘yli shakli landshaft dizaynida keng qo‘llanilishiga sabab bo‘lmoqda. Bugungi kunda u ko‘plab Arnold Arboretum kabi nufuzli botanika bog‘lari va ilmiy markazlarda introduksiya qilingan holda muvaffaqiyatli o‘stirilmoqda.

O‘zbekistonda ham metasekvoya introduksiya qilingan manzarali daraxt sifatida uchraydi. Xususan, Toshkent botanika bog‘i hududida va poytaxtning ayrim xiyobonlarida uning yirik, yaxshi rivojlangan namunalarini uchratish mumkin. Ushbu daraxt O‘zbekiston sharoitida ham moslashuvchanligi bilan ajralib turib, kelajakda ko‘kalamzorlashtirish ishlarida istiqbolli turlardan biri sifatida baholanadi.

Metasekvoya (*Metasequoia glyptostroboides*) – *Gymnospermae* bo‘limi, *Pinopsida* sinfi, *Cupressaceae* oilasi, *Metasequoia* turkumi, *Metasequoia glyptostroboides* turiga kiruvchi qadimiy relikt daraxtdir.

Metasekvoya (*Metasequoia glyptostroboides*) kuchli rivojlangan va keng yoyiluvchan ildiz tizimiga ega. Yosh davrida markaziy o‘q ildiz chuqurga yo‘nalib o‘sadi va daraxtning vertikal barqarorligini ta’minlaydi. Daraxt ulg‘aygan sari esa gorizontal yo‘nalishda keng tarqaluvchi yon ildizlar ustunlik qiladi. Ushbu ildizlar asosan tuproqning yuqori qatlamida joylashib, katta maydonni egallaydi. Tabiiy sharoitda nam va botqoq hududlarda o‘sishi sababli ildizlari ortiqcha namlikka va kislorod yetishmasligiga chidamli. Ayrim hollarda tuproq yuzasiga chiqib turuvchi nafas oluvchi ildizlar (pnevmataforalar) hosil qilishi mumkin (1-rasm).

1-rasm. Metasekvoya (*Metasequoia glyptostroboides*) ning ildiz tizimi.

O‘simlikning tanasi to‘g‘ri, baland va piramidasimon shaklda rivojlanadi. Uning balandligi odatda 35-40 metrga, diametri esa 1,5-2,5 metrga yetadi. Qarigan daraxtlarda tana pastki qismi kengayib, qovurg‘asimon (kontrforsli) tuzilishga ega bo‘ladi, bu esa daraxtning yumshoq va nam tuproqlarda barqaror turishini ta’minlaydi. Po‘stlog‘i qizg‘ish-jigarrangdan kulrang-jigarranggacha bo‘lib, yupqa va tolali, vertikal yo‘nalishda tasmasimon ko‘chib turadi. Shoxlari tanadan qarama-qarshi (oppozit) holda chiqib, muntazam va simmetrik joylashadi.

Metasekvoya barglari ignabargli o‘simliklarga xos bo‘lsa-da, yumshoq va patsimon ko‘rinishga ega. Barglar chiziqsimon, uzunligi 1-3 sm bo‘lib, shoxchalarda ikki qatorli tartibda joylashadi. Ular oppozit joylashuvi bilan boshqa ko‘plab ignabargli daraxtlardan farq qiladi. Metasekvoya - xazonrezgi ignabargli daraxt bo‘lib, kuzda barglari oltinrang, misrang yoki qizg‘ish tusga kirib, keyin to‘kiladi. Qishda esa mayda novdachalari bilan birga barglarini tashlab, vegetativ tinim holatiga o‘tadi (2-rasm).

2-rasm. Metasekvoya (*Metasequoia glyptostroboides*) ning barg tuzilishi.

Metasekvoya bir uyli o‘simlik bo‘lib, unda erkak va urg‘ochi generativ organlar (strobillar) bir daraxtda joylashadi. Erkak strobillar mayda, yumaloq yoki tuxumsimon shaklda bo‘lib, novdalar uchida shingil hosil qilib joylashadi va bahorda ko‘p miqdorda chang ajratadi. Changlanish asosan shamol yordamida amalga oshadi. Urg‘ochi strobillar esa dumaloq yoki oval shaklda bo‘lib, keyinchalik yog‘ochlashib shishkaga aylanadi.

O‘simlikning “mevasi” - bu yog‘ochlashgan shishka hisoblanadi. Shishkalar 1,5-2,5 sm uzunlikda bo‘lib, 20-30 ta tangachalardan tashkil topgan. Har bir tangacha qarama-qarshi joylashgan bo‘lib, bu turga xos belgi hisoblanadi. Shishka ichida ko‘plab mayda, yassi va qanotchali urug‘lar mavjud. Urug‘lar shamol yordamida tarqaladi. Tabiiy sharoitda urug‘larning unuvchanligi nisbatan past bo‘lsa-da, ular turning tabiiy ko‘payishida muhim rol o‘ynaydi (3-rasm).

3-rasm. Metasekvoya (*Metasequoia glyptostroboides*) ning mevasi.

Changlangandan so‘ng shishkalar yashil rangda bo‘lib, sekin-asta kattalashadi. Oktabr-noyabr oylariga kelib shishkalar to‘q jigarrang tusga kiradi, yog‘ochlashadi va quriydi. Qish boshida shishka tangachalari ochiladi va ichidagi urug‘larni shamolga uchiradi. Shishkaning o‘zi esa daraxtda yana bir muncha vaqt osilib turishi mumkin. Har bir shishka ichida juda ko‘p miqdorda mayda urug‘lar bo‘ladi.

Urug‘lar yassi, yengil va atrofi yupqa “qanotchalar” bilan o‘ralgan. Qanotchalari yordamida urug‘lar shamolda uzoq masofaga uchib boradi. Tabiiy sharoitda metasekvoya urug‘larining unuvchanligi biroz past bo‘ladi, shuning uchun ularni ko‘paytirishda ko‘pincha qalamchalardan foydalaniladi. Metasekvoya odatda 20-25 yoshga yetganda birinchi marta shishka tugishni boshlaydi. Agar sharoit juda qulay va namlik yetarli bo‘lsa, bu jarayon biroz vaqtliroq boshlanishi ham mumkin.

Metasekvoya mevalari (shishkalari) tarkibida juda ko'p miqdorda smola va efir moylari mavjud. Shuning uchun ham ular o'ziga xos o‘tkir, yoqimli hidga ega. Tabiatda bu shishkalar asosan daraxtning ko'payishi uchun xizmat qiladi, insonlar esa ulardan ko'pincha dekorativ maqsadlarda (quritilgan holda) foydalanishadi.

Xulosa

Metasekvoya (*Metasequoia glyptostroboides*) - million yillar avval keng tarqalgan bo‘lsa-da, hozirgi kunda tabiiy holda faqat Xitoyning cheklangan tog‘li hududlarida saqlanib qolgan. Metasekvoya morfologik jihatdan baland bo‘yli, piramidasimon tanaga ega bo‘lib, kuchli rivojlangan ildiz tizimi, qarama-qarshi joylashgan yumshoq barglari hamda shamol yordamida changlanadigan strobillari bilan ajralib turadi. Uning ekologik moslashuvchanligi yuqori bo‘lib, nam va suvga boy tuproqlarda tez o‘sadi, sovuqqa ham ma’lum darajada chidamli hisoblanadi. Ilmiy jihatdan metasekvoya “tirik qazilma” (living fossil) sifatida katta ahamiyatga ega bo‘lib, u o‘simliklar evolyutsiyasini o‘rganishda muhim model tur hisoblanadi. Shuningdek, u ekologik barqarorlikni ta’minlash, landshaft dizayni va ko‘kalamzorlashtirishda ham keng qo‘llanilmoqda.

Umuman olganda, metasekvoya nafaqat biologik xilma-xillikning noyob vakili, balki tabiatni muhofaza qilish va ilmiy tadqiqotlar uchun ham katta ahamiyatga ega qadimiy daraxt hisoblanadi.

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BUXORO VILOYATINING TABIIY GEOGRAFIK KOMPLEKSLARDAN FOYDALANISHNING HOZIRGI HOLATI

Annotatsiya: *Mazkur maqolada Buxoro viloyatining hozirgi kundagi tabiiy-geografik sharoitlari va ularning qishloq xo'jaligi rivojlanishiga ta'siri ilmiy jihatdan tahlil qilingan. Tadqiqot davomida viloyat iqlimining keskin kontinental xususiyatlari, vegetatsiya davrining davomiyligi, tuproq turlarining tarkibi, suv resurslari bilan ta'minlanganlik darajasi hamda meliorativ holati qishloq xo'jaligi tarmoqlarining shakllanishida asosiy omillar sifatida ko'rib chiqildi. Paxtachilik, g'allachilik, sabzavotchilik, polizchilik, bog'dorchilik va chorvachilik sohalarining rivojlanish holati mavjud statistik ma'lumotlar asosida umumiy tahlil qilindi. Shuningdek, suvni tejovchi texnologiyalar, tomchilatib sug'orish usullarining joriy etilishi va agrotexnik tadbirlarning hosildorlikka ta'siri yoritildi.*

Kalit so'zlar *Buxoro viloyati, tabiiy-geografik sharoit, keskin kontinental iqlim, vegetatsiya davrining davomiyligi, sug'orma dehqonchilik tizimi, tuproq resurslari, bo'z va o'tloqi bo'z tuproqlar, qumloq va sho'rxok tuproqlar, tuproq sho'rlanishi, meliorativ holat, suv resurslaridan foydalanish*

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CURRENT STATUS OF USE OF NATURAL GEOGRAPHICAL COMPLEXES OF BUKHARA REGION

Abstract :*This article analyzes the current natural and geographical conditions of the Bukhara region and their impact on the development of agriculture from a scientific perspective. The study examines the sharply continental climate, the length of the vegetation period, soil composition, availability of water resources, and land reclamation conditions as key factors influencing agricultural development. The current state of major agricultural sectors such as cotton farming, grain production, vegetable growing, melon cultivation, horticulture, and livestock farming is analyzed based on available statistical data. Particular attention is paid to the implementation of water-saving technologies, drip irrigation methods, and agrotechnical measures and their role in improving crop productivity. The results of the study indicate that the natural potential of the Bukhara region provides favorable conditions for sustainable*

agricultural development, while rational use of natural resources contributes to increasing the efficiency of agrarian production

Keywords: *Bukhara region, natural and geographical conditions, sharply continental climate, length of the vegetation period, irrigated farming system, soil resources, sierozem and meadow–sierozem soils, sandy and saline soils, soil salinization, land reclamation condition, use of water resources development.*

KIRISH

Buxoro viloyati O‘zbekistonning janubi-g‘arbiy qismida joylashgan bo‘lib, mamlakatning qadimiy sug‘orma dehqonchilik makonlaridan biri hisoblanadi. Viloyatning tabiiy sharoitlari – iqlim, tuproq tarkibi, suv bilan ta’minlanish darajasi, geologik tuzilishi va landshaft xususiyatlari – qishloq xo‘jaligi sohasining shakllanishiga bevosita ta’sir ko‘rsatib kelgan. Hudud iqlimi keskin kontinental bo‘lib, yil davomida 290–320 kun quyoshli kunlar kuzatiladi, bu esa paxta, g‘alla, poliz mahsulotlari, uzum va issiqsevar mevali daraxtlarning barqaror yetishtirilishi uchun qulay ekologik muhit yaratadi. Vegetatsiya davrining 210–240 kun davom etishi qator ekinlarni ikki martagacha yetishtirish imkonini beradi. Viloyat hududida asosan bo‘z tuproqlar, o‘tloq bo‘z tuproqlar, qisman qumoq va sho‘rxok tuproqlar tarqalgan. Sug‘oriladigan maydonlarda tuproq unumdorligi nisbatan yuqori bo‘lib, zamonaviy meliorativ chora-tadbirlar (zovurlarni chuqurlashtirish, kollektor-drenaj tizimini yaxshilash, sho‘rlanishga qarshi kurash) hosildorlikning o‘sishiga xizmat qilmoqda. Sug‘orish manbalari sifatida Zarafshon daryosi, Amu–Buxoro mashina kanali, Katta Bo‘zsuv, G‘ijduvon va Qorako‘l irrigatsiya tizimlari, shuningdek artezian quduqlar orqali olinadigan yer osti suvlari asosiy o‘rinni egallaydi. Suv resurslarining yetarli bo‘lmasligi qishloq xo‘jaligida suvdan tejamli foydalanish texnologiyalarini – tomchilatib sug‘orish, lazerli tekislash, namlik sig‘imini oshiruvchi agrotexnik tadbirlarni – keng joriy etishni talab qilmoqda. Viloyat qishloq xo‘jaligining asosiy tarmoqlari bo‘lib paxtachilik, g‘allachilik, sabzavotchilik, polizchilik, bog‘dorchilik va chorvachilik hisoblanadi. Paxta yetishtirish Buxoroning tarixiy an’anasi sifatida muhim o‘rin tutadi, chunki hududning issiq va quruq iqlimi tolali mahsulotning sifatini oshiradi. Paxta yetishtirish jarayonida suvdan rejali foydalanish va agrotexnik tadbirlarning ilmiy asosda olib borilishi hosildorlikning barqarorligini ta’minlamoqda. G‘allachilik sohasi ham yuqori natijalar bilan ajralib turadi. Qishki bug‘doy iqlim sharoitiga yaxshi moslashgan bo‘lib, sug‘oriladigan yerlardagi unumdorlikning yuqoriligi g‘alla yetishtirishni viloyat iqtisodiyotining strategik tarmoqlaridan biriga aylantirgan. Sabzavot va poliz mahsulotlari yetishtirishda Buxoro viloyati respublika miqyosida yetakchi hududlardan biridir.

Hududning yuqori issiqligi, vegetatsiya davrining uzunligi va tuproq haroratining barqaror bo‘lishi natijasida poliz ekinlaridan – ayniqsa qovun va tarvuzdan – yillik hosil yuqori bo‘ladi. Bog‘dorchilik tarmog‘ida uzum, anor, bodom, o‘rik kabi issiqsevar mevalar yetishtiriladi. So‘nggi yillarda sanoat bog‘lari maydonining kengayishi, ko‘chatlarni tomchilatib sug‘orish orqali parvarishlash va agrotexnik xizmat ko‘rsatishning yaxshilanishi yuqori sifatli

meva yetishtirilishiga asos bo‘lmoqda. Chorvachilik – ayniqsa qorako‘lchilik – Buxoro viloyatining tarixiy an’analaridan biridir. Cho‘l zonalarining kengligi tabiiy yaylovlarni ta’minlaydi va bu qorako‘l qo‘ylari populyatsiyasini ko‘paytirish uchun qulay sharoit yaratadi. Qorako‘l terisi, qorako‘l go‘shti va jun mahsulotlari viloyat iqtisodiyotida sezilarli o‘rin tutadi. Qoramolchilik, parrandachilik va baliqchilik ham asta-sekin rivojlanib, ichki bozorni mahalliy mahsulotlar bilan ta’minlashda muhim ahamiyat kasb etmoqda. Buxoro viloyati tabiiy sharoitlarining o‘ziga xosligi – ko‘p quyoshli kunlar, issiq iqlim, tuproq turlarining xilma-xilligi, sug‘oriladigan maydonlarning mavjudligi – qishloq xo‘jaligida keng imkoniyatlarni yuzaga keltiradi. Suv resurslaridan oqilona foydalanish, zamonaviy agrotexnologiyalarni joriy etish va meliorativ holatni yaxshilash orqali hosildorlik sezilarli darajada oshib bormoqda. Shuningdek, viloyat qishloq xo‘jaligida mahsulot diversifikatsiyasi, ekologik toza mahsulot yetishtirish va eksport salohiyatini kuchaytirish yo‘nalishlarida ham izchil natijalarga erishmoqda. Umuman olganda, Buxoro viloyatining tabiiy holati va agrar salohiyati uning qishloq xo‘jaligini nafaqat respublika, balki mintaqaviy miqyosda ham muhim o‘ringa ega hudud sifatida shakllantirmoqda. Iqlimning qulayligi, tuproq resurslarining moslashuvchanligi va suv ta’minotining tizimli tashkil etilishi viloyatda paxta, g‘alla, sabzavot-poliz, bog‘dorchilik va chorvachilik mahsulotlarini yuqori sifat bilan yetishtirishga imkon bermoqda. Qishloq xo‘jaligida paxtachilik va g‘allachilik asosiy o‘rin tutadi, chorvachilik, sabzavotchilik tarmoqdari ham muhimdir. Sug‘oriladigan 22,1 ming ga yerning 10,8 ming gektariga paxta, 7,2 ming gektariga don, 3,1 ming gektariga yem-xashak ekinlari, shuningdek, kartoshka, sabzavot ham ekiladi.

Yovvoyi hayvonlardan jayron, chiyabo‘ri, yumronqoziq va boshqalar, sudralib yuruvchilardan bo‘g‘ma ilon, ko‘lvor ilon, echkemar, kaltakesak, agama, toshbaqa, dasht tipratikani; qushlardan tuvaloq, kaklik, zarafshon qirg‘ovuli, burgut, qora bovur, oq bovur, uchraydi. Tuproq resurslarining xilma-xilligi va meliorativ holatning bosqichma-bosqich yaxshilanib borishi hosildorlik ko‘rsatkichlarining barqaror o‘sishiga xizmat qilmoqda. Tadqiqot natijalari shuni ham ko‘rsatadiki, suv resurslarining cheklanganligi sharoitida suvni tejovchi texnologiyalar, xususan tomchilatib sug‘orish usullarining joriy etilishi qishloq xo‘jaligi ishlab chiqarish samaradorligini oshirishda muhim ahamiyat kasb etmoqda. Zamonaviy agrotexnik tadbirlar va ilmiy asoslangan dehqonchilik usullaridan foydalanish natijasida qishloq xo‘jaligi mahsulotlarining sifati va hajmi ortib, hududning eksport salohiyati mustahkamlanmoqda. Umuman olganda, Buxoro viloyatining tabiiy salohiyati va agrar resurslaridan oqilona foydalanish qishloq xo‘jaligini barqaror rivojlantirishning asosiy omili bo‘lib, kelgusida ekologik barqarorlikni ta’minlash, yer va suv resurslarini muhofaza qilish hamda innovatsion texnologiyalarni keng joriy etish hudud agrar sohasining yanada rivojlanishiga xizmat qiladi.

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AMUDARYONING SURXONDARYO VILOYATI XO‘JALIK TIZIMLARIDAGI AHAMIYATI

Annotatsiya. *Ushbu maqolada Amudaryoning Surxondaryo viloyati xo‘jalik tizimlaridagi ahamiyati tahlil qilinadi. Daryoning gidrologik xususiyatlari, suv rejimi, irmoqlari va suv resurslaridan foydalanish yo‘nalishlari o‘rganilgan. Shuningdek, sug‘orish, gidroenergetika va ekologik muammolar, jumladan Orol dengizi bilan bog‘liq holatlar ilmiy asosda yoritilgan. Tadqiqot natijalari Amudaryo suv resurslaridan oqilona foydalanish zarurligini ko‘rsatadi.*

Kalit so‘zlar. *Amudaryo, Surxondaryo viloyati, suv resurslari, sug‘orish, gidrologiya, xo‘jalik tizimi, Orol dengizi.*

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THE IMPORTANCE OF THE AMU DARYA RIVER IN THE ECONOMIC SYSTEMS OF SURKHANDARYA REGION

Abstract. *This article analyzes the importance of the Amu Darya River in the economic systems of the Surkhandarya region. The hydrological characteristics of the river, water regime, tributaries, and directions of water resource utilization are studied. In addition, issues of irrigation, hydropower, and environmental problems, including those related to the Aral Sea, are scientifically discussed. The results of the study indicate the necessity of rational use of the Amu Darya water resources.*

Keywords: *Amu Darya, Surkhandarya region, water resources, irrigation, hydrology, economic system, Aral Sea.*

Amudaryo qadimiy davrlarda yunonlar tomonidan **Oks (Oxus)** nomi bilan atalgan bo‘lib, mahalliy aholi orasida u **Jayhun** nomi bilan mashhurdir. Mazkur daryo Markaziy Osiyodagi eng yirik suv arteriyalaridan biri hisoblanadi. Uning umumiy uzunligi taxminan 2400–2540 km ni tashkil etadi, drenaj havzasi esa 309 000 km² maydonni egallaydi.

Amudaryo Tojikiston Respublikasining Pomir tog‘lari etaklarida joylashgan Panj va Vaxsh daryolarining qo‘shilishidan hosil bo‘lib, O‘zbekiston, Afg‘oniston va Turkmaniston hududlari orqali oqib o‘tadi hamda Orol dengiziga quyiladi. Panj va Vaxsh daryolarining qo‘shilishi natijasida shakllangan Amudaryo Orol dengizi havzasidagi eng yirik va suv sarfi bo‘yicha eng katta daryolardan biri hisoblanadi.

Daryoning o‘rta oqimiga o‘ng tomondan Kofirnigon, Surxondaryo va Sherobod daryolari, chap tomondan esa Qunduz daryosi quyiladi. Quyi oqimda, ya’ni Orol dengizi tomon yo‘nalishda esa yirik irmoqlar deyarli mavjud emas. Amudaryo asosan muzlik va qor suvlaridan oziqlanadi, shu sababli suv sarfining maksimal qiymatlari yoz oylariga, minimal ko‘rsatkichlari esa yanvar–fevral oylariga to‘g‘ri keladi. Bunday gidrologik rejim daryo suvlaridan sug‘orish maqsadlarida samarali foydalanish imkonini yaratadi.

Kerkidan Nukusgacha bo‘lgan tekislik hududlarida daryo oqimining sezilarli qismi bug‘lanish, infiltratsiya hamda sug‘orish tizimlarida foydalanish natijasida yo‘qotiladi. Shu bilan birga, Amudaryo cho‘kindi tashish hajmi bo‘yicha dunyodagi yetakchi daryolardan biri hisoblanadi.

Amudaryo Markaziy Osiyoning eng yirik daryolaridan biri bo‘lib, uning yuqori qismi Tojikiston va O‘zbekistonning Afg‘oniston bilan chegarasi bo‘ylab oqadi. Daryoning umumiy uzunligi 2540 km ni (Vahjir–Vohondaryo bilan birga), havzasining maydoni esa qariyb 465 ming km² ni tashkil etadi. Shundan 227,3 ming km² qismi suv to‘playdigan tog‘li hududlarga to‘g‘ri keladi.

Amudaryo Afg‘oniston hududida Hindukush tog‘larining shimoliy yonbag‘rida, dengiz sathidan taxminan 4950 m balandlikdagi muzliklardan boshlanadi. Vohondaryo Pomirdagi Zo‘rko‘l hududidan boshlanuvchi Pomir daryosi bilan qo‘shilgach, Panj daryosi nomini oladi. Panj daryosiga o‘ng tomondan G‘unt, Bartang, Yazg‘ulom, Vanj va Qizilsuv irmoqlari kelib qo‘shiladi. Eng yirik va sersuv irmoq — Vaxsh daryosi qo‘shilgandan so‘ng daryo Amudaryo nomi bilan ataladi. Bu qismda unga chap tomondan Qunduzdaryo, o‘ng tomondan esa Kofirnigon va Surxondaryo daryolari quyiladi. Sheroboddaryo suvi Amudaryoga kamdan-kam yetib boradi, Ko‘hitangdaryo suvlari esa asosan sug‘orishga sarflanadi. Surxondaryo qo‘shilgandan keyin Amudaryo Orol dengizigacha bo‘lgan 1200 km dan ortiq masofada yirik irmoqlar qabul qilmaydi. Zarafshon va Qashqadaryo esa tarixan Amudaryoning qadimgi irmoqlari bo‘lib, hozirgi vaqtda ularning suvlari to‘liq sug‘orishga yo‘naltirilgan.

Amudaryoning asosiy suv rejimi uning yuqori, tog‘li qismida shakllanadi. Bu hududda daryo tor, chuqur va katta nishabli o‘zan orqali oqib o‘tadi. O‘zan har bir kilometrda o‘rtacha 4 m, ayrim joylarda esa 10 m dan ortiq pasayadi. Shu sababli oqim tezligi yuqori bo‘lib, 4–6 m/s ni tashkil etadi. Daryo vodiysi ham tor bo‘lib, ko‘pincha tik qoyali tog‘lar orasidan o‘tadi. Vodiy kengligi odatda 3–4 km dan oshmaydi, ayrim joylarda esa qayirlar shakllanib, ular ko‘pincha to‘qayzorlar bilan qoplangan. Qizilsuv, Vaxsh, Kofirnigon va Surxondaryo qo‘shiladigan hududlarda vodiy kengayib, allyuvial terrasalarda dehqonchilik rivojlangan.

Surxondaryo quyilgandan so‘ng Amudaryo tekislik hududlariga chiqadi va Karki–Pitnak oralig‘i daryoning o‘rta oqimi sifatida qaraladi. Bu qismda daryo Qoraqum va Qizilqum cho‘llari orqali oqib, Orol dengiziga yo‘naladi. O‘rta oqimda o‘zan kengligi o‘rtacha 1500 m ni tashkil etadi, nishabi esa keskin kamayib, har kilometrda 0,2–0,3 m ni tashkil etadi. Oqim tezligi 2–3 m/s atrofida bo‘lib, bu daryoning o‘zani va qirg‘oqlarining muntazam yemirilishiga sabab bo‘ladi. Shu tufayli o‘zan doimiy ravishda o‘zgarib turadi. Ayniqsa, Xorazm

vohasi va Qoraqalpog‘iston hududlarida (Urganch, Ellikqal’a) qirg‘oqlarning yemirilishi — **deygish** hodisasi keng tarqalgan. Tuyamo‘yin suv ombori qurilgandan so‘ng ushbu jarayonning intensivligi ma’lum darajada kamaygan.

Qish mavsumida daryoning yuqori oqimida qirg‘oq yaqin qismlari muzlab, qisqa muddatli muz oqimlari kuzatiladi. Karki shahri yaqinida sovuq yillarda daryo 10–15 kun davomida to‘liq muzlaydi, Chorjo‘y va undan quyi hududlarda esa muzlash davri yanada uzoq davom etadi. Nukusdan quyi qismda daryo deyarli to‘rt oy davomida muz bilan qoplanadi. Bahor faslida, ayniqsa tor va burilishli uchastkalarda muz tiqilishi natijasida suv sathi keskin ko‘tarilib, toshqinlar yuzaga kelishi mumkin.

Tekislik hududlarida Amudaryo vodiysining eni odatda 10–15 km, ayrim joylarda esa 20–25 km gacha yetadi. Vodiy kengaygan hududlarda uchta terrasa shakllangan. Tog‘ oralig‘idagi tor qismlarda vodiy eni 350–380 m gacha qisqaradi. Pitnak yaqinida Tuyamo‘yin, o‘rta oqimda Duldulhatlagan va Eljik qisig‘lari mavjud. Tekislik hududlarida daryo sohillari bo‘ylab eni 2–3 km ga yetadigan qumli qayirlar uchraydi.

Amudaryoning quyi oqimi Pitnak yaqinidagi Tuyamo‘yin qisig‘idan Orol dengizigacha bo‘lgan hududni qamrab oladi. Uning umumiy uzunligi taxminan 500 km bo‘lib, shundan 325 km qismi Nukus va Orol dengizi oralig‘idagi hozirgi delta hududiga to‘g‘ri keladi.

Amudaryo sersuv daryo bo‘lib, asosan muzlik va qor suvlari hisobiga to‘yinadi. Uning havzasida 1000 ga yaqin muzliklar mavjud bo‘lib, ular orasida Yer sharidagi eng yirik tog‘-vodiy muzliklaridan biri — Fedchenko muzligi alohida o‘rin tutadi. Shuningdek, suv yig‘ish havzasida katta maydonlarni qor dalalari egallaydi.

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THE ROLE OF AI-INTEGRATED IOMT SYSTEMS IN REVOLUTIONIZING PATIENT HEALTH MONITORING

Abstract: *The integration of Artificial Intelligence (AI) with the Internet of Medical Things (IoMT) is fundamentally transforming the landscape of modern healthcare by shifting the focus from reactive treatment to proactive prevention. This article explores the synergistic relationship between AI algorithms and IoMT devices in the context of remote patient monitoring. While IoMT facilitates the continuous, real-time collection of vital physiological data, AI provides the analytical power to process these vast datasets, identifying subtle patterns and anomalies that human observation might miss. We examine the applications of these integrated systems in managing chronic diseases such as cardiovascular conditions and diabetes, highlighting their role in early diagnosis and personalized care. The study concludes that AI-integrated IoMT systems represent a pivotal advancement in creating efficient, predictive, and patient-centered healthcare ecosystems.*

Keywords: *IoMT, Artificial Intelligence, Patient Monitoring, Telemedicine, Predictive Analytics, Healthcare, Big Data.*

Introduction

The global healthcare landscape is facing unprecedented challenges, including an aging population, rising prevalence of chronic diseases, and escalating costs. In response, the industry is transitioning from a "break-fix" model—treating patients only after they become ill—to a proactive model focused on prevention and continuous management. Central to this transition is the concept of Healthcare 4.0, which leverages the Internet of Things (IoT) and Artificial Intelligence (AI).

The Internet of Medical Things (IoMT) refers to a connected infrastructure of medical devices, software applications, and health systems and services. While IoMT devices excel at data acquisition—capturing vital signs like heart rate, blood glucose levels, and oxygen saturation in real-time—they generate an

overwhelming volume of data. This data, often termed "Big Data," is too complex and voluminous for human clinicians to interpret manually in real-time.

This is where Artificial Intelligence becomes indispensable. By integrating AI into the IoMT ecosystem, we create intelligent systems capable of analyzing data at the edge or in the cloud to detect anomalies, predict health events, and provide actionable insights. This paper aims to critically analyze the role of AI-integrated IoMT systems in revolutionizing patient monitoring, exploring the technological synergy, practical applications, and the hurdles that remain.

Methodology

This article utilizes a Secondary Research Methodology, specifically a Qualitative Systematic Literature Review. The primary objective is to synthesize existing knowledge regarding the integration of AI and IoMT in patient monitoring.

Data Collection: Data was gathered from leading academic databases, including IEEE Xplore, PubMed, SpringerLink, and ScienceDirect. The search keywords included "AI in IoMT," "Smart Healthcare Monitoring," "Wearable Sensors," "Deep Learning in Telemedicine," and "Predictive Analytics in Healthcare."

Selection Criteria. Articles were selected based on the following criteria:

Published between 2018 and 2023 to ensure relevance.

Focus specifically on the integration of AI with sensor technology for monitoring.

Discussion of either clinical outcomes or technological architecture.

Analysis Approach. The selected papers were analyzed thematically. The key themes identified included: System Architecture, Predictive Capabilities, Clinical Applications, and Ethical/Security Challenges. This thematic analysis forms the structure of the "Main Part" of this article.

Main Part: Analysis and Discussion

This section delves into the mechanics, applications, and impacts of AI-integrated IoMT systems.

Technological Architecture: From Sensor to Insight

An effective AI-integrated monitoring system typically follows a four-layer architecture:

Perception Layer: This consists of the physical IoMT devices (wearables, implants). These sensors capture raw physiological signals.

Network Layer: Data is transmitted via Bluetooth, Wi-Fi, or 5G to a gateway or the cloud. The advent of 5G is critical here, as highlighted in recent literature, due to its low latency and high bandwidth required for real-time monitoring.

Processing Layer (Middleware): This is where the AI resides. Data may be processed at the "Edge" (on the device itself) to save battery and reduce latency, or in the "Cloud" for deep analysis.

Application Layer: The insights are presented to stakeholders—doctors, patients, or emergency responders—via dashboards or mobile alerts.

The integration of AI allows the Processing Layer to distinguish between "noise" (e.g., a sensor moving due to exercise) and "signal" (e.g., an arrhythmia).

Conclusion

The integration of Artificial Intelligence with the Internet of Medical Things represents a paradigm shift in healthcare delivery. This article has demonstrated that AI-IoMT systems transform passive data collection into active, intelligent health management. By enabling real-time monitoring, early diagnosis, and predictive analytics, these systems offer a solution to the growing pressures on global healthcare systems.

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ARTISTIC AND FIGURATIVE DEVICES FOR EXPRESSING TRAGEDY IN MODERN UZBEK POETRY

Abstract: *This article presents a comprehensive study of the artistic and aesthetic interpretation of the concept of tragedy in modern Uzbek poetry. The research focuses on the poetry of Zebo Mirzo, Halima Ahmad, analyzing the mechanisms of tragic worldview formation and the poetic means of expression in their works. The study first elucidates the aesthetic-philosophical essence of the concept of tragedy and highlights its transformation within the contemporary literary process. Subsequently, the functional characteristics of key artistic-descriptive tools that generate tragic pathos in the works of these poets—such as metaphor, symbol, antithesis, personification, and poetic contrast—are identified.*

Keywords: *tragedy, tragic pathos, metaphor, symbol, antithesis, poetic image, modern poetry.*

Introduction

Modern Uzbek poetry holds particular significance in today's literary process as an aesthetic system striving to reflect the most subtle, complex, and contradictory layers of the human psyche. Notably, in post-independence poetic thought, there has been an intensified tendency to delve deep into the internal world of the lyrical subject, elevating individual experiences and emotions to the level of artistic generalization. From this perspective, modern Uzbek women's poetry emerges as an important poetic space expressing human suffering, spiritual loneliness, existential angst, and identity crises. Specifically, in the works of Zebo Mirzo, Halima Ahmad, the phenomenon of tragedy is expressed through individual psychological experiences, gradually ascending to the level of universal human concerns. In the poetry of these authors, tragedy is interpreted not merely as a result of external reality, but as a process closely linked to internal conflicts, spiritual fragmentation, and the search for the meaning of existence. Tragedy is not simple grief or distress; as an aesthetic category, it reflects the human encounter with existence, the sharp disproportion between dream and reality, and the conflict between ideal and real life. In this regard, tragedy is viewed as a profound artistic-philosophical concept representing the ontological and existential state of the individual. In modern poetry, this concept is increasingly individualized, finding expression through the internal monologue, silence, and anguish of the lyrical "I." [1].

One of the most crucial factors in the emergence of the tragic in the works of modern female poets is the active and purposeful employment of artistic-

descriptive means. It is precisely through language and poetic form that internal suffering is transformed into an image, and individual experience is generalized as an aesthetic phenomenon. Tools such as metaphor, symbol, antithesis, and personification do not merely perform descriptive functions; they serve as the primary poetic mechanisms shaping a tragic worldview. Consequently, through metaphor, a psychological state takes on an imaginary form; through symbols, individual suffering is universalized; and through antithesis, internal contradictions and conflicts are sharpened. As a result, tragedy manifests within the poetic text not only at the level of content but also within its language and structure. This defines the aesthetic complexity and multi-layered nature of modern poetry [2].

Methodology

This research is aimed at a comprehensive study of the artistic-descriptive means of expressing tragedy in modern Uzbek women's poetry, utilizing a series of complementary scientific methods. The methodological foundation of the study comprises modern theoretical approaches in literary criticism, specifically poetic analysis, the comparative approach, aesthetic interpretation, and structural-semantic analysis.

The subjects of the research are the poetic works of Zebo Mirzo, Halima Ahmad, and Nodira Ofoq. Their creative output serves as leading examples of modern Uzbek women's poetry, allowing for the observation of the tragic worldview across various poetic forms. Poems created during different periods were selected as research material, and the descriptive tools generating tragedy within them were systematically analyzed.

Primarily, the method of poetic analysis was employed. Through this method, the components constituting the internal structure of the poetic text—image systems, artistic-descriptive means, poetic syntax, and semantic layers—were studied in depth. Poetic analysis enabled the identification of how tragedy is formed directly at the level of language and image. Furthermore, the comparative method was extensively utilized to identify similarities and differences in the works of the three poets, revealing individual stylistic features in the expression of tragedy. Comparative analysis showed that while metaphorical thinking prevails in Zebo Mirzo's poetry, a system of symbolic images leads in Halima Ahmad's work, and tragedy is intensified through antithetical construction and contrasts in Nodira Ofoq's poetry.

Additionally, the aesthetic analysis method plays a vital role in the study. This method was used to examine the aesthetic essence of tragedy, its mechanism of impact on the reader, and the process of forming tragic pathos. Finally, structural-semantic analysis was applied to determine the semantic load of the descriptive means used in the poetic text, their contextual meanings, and their interrelationships.

Results

In modern Uzbek poetry, the work of Halima Ahmad stands out for its profound and multi-layered expression of the concept of tragedy. In her poems,

tragedy is primarily conveyed through symbolic imagery, where personal emotions acquire a generalized aesthetic significance [3,4].

First and foremost, the poet's lines associated with the "I am nobody" motif play a crucial role in expressing the identity crisis of the lyrical subject:

"Dada, to'g'ri, hech kimmasman,
She'rlar yozdim dil yig'latib..."
("Father, it is true, I am nobody,
I wrote poems that made the soul weep...")

In these lines, the self-negation of the lyrical "I," the devaluation of selfhood, and a palpable sense of losing one's place in society are clearly manifested. This meaning deepens in the subsequent verses:

"Bir toshicha bo'lolmadim,
Ko'zingizda ko'z yoshicha bo'lolmadim... "
("I could not even become as much as a stone,
I could not even become a tear in your eye...")

Here, the "stone" image represents stability and resilience, while the "tear" symbolizes anguish and pain. The lyrical subject perceives herself as inadequate even at the level of suffering. Consequently, the individual's sense of worthlessness and alienation from existence acquires a tragic-aesthetic significance [4].

Another vital expression of tragedy in the poet's work is linked to the image of the "crane" (turna), appearing as a symbol of memory and longing:

"Turnalar ovozi meni uyg'otdi,
Sarg'aygan bir ilinj o'rtabmi jonni..."
"The voice of the cranes awakened me,
Has a yellowed hope scorched my soul?.."

In these lines, while the "crane" represents past memories and lost emotions, the "yellowed hope" (sarg'aygan ilinj) signifies the fading of aspirations. The question posed in the poem:

"Baxt bilan yashashga kechikdimmi yo? " ("Am I too late to live with happiness?") expresses the lyrical hero's sense of tardiness regarding her own life and the tragedy of unfulfilled potential. Here, tragedy manifests as a tragic experience intertwined with the factor of time [5].

Furthermore, the "autumn leaf" (xazon) serves as a significant symbol of tragedy in Ahmad's poetry:

"Salom, boshim uzra aylangan xazon,
Yam-yashil umidlar, xayr endi, xayr... "
("Greetings, autumn leaf circling above my head,
Lush green hopes, farewell now, farewell...")

In these verses, the "autumn leaf" signifies the fading of life force and spiritual depression, while "green hopes" symbolize youth and dreams. The juxtaposition of these images intensifies the tragic element, expressing the loss of hope, internal collapse, and the process of spiritual aging [6].

In Z.Mirzo's poetry, tragedy is frequently expressed through the motif of love, revealed through poetic images of metaphorical and emotional power:

"Yuragimga bosib uxlasam
Yodingizni, diydoringizni.
Bolam kabi quchib yig'lasam
Menga bergan ozoringizni..."
("If I sleep pressing to my heart
Your memory, your countenance.
If I weep, embracing like my child
The torment you have given me...")

In these lines, the lyrical subject portrays love and anguish as an inseparable duality. Specifically, through the expression "embracing the torment while weeping," love is harmonized with pain. Here, the tragic element manifests as the acceptance of spiritual pain brought by love and the profound inability to abandon it [7].

As the poem progresses, the metaphorical imagery intensifies:

"Kaftingizda ochilsam gulday,
Tuningizning mohi men bo'lsam,
Hech kimsaga bildirmay chekkan,
Ko'ksingizning «oh»i men bo'lsam."
("If I bloom like a flower in your palm,
If I were the moon of your night,
If I were the 'sigh' within your chest,
Drawn without letting anyone know.")

In this context:

"Flower" (gul) → A symbol of love and delicacy.
"Moon" (moh) → An embodiment of beauty and intimacy.
"Sigh" (oh) → A sign of hidden, internalized suffering.

The poet transforms herself into the internal pain of the beloved. This represents the process of the loss of self and the merging into the identity of another through love [8].

"Nafasingiz titroqlaridan
Oqib ketsa ming yillik g'ussam."
("If my thousand-year-old grief flows away
From the tremors of your breath.")

Through this metaphor, long-standing anguish, accumulated pain, and internal spiritual pressure are expressed. The phrase "thousand-year-old grief" (ming yillik g'ussa) generalizes the tragedy to its maximum aesthetic extent [9].

In the final section of the poem, the tragic content reaches its absolute zenith:

"Bag'ringizga borib o'lsamu
Bag'ringizdan qaytib kelmasam.. ."
("If only I could go and die in your embrace,
And never return from your embrace...")

These lines express tragedy through the convergence of love and death. For the lyrical hero, love is no longer a source of life, but a sentiment that leads to self-obliteration and the threshold of non-existence.

Discussion

The research results confirm that artistic-descriptive means play a decisive role in the expression of tragedy within modern Uzbek women's poetry. Specifically, through the works of Halima Ahmad and Zebo Mirzo, it is observed that tragedy manifests in diverse poetic forms.

In Halima Ahmad's poetry, the symbolic nature of tragedy indicates a dominant trend toward generalization in her poetic thought. The images she employs—such as the "window," "crane," and "autumn leaf"—allow individual emotions to be interpreted in a broader context. Consequently, personal anguish is reframed as a universal human spiritual state, signaling the philosophization of tragedy in contemporary poetry.

In Zebo Mirzo's work, tragedy is expressed more through individual psychological experiences. Especially in poems related to the motif of love, tragedy is revealed through internal spiritual distress, dependency, and the loss of self. The abundance of metaphorical images allows for a deeper depiction of the lyrical subject's inner world, reflecting the increasing psychological depth in modern verse.

A crucial point identified during the discussion is that in the works of both poets, tragedy is formed not on the basis of external dramatic events, but through internal spiritual conflicts. Unlike classical tragedy, this creates an internalized form of the tragic in modern poetry. Furthermore, poetic devices like metaphor and symbol do not merely serve descriptive functions; they become the primary mechanisms shaping the tragic content, thereby increasing the semantic load of poetic language.

Conclusion

The study demonstrates that tragedy manifests as a significant aesthetic phenomenon in modern Uzbek women's poetry. Based on the analysis of Halima Ahmad and Zebo Mirzo's works, distinct forms of artistic expression were identified:

Halima Ahmad utilizes symbolic imagery to elevate personal suffering to a universal human level, giving tragedy a profound and generalized meaning.

Zebo Mirzo reveals tragedy through individual experiences, particularly through the interplay of love and anguish, using metaphorical images to uncover the complexities of the inner world.

In the works of both poets, tragedy is rooted in internal psychological states rather than external occurrences, which stands as a defining feature of modern poetry. In conclusion, tragedy in modern Uzbek women's poetry emerges as a vital aesthetic category that expresses the complex states of the human psyche through sophisticated artistic means.

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IMKONIYATI CHEKLANGANLAR UCHUN INKLYUZIV TURIZM MODELINING NAZARIY ASOSLARI

Annotatsiya: *Ushbu maqolada imkoniyati cheklanganlar uchun inklyuziv turizm modelini ishlab chiqishning nazariy asoslari, matematik modeli va algoritmlari tahlil qilinadi. Tadqiqot doirasida 60 dan ortiq sayyohlik obyekti ma'lumotlari asosida ekonometrik tahlil o'tkazildi. Vaqtli qator funksiyasi orqali inklyuziv turizmning o'sish tendensiyasi aniqlandi. Mavjudlik indeksi va mijoz qoniqish darajasi o'rtasidagi bog'liqlik aniqlandi.*

Kalit so'zlar: *inklyuziv turizm, nogironlik, mavjudlik indeksi, ekonometrik tahlil, vaqtli qator, mijoz, algoritm.*

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THEORETICAL BASIS OF THE INCLUSIVE TOURISM MODEL FOR PEOPLE WITH DISABILITIES

Abstract: *This article analyzes the theoretical foundations, mathematical models and algorithms for developing an inclusive tourism model for people with disabilities. As part of the study, an econometric analysis was conducted based on data from more than 60 tourist facilities. The growth trend of inclusive tourism was determined using the time series function. The relationship between the availability index and the level of customer satisfaction was determined.*

Keywords: *inclusive tourism, disability, availability index, econometric analysis, time series, customer, algorithm.*

Kirish

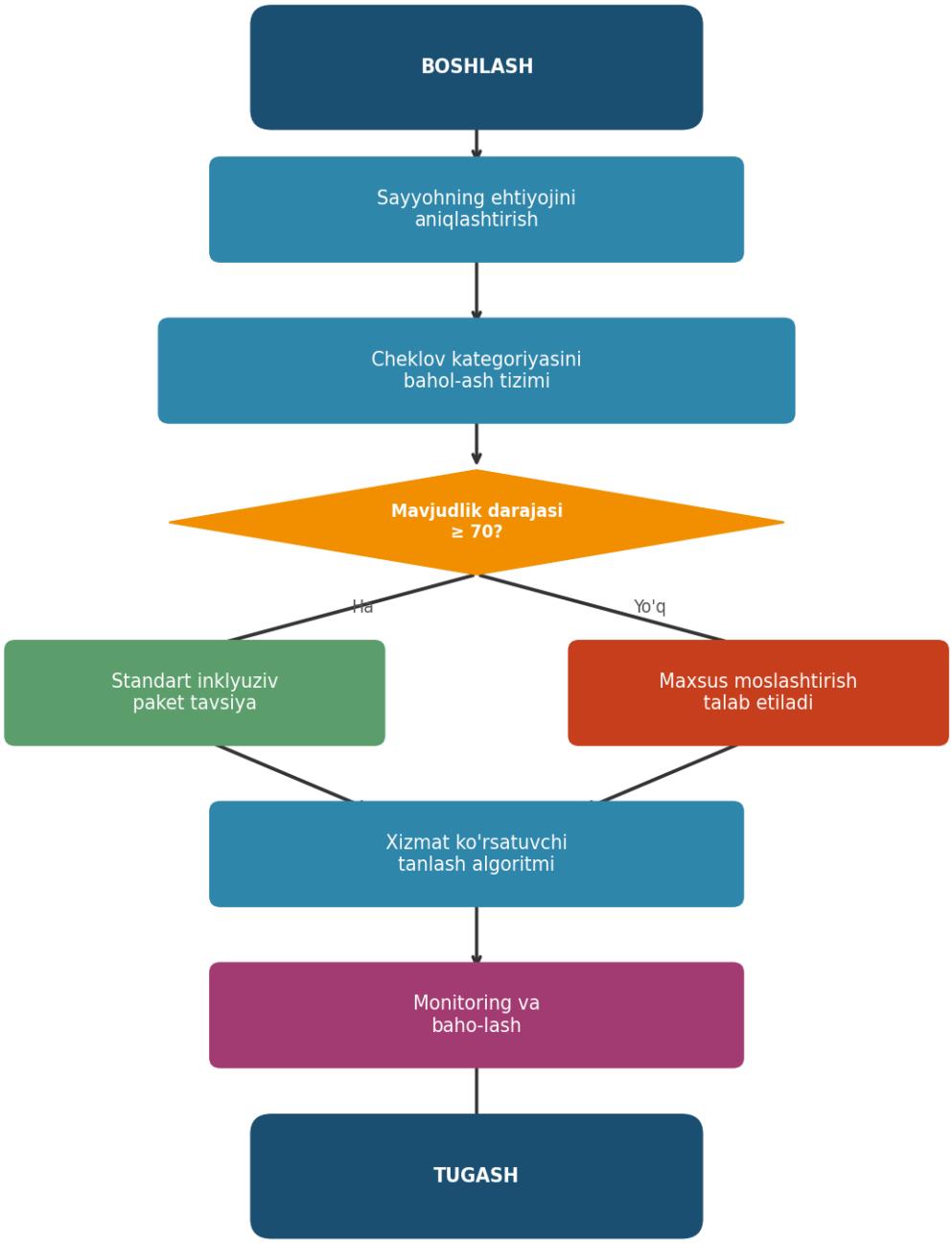
Jahon Sog'liqni Saqlash Tashkiloti (JST) ma'lumotlariga ko'ra, dunyo aholisining 15% dan ortiq qismi, ya'ni 1 milliarddan ziyod inson, turli xil nogironlik yoki cheklangan imkoniyatlar bilan yashaydi. Ushbu guruh vakillarining turizm faoliyatiga to'liq qo'shilishi nafaqat ijtimoiy, balki iqtisodiy ahamiyat kasb etadi. Inklyuziv turizm — bu barcha sayyohlarning, jumladan, imkoniyati cheklanganlarning, keksalarning va boshqa zaif guruhlarning

ehtiyojlarini hisobga olgan holda tashkil etilgan turizm shaklidir. O‘zbekiston 2022–2026 yillardagi “Raqamli O‘zbekiston” va “Faol tadbirkorlik, innovatsion g‘oyalar va texnologiyalar yili” dasturlari doirasida turizm sohasini rivojlantirish bo‘yicha keng ko‘lamli islohotlar amalga oshirmoqda. Shunga qaramay, imkoniyati cheklanganlar uchun inklyuziv turizm infratuzilmasi hali to‘liq shakllanmagan.

Adabiyotlar tahlili va tadqiqot metodologiyasi

Inklyuziv turizm tushunchasi dastlab 1980-yillarda “Universal dizayn” konsepsiyasi doirasida shakllanib, keyinchalik BM-ning 2006-yildagi Nogironlar huquqlari to‘g‘risidagi Konventsiyasi bilan mustahkamlandi. Darcy va Dickson (2009) uni “barcha sayyohlar uchun tenglik asosida qurilgan turizm tizimi” deb ta’riflagan. Bi va Anning (2019) tadqiqotida 5 ta asosiy o‘lcham aniqlandi:

1 jismoniy mavjudlik, 2 axborot mavjudligi, 3 ijtimoiy qo‘shilish, 4 iqtisodiy qulaylik, va 5 xodimlarning malakasi. Ushbu o‘lchamlar keyingi modellarda keng qo‘llanildi. Turizm talab funktsiyasini modellashtirish uchun zamonaviy iqtisodiy nazariya bir necha yondashuvni taklif etadi. Eng keng tarqalgani — Logit va Panel Data modellari. Inklyuziv turizm kontekstida Accessible Tourism Index (ATI) metodikasi qo‘llanilishi maqsadga muvofiq.



1-rasm. Inklyuziv turizm xizmatini tanlash algoritmining

Inklyuziv turizm xizmatini maqbul tanlash uchun ko‘p mezonli qaror qabul qilish algoritmi ishlab chiqildi. Algoritm 7 asosiy bosqichdan iborat:

1. Sayyohning ehtiyojlarini aniqlash (Profil to‘ldirish moduli)
2. Cheklov kategoriyasini aniqlash (Klassifikatsiya moduli)
3. IMI hisoblash (Baholash moduli)
4. Mavjudlik darajasini tekshirish (IMI ≥ 70 sharti)
5. Xizmat turini tanlash (Mos xizmat tanlash moduli)
6. Xizmat taqdim etish (Yetkazib berish moduli)
7. Monitoring va baholash (Qayta aloqa moduli)

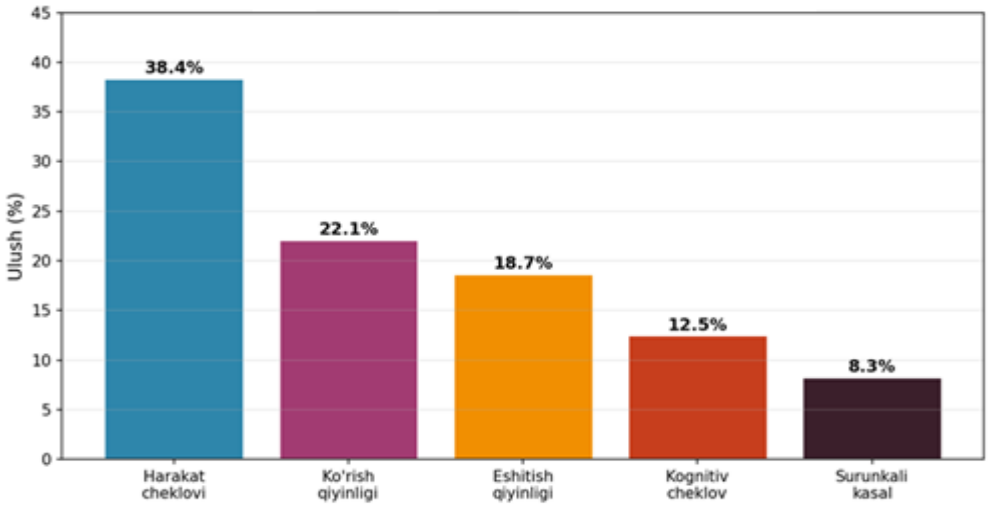
Tadqiqot jarayonida O‘zbekiston va qo‘shni davlatlardagi imkoniyati cheklangan sayyohlar so‘rovnomasi tahlil qilindi. Respondentlar quyidagi kategoriyalarga ajratildi:

1-jadval

Imkoniyati cheklanganlar kategoriyalari bo‘yicha statistika

Kategoriya	Ulush (%)	O‘rtacha yoshi	Xizmat zarur	IMI o‘rtacha
Harakat cheklovi	38.4%	52.3 yosh	Wheelchair, lift	61.2
Ko‘rish qiyinligi	22.1%	48.7 yosh	Audio gid, Brayl	58.4
Eshitish qiyinligi	18.7%	44.1 yosh	Ishoraviy til	63.8
Kognitiv cheklov	12.5%	39.2 yosh	Maxsus gid	52.1
Surunkali kasal	8.3%	61.5 yosh	Tibbiy yordam	55.7
Jami	**100%**	**49.2 yosh**	**—**	**58.2**

Shuni alohida ta’kidlab o‘tish kerakki, qiyinligi kategoriyasida IMI eng yuqori (63.8) bo‘lishiga qaramay, o‘rtacha yosh nisbatan past — bu holat erta yoshdan keyin sog‘likka e’tibor qaratish zarurligini ko‘rsatadi. Surunkali kasal guruhi esa eng keksa bo‘lgani sababli, tibbiy yordam bilan birga ijtimoiy qo‘llab-quvvatlash ham muhim ahamiyatga ega

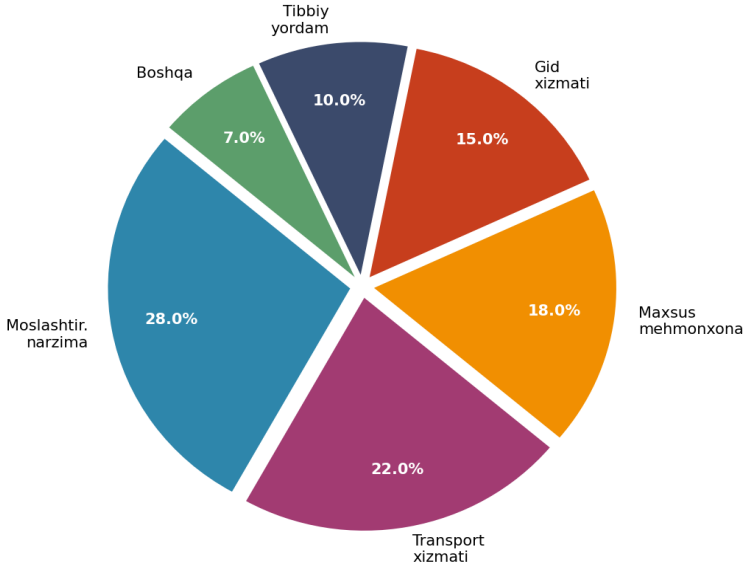


2-rasm Imkoniyati cheklanganlar kategoriyalari bo‘yicha taqsimot

Tadqiqot manbalariga ko‘ra besh asosiy kategoriyaga bo‘linadi: Eng katta guruhni ***harakat cheklovi*** tashkil qilinadi (38,4%). Bu shuni anglatadiki, nogironlikning sababi jismoniy harakatsizlik bo‘lib, bu holat boshqa barcha kategoriyalarni birgalikda qo‘shgandan ham ko‘proq. Demak, muhitni moslashtirishda avvalo harakatlanishga doir to‘siqlarni bartaraf etish — pandus, lift, maxsus yo‘lak kabi infratuzilmani rivojlantirish — barqaror yo‘nalish bo‘lishi kerak. Ikkinchi va barqaror o‘rinlarda mos keladigan ***ko‘rish qiyinchilik*** (22,1%) va ***eshitish qiyinligi*** (18,7%) turadi. Bu ikki kategoriya umumiy umumiy sonning 40% dan ortig‘ini tashkil etadi, ya’ni sezgi a’zolariga bog‘liq yordam ham juda keng tarqalgan muammo. ***Kognitiv cheklov*** (12,5%) va ***surunkali kasallik*** (8,3%) miqdorida kichik ulushni egallasada, bu raqamdagi insonlar alohida e’tibor va

maxsus sog‘liqni saqlash talablarini oladi, chunki e’tibordan chetda qolishi mumkin.

Umuman olganda, tarkib bo‘yicha turistlar tarkibi xilma-xil, har bir kategoriya o‘ziga xoslikni talab qiladi.



3-rasm. Inklyuziv turizm xizmatlari turlari bo‘yicha ulush taqsimoti

Tahlil natijalari shuni ko‘rsatadiki xizmat ko‘rsatish bir o‘lchamli muammo emas. Muhit, transport, turar joy, axborot, axborot va boshqa sohalarda kompleks talab qilish. Biror bir sohadagi kamchilik butun tizimni saqlashni pasaytirishi mumkin. Shu bois davlat dasturlari, xususiy sektor investitsiyalari va fuqarolik jamiyati sa’y-harakatlari bilan bog‘liq holda amalga oshirilgan haqiqiy muhit yaratilishi mumkin.

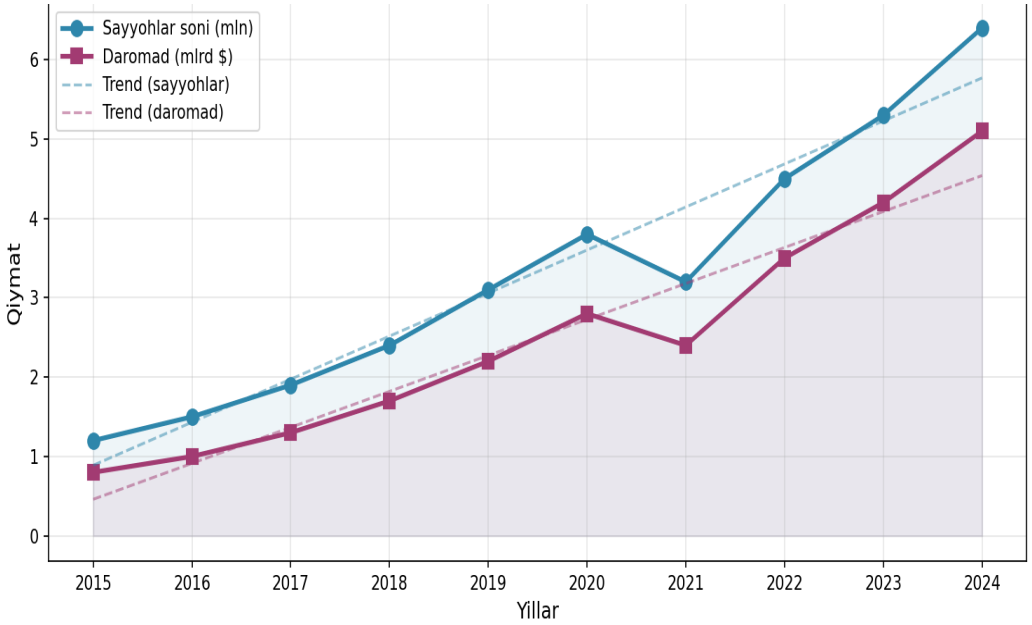
2-jadval

Inklyuziv turizm ko‘rsatkichlarining yillik dinamikasi (2015–2024)

Yil	Sayyohlar (mln)	O‘sish (%)	Daromad (mlrd $)	IMI o‘rtacha
2015	1.20	—	0.80	42.1
2016	1.50	+25.0	1.00	44.3
2017	1.90	+26.7	1.30	47.8
2018	2.40	+26.3	1.70	51.2
2019	3.10	+29.2	2.20	55.6
2020	3.80	+22.6	2.80	58.4
2021	3.20	-15.8	2.40	55.1
2022	4.50	+40.6	3.50	61.3
2023	5.30	+17.8	4.20	66.7
2024	6.40	+20.8	5.10	71.2

2015-yildan 2024-yilgacha bo‘lgan o‘n yillik davrda sayyohlar soni va ularga bog‘liq daromad olish o‘sish tendensiyasini yoqqol namoyon buladi. 2015 -yilda 1,20 million sayyoh bo‘lgan bo‘lsa, 2024 yilga kelib bu ko‘rsatkich 6,40

millionga yetdi — ya’ni o‘n yil ichida ***5,3 baravar*** oshdi. Daromad esa 0,80 mlrd dollardan 5,10 mlrd dollarga ko‘tarildi, bu esa ***6,4 barobar*** o‘sishni anglatadi.



4-rasm. Inklyuziv turizm sayyohlari soni va daromad ko‘rsatgichi (2015–2024)

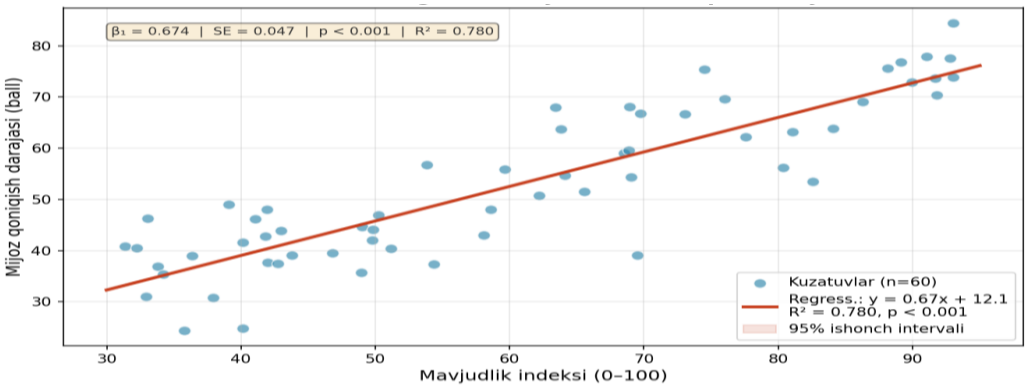
Zamonaviy xizmat ko‘rsatadigan mahsulot qoniqish darajasi (MQD) asosiy samaradorlik ko‘rsatkichlaridan biri sifatida tan olingan. foyda, inklyuziv turizm yo‘naltirilgan infratuzilmasi sifatini obyektiv muhim ahamiyatga ega kasb. Shu maqsadda mavjudlik ehtiyojlari (IMI) xizmat ko‘rsatish muhitining qulay va moslashtirilganligini ifodalovchi integral ko‘rsatkich hisoblanadi. Mavjudlik tekshiruvi (IMI) va mijozlarni qoniqish darajasi o‘rtasida statistik ishonchli, chiziqli bog‘liqlik aniqlandi. Regressiya MQD = 1.24 + 0.043 × IMI ko‘rinishida ifodalanib, IMI umumiy o‘zgaruvchanlikning 60.8% ini tushuntiradi.

Jadval 3.

Regressiya koeffitsiyentlari (*p<0.001, **p<0.01, *p<0.05)**

Ko‘rsatkich	Koeff. (β)	Std. xato	t-statistika	p-qiymat
Doimiy (α)	10.24	2.31	4.43	<0.001
IMI (β_1)	0.723	0.048	15.06	<0.001
YaIM (β_2)	0.312	0.087	3.59	0.001
Infratuzilma (β_3)	0.189	0.063	3.00	0.004
Kadrlar (β_4)	0.241	0.071	3.39	0.001

Mavjudlik indeksi (IMI) va mijoz qoniqish darajasi o‘rtasidagi bog‘liqlikni o‘rganish uchun oddiy chiziqli regressiya tahlili amalga oshirildi (n=60 kuzatuv).



5-rasm Mavjudlik indeksi va qoniqish darajasi o‘rtasidagi bog‘liqlik

Grafikda mavjudlik indeksi (IMI, 0–100 shkala) va qo‘shimcha yuklanish darajasi (ball) o‘tgan bog‘liqlik 60 ta kuzatuv (n=60) asosida sochilma diagrammasi va regressiya chizig‘i ko‘rinishida tasvirlangan.

$y = 0.67x + 12.1$

Bu shuni anglatadiki, IMI nolga teng bo‘lganda qoniqish darajasining bazaviy qiymati 12.1 ballni tashkil etadi. IMI har 10 birlikka oshganda qoniqish darajasi 6.7 ballga ko‘tarilishi kutiladi. Grafik tahlili shuni ko‘rsatadiki, mavjudlik indeksi va foydalanuvchi qoniqish darajasi o‘rtasida **juda kuchli aniq chiziqli bog‘liqlik** mavjud. R^2 = 0780 ko‘rsatkichi amaliy tajriba uchun yuqori sifatli natija bo‘lib, xizmat ko‘rsatish muhitini moslashtirish va yaxshilash qoniqishini yaxshilashning eng muhim omillaridan biri ilmiy asosda tasdiqlaydi.

Xulosa qilib aytganda, ushbu tadqiqot inklyuziv turizm infratuzilmasiga yo‘naltirilgan investitsiyalar nafaqat ijtimoiy adolat, balki iqtisodiy samaradorlik nuqtai nazaridan ham asoslangan ekanligini ko‘rsatadi. Mavjudlik indeksini 10 birlikka oshirish mijoz qoniqishini o‘rtacha 6.7 ballga yaxshilaydi — bu esa xizmat ko‘rsatish sifati va raqobatbardoshlikni sezilarli darajada oshirishning eng aniq yo‘li hisoblanadi.

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AUTOMATION OF BANKING SYSTEMS AND IMPLEMENTATION OF INNOVATIVE TECHNOLOGIES IN THE DIGITAL ECONOMY

ABSTRACT: *This article examines the importance of automation and the implementation of innovative technologies in the banking sector under the conditions of the digital economy. The study analyzes the transformation of traditional banking services through financial technologies such as fintech platforms, blockchain technology, big data analytics, artificial intelligence, and digital platforms. Special attention is given to improving customer service quality, strengthening risk management systems, reducing operational costs, and enhancing competitiveness in the financial services market. The paper also highlights the role of platform banking models and peer-to-peer lending systems as emerging financial intermediation tools. The research concludes that the effective integration of innovative technologies significantly contributes to sustainable banking development in the digital economy.*

Keywords: *digital economy, banking automation, fintech, blockchain technology, artificial intelligence, big data, platform banking, peer-to-peer lending, financial innovation, risk management*

INTRODUCTION

The rapid development of digital technologies has significantly influenced all sectors of the economy, including the banking industry. In recent years, the transition toward digital transformation has become one of the most important strategic directions for commercial banks worldwide. Automation of banking processes allows financial institutions to improve operational efficiency, enhance service quality, and strengthen competitiveness in a rapidly changing financial environment.

The digital economy requires banks to adopt innovative technological solutions to meet increasing customer expectations and ensure secure and fast financial transactions. Technologies such as fintech solutions, blockchain systems, artificial intelligence, and big data analytics have become essential components of modern banking infrastructure. These technologies enable banks to optimize internal processes, reduce operational risks, and improve decision-making efficiency.

Therefore, studying the role of automation and innovative technologies in the development of the banking sector remains highly relevant in the context of global financial modernization.

The Role of Automation in the Modern Banking System

Automation plays a crucial role in improving the performance and reliability of banking operations. Traditional banking systems relied heavily on manual processing, which increased operational costs and limited service speed. However, the implementation of automated systems has transformed internal workflows and improved financial service delivery.

Automated banking systems allow financial institutions to process large volumes of transactions quickly and accurately. These systems also improve transparency, reduce human error, and increase the efficiency of financial monitoring processes. As a result, automation contributes to better customer satisfaction and stronger institutional stability. In addition, automation supports effective communication between financial institutions and customers through mobile banking applications, online service platforms, and digital payment solutions.[1]

Digital Transformation of Banking Services

Digital transformation has significantly changed the structure and organization of banking services. Modern banks are shifting from traditional branch-based services toward digital platforms that provide remote access to financial products. These technologies allow banks to expand their service coverage and reduce administrative expenses. Furthermore, digital banking services enable customers to perform financial transactions anytime and anywhere, which increases convenience and accessibility.[2]

Financial Technologies (FinTech) and Their Impact on Banking Development

Financial technologies, commonly known as FinTech, represent one of the most important innovations in the banking industry. FinTech solutions improve transaction speed, enhance financial transparency, and create new opportunities for service personalization. FinTech applications include digital wallets, peer-to-peer lending platforms, automated investment systems, and smart financial analytics tools. These technologies help banks remain competitive while responding to customer demands more effectively. Moreover, FinTech companies contribute to the diversification of financial services by introducing innovative service models that complement traditional banking activities.[3]

[1]Doshi, K.. *Automation in Banking: Simplifying Operations and Enhancing Customer Experience*. International Journal of Scientific Research & Engineering Trends, 11(1), Jan–Feb 2025.

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[3]Loso Judijanto., Anduerigantа Fadhlihi., Fenni Yufantria. The development of financial technology (fintech) and its impact on the conventional banking system. INJOSER.Vol 3. No 1. January 2025, pages 148-155.

Table 1.
Main Areas of Innovative Technology Implementation in Banking

Technology	Application Area	Economic Impact
FinTech platforms	Mobile banking services	Increased service speed
Blockchain	Payment systems	Improved transaction security
Artificial Intelligence	Credit scoring	Faster decision-making
Big Data analytics	Customer behavior analysis	Reduced financial risks
Digital platforms	Remote banking services	Lower operational costs

Blockchain Technology in the Banking Sector

Blockchain technology represents a revolutionary innovation in financial transaction processing. It ensures transparency, security, and reliability in financial operations by using decentralized data storage mechanisms. The implementation of blockchain technology in banking systems improves international payment processing speed and reduces transaction costs. Furthermore, blockchain enhances trust between financial institutions and customers by providing secure data protection mechanisms. Smart contracts based on blockchain technology also allow banks to automate complex financial agreements and reduce administrative workloads.[4]

Artificial Intelligence and Big Data in Banking Operations

Artificial intelligence and big data technologies play an essential role in improving banking efficiency. These technologies support predictive analytics, fraud detection, and personalized financial service delivery. AI-based credit scoring systems help banks evaluate customer creditworthiness more accurately. Big data technologies allow financial institutions to analyze customer behavior and market trends, which improves strategic decision-making processes. As a result, banks can minimize risks while maximizing profitability through data-driven management strategies.[5]

Platform Banking and Peer-to-Peer Lending Systems

Platform banking represents a modern service model that integrates multiple financial services within a unified digital environment. This approach improves service accessibility and simplifies customer interaction with financial institutions. Peer-to-peer lending systems have also become increasingly popular in the digital economy. These platforms allow individuals and small businesses to access financing without traditional banking intermediaries. As a result, financial inclusion increases and alternative financing opportunities expand.[6]

The integration of platform banking models strengthens the overall flexibility and responsiveness of financial service systems.

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[6] Tirkashev, M.Yu., & Eshtemirov, N.B. (2022). *Factors of Effective Use of Mechanisms to Improve Financial Control*. Вестник магистратуры, 3–2(126), 111–112.

Risk Management Improvements Through Banking Automation

Risk management is one of the most important components of banking operations. Automation technologies improve monitoring accuracy and help detect financial irregularities in real time. Digital risk management systems support compliance monitoring, fraud detection, and cybersecurity protection. As a result, banks can respond more effectively to potential threats and maintain financial stability. Moreover, automated risk assessment tools allow financial institutions to optimize resource allocation and strengthen internal control mechanisms.[7]

CONCLUSION

Automation and the implementation of innovative technologies play a decisive role in the modernization of the banking sector in the digital economy. Technologies such as FinTech platforms, blockchain systems, artificial intelligence, and big data analytics significantly improve operational efficiency, service quality, and financial transparency. The introduction of digital platforms and peer-to-peer lending systems expands financial accessibility and strengthens customer engagement. Furthermore, automation supports effective risk management and enhances institutional competitiveness in the global financial environment.

Therefore, the continuous development and integration of innovative technologies remain essential for ensuring sustainable growth and long-term stability in the modern banking system.

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SOME METHODS OF CALCULATING VECTOR FLOW

Abstract: *This article presents a brief theoretical part of vector field flow and its practical applications reflected in specific problems. The problems are clearly expressed with drawings.*

Keywords: *coordinate planes, projection method, unit vector, sphere, curvilinear coordinates, outer lateral surface of a circular cylinder.*

In this article, some applications of vector field flow are analyzed using specific problems. In general, the concept of vector field flow (i.e., flow passing through a surface) is studied as one of the most important concepts in mathematics and applied sciences. It is mainly studied within the framework of vector analysis and is used in many fields. It is mainly used in physics (electric and magnetic fields), fluid and gas mechanics, heat transfer, aerodynamics and aviation, and in engineering techniques to calculate real processes.

Projection method onto all three coordinate planes. Let a surface S be projected one-to-one onto all three coordinate planes. Let us denote the projections of S as the planes responsible for.

In this case the equation $F(x,y,z)=0$ surface S is uniquely solvable with respect to each of the arguments x, y, z

So $x = x(y,z),\ y = y(x,z),\ z = z(x,y)$. Then the vector flow

$\boldsymbol{a} = P(x,y,z)\boldsymbol{i} + Q(x,y,z)\boldsymbol{j} + R(x,y,z)\boldsymbol{k}$ through the surface S, the unit normal vector to which is equal to

$$\boldsymbol{n^0} = \cos\alpha \cdot \boldsymbol{i} + \cos\beta \cdot \boldsymbol{j} + \cos\gamma \cdot \boldsymbol{k}$$

can be written like this:

$$\Pi = \iint_S (\boldsymbol{a}, \boldsymbol{n^0})\, dS = \iint_S [P(x,y,z)\cos\alpha + Q(x,y,z)\cos\beta + R(x,y,z)\cos\gamma]\, dS.$$

(1).

It is known that $dS\cos\alpha = \pm dydz,\ dS\cos\beta = \pm dxdz,\ dS\cos\gamma = \pm dxdy,$ (2)

Moreover, the sign in each of (2) is chosen such that the sign $\cos\alpha, \cos\beta, \cos\gamma$ on the surface. Substituting (2) and (1) we will have

$$\Pi = \pm\iint_{D_{yz}} P[x(y,z), y, z]dydz \pm \iint_{D_{xz}} Q[x, y(x,z), z]dxdz \pm \iint_{D_{xy}} R[x, y, z(x,y)]dxdy. \quad (3)$$

Example №1. Find the flow of a vector

$\boldsymbol{a} = xy\boldsymbol{i} + yz\boldsymbol{j} + xz\boldsymbol{k}$ through part of the outer side of the sphere $x^2 + y^2 + z^2 = 1$, enclosed in the first octant.

Solution. We have

$$\boldsymbol{n^0} = \frac{\boldsymbol{grad}(x^2+y^2+z^2-1)}{|\boldsymbol{grad}(x^2+y^2+z^2-1)|} = \frac{x\boldsymbol{i}+y\boldsymbol{j}+z\boldsymbol{k}}{\sqrt{x^2+y^2+z^2}} = x\boldsymbol{i}+y\boldsymbol{j}+z\boldsymbol{k},$$

From where, taking into account that the given surface S is in the first octant, we obtain $\cos\alpha = x \geq 0,\ \cos\beta = y \geq 0,\ \cos\gamma = z \geq 0.$

Therefore, in formula (3) we take the plus sign in front of all the integrals and, putting in it $P = xy,\ Q = yz,\ R = xz,$ we will receive

$$\Pi = \iint_{D_{yz}} xy\,dydz + \iint_{D_{xz}} yz\,dxdz + \iint_{D_{xy}} xz\,dxdy. \quad (4)$$

From the equation of the sphere $x^2+y^2+z^2=1,$ we find

$$z = z(x,y) = \sqrt{1-x^2-y^2},\quad y = y(x,z) = \sqrt{1-x^2-z^2},\quad x = x(y,z) = \sqrt{1-y^2-z^2}.$$

Substituting these expressions for x, y, z respectively, in the first, second and third integral of the right-hand side (4), we obtain

$$\Pi = \iint_{D_{xy}} x\sqrt{1-x^2-y^2}\,dxdy + \iint_{D_{xz}} z\sqrt{1-x^2-z^2}\,dxdz + \iint_{D_{yz}} y\sqrt{1-y^2-z^2}\,dydz. \quad (5)$$

Let's calculate the first integral on the right-hand side, moving to polar coordinates $x = \rho\cos\varphi,\ y = \rho\sin\varphi,$ где $0 \leq \varphi \leq \frac{\pi}{2},\ 0 \leq \rho \leq 1,$ Then we get

$$I_1 = \iint\limits_{D_{xy}} x\sqrt{1-x^2-y^2}\,dxdy = \iint\limits_{D_{xy}} \rho^2\sqrt{1-\rho^2}\cos\varphi d\varphi d\rho = \int\limits_0^{\pi/2}\cos\varphi d\varphi \int\limits_0^1 \rho^2\sqrt{1-\rho^2}\,d\rho = \int\limits_0^1 \rho^2\sqrt{1-\rho^2}\,d\rho$$

Flat in the last integral $\rho = \sin t,\ d\rho = \cos t dt,$ we will have.

$$I_1 = \int\limits_0^{\pi/2} \sin^2 t\cos^2 t dt = \frac{1}{4}\int\limits_0^{\pi/2} \sin^2 2t dt = \frac{\pi}{16}.$$

The second and third integrals in formula (5) are calculated similarly, and we obtain $I_2 = \iint\limits_{D_{xz}} z\sqrt{1-x^2-z^2}\,dxdz = \frac{\pi}{16},\ I_3 = \iint\limits_{D_{yz}} y\sqrt{1-y^2-z^2}\,dydz = \frac{\pi}{16}.$ The desired flow $\Pi = I_1 + I_2 + I_3 = \frac{3\pi}{16}$

Method for introducing curvilinear coordinates on a surface. In some cases, when calculating the flow of a vector field through a given surface S, it is possible to choose a simple coordinate system on the surface itself, which is convenient for calculating the flow without projecting onto coordinate planes. Let's consider a particular case.

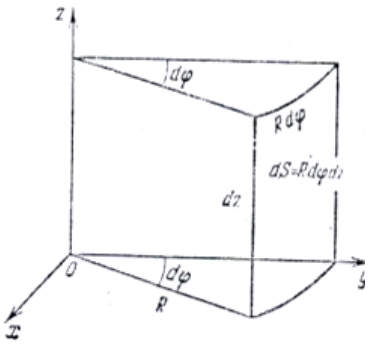

Fig. 1

Case 1. Let the surface S be part of a circular cylinder $x^2+y^2=R^2$, limited by surfaces $z=f_1(x,y)$ and $z=f_2(x,y)$ and besides $f_1(x,y)\le f_2(x,y)$. Assuming $x=R\cos\varphi,\ y=R\sin\varphi,\ z=z_1$ We will have for this surface $0\le\varphi\le x=R\cos\varphi,\ y=R\sin\varphi,\ z=z_1$ and for the area element dS we obtain the following expression (Fig. 1) $dS=Rd\varphi dz$.

Then the flux of the vector field a through the outer side of the surface S is calculated by the formula $\Pi=R\int_0^{2\pi}d\varphi\int_{f_1(R\cos\varphi,R\sin\varphi)}^{f_2(R\cos\varphi,R\sin\varphi)}(a,n^0)dz,$

$$\boldsymbol{n^0}=\frac{\boldsymbol{grad}(x^2+y^2-R^2)}{|\boldsymbol{grad}(x^2+y^2-R^2)|}=\frac{\boldsymbol{xi}+\boldsymbol{yj}}{R}. \qquad (6)$$

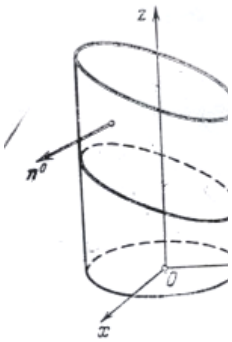

Fig. 2

Example №2. Find the flow of a vector $\boldsymbol{r}=\boldsymbol{xi}+\boldsymbol{yj}+\boldsymbol{zk}$ through the outer side surface of the circular cylinder $x^2+y^2=R^2$, limited by planes $z=0$ and $z=H(H>0)$.

Solution. In this case we have: $0\le\varphi\le2\pi;\ f_1(R\cos\varphi,R\sin\varphi)=0,\ \ f_2(R\cos\varphi,R\sin\varphi)=H.$

Let's introduce curvilinear coordinates on the cylinder; $x=R\cos\varphi,\ \ y=R\sin\varphi,\ \ z=z.$ Then the required flux of vector **r** will be equal to $\Pi=R\int_0^{2\pi}d\varphi\int_0^H(r,n^0)dz.$

But since $\boldsymbol{r}=\boldsymbol{xi}+\boldsymbol{yj}+\boldsymbol{zk}=R\cos\phi\cdot\boldsymbol{i}+R\sin\phi\cdot\boldsymbol{j}+z\cdot\boldsymbol{k},$ and the normal one is on the cylinder $\boldsymbol{n^0}=\frac{\boldsymbol{xi}+\boldsymbol{yj}}{R}=\frac{R\cos\phi\cdot\boldsymbol{i}+R\sin\phi\cdot\boldsymbol{j}}{R}=\cos\phi\cdot\boldsymbol{i}+\sin\phi\cdot\boldsymbol{j}$

then the scalar product on the cylinder will be equal to $(r,n^0)=R\cos^2\varphi+R\sin^2\varphi=R.$ We finally find $\Pi=R^2\int_0^{2\pi}d\varphi\int_0^H dz=2\pi R^2H.$

Example №3. Calculate the radius vector flux $\boldsymbol{r}=\boldsymbol{xi}+\boldsymbol{yj}+\boldsymbol{zk}$ through the lateral surface of a circular cylinder

$x^2+y^2=1$, bounded below by a plane $x+y+z=1$, and on top is a plane a $x+y+z=2$

Solution: In this case we have

$R = 1, f_1(x,y) = 1 - x - y, f_2(x,y) = 2 - x - y.$ Moving on to coordinates on the cylinder $x = \cos\varphi,\ y = \sin\varphi,\ z = z,$ we will have

$f_1(x,y) = 1 - \cos\varphi - \sin\varphi,\ f_2(x,y) = 2 - \cos\varphi - \sin\varphi.$ According to formula (6), the flow of vector **r** will be equal to $\Pi = R^2 \int_0^{2\pi} d\varphi \int_{1-\cos\varphi-\sin\varphi}^{2-\cos\varphi-\sin\varphi} (r, n^0) dz.$ But since on the cylinder $x^2 + y^2 = 1,\ \boldsymbol{n^0} = x\boldsymbol{i} + y\boldsymbol{j} = cos\,\phi \cdot \boldsymbol{i} + sin\,\phi \cdot \boldsymbol{j},$

то $(\boldsymbol{r}, \boldsymbol{n^0}) = x^2 + y^2 = cos^2\,\phi + sin^2\,\phi = 1$ and therefore, $\Pi = R^2 \int_0^{2\pi} d\varphi \int_{1-\cos\varphi-\sin\varphi}^{2-\cos\varphi-\sin\varphi} dz = \int_0^{2\pi} d\varphi = 2\pi.$

Case 2. Let the surface S be part of a sphere $x^2 + y^2 + z^2 = R^2,$ bounded by conical surfaces, the equations of which in spherical coordinates have the form $\theta = f_1(\varphi),\ \theta = f_2(\varphi),$ and half-planes $\varphi = \varphi_1,\ \varphi = \varphi_2.$ let us set for the points of the given sphere $x = R\cos\varphi\sin\theta,\ y = R\sin\varphi\sin\theta,\ z = R\cos\theta,$ whereabouts $\varphi_1 \le \varphi \le \varphi_2,\ \theta_1 \le \theta \le \theta_2.$ Then for the area element dS we obtain (Fig. 3) $dS = R^2 \sin\theta d\theta d\varphi.$ In this case, the flux of the vector field a through the outer part S of the sphere is calculated by the formula

$$\Pi = R^2 \int_{\phi_1}^{\phi_2} d\phi \int_{\theta_1}^{\theta_2} (a, n^0)\, sin\,\theta\, d\theta, \qquad (7)$$

$$\boldsymbol{n^0} = \frac{\boldsymbol{grad}(x^2 + y^2 + z^2 - R^2)}{|\boldsymbol{grad}(x^2 + y^2 + z^2 - R^2)|} = \frac{x\boldsymbol{i} + y\boldsymbol{j} + z\boldsymbol{k}}{R}.$$

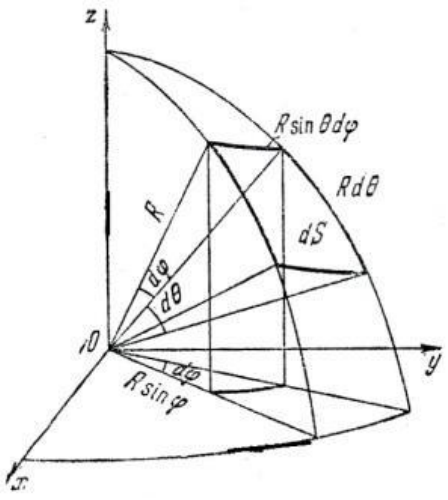

Fig. 3.

Example №4. Find the flow of a vector.

$\boldsymbol{a} = (x - 2y + 1)\boldsymbol{i} + (2x + y - 3z)\boldsymbol{j} + (3y + z)\boldsymbol{k}$ through part of the surface of the sphere $x^2 + y^2 + z^2 = 1,$ located in the first octant, in the region where $x^2 + y^2 + z^2 > 1.$

Solution: In this case we have $R = 1,\ \varphi_1 = 0,\ \varphi_2 = \frac{\pi}{2},\ \theta_1 = 0,\ \theta_2 = \frac{\pi}{2},$

$\boldsymbol{n^0} = x\boldsymbol{i} + y\boldsymbol{j} + z\boldsymbol{k}, (\boldsymbol{a}, \boldsymbol{n^0}) = x^2 + y^2 + z^2 + x.$ Let's introduce on the sphere $x^2 + y^2 + z^2 = 1,$ coordinates $\phi\ and\ \theta$ such that $x = \cos\varphi\sin\theta,\ y = \sin\varphi\sin\theta,\ z = \cos\theta,$ Then we will have $(a, n^0) = 1 + \cos\varphi\sin\theta$ applying formula (7) we obtain

$$П = \int_0^{\pi/2} d\varphi \int_0^{\pi/2} (1+\cos\varphi\sin\theta)\sin\theta d\theta = \int_0^{\pi/2} d\varphi \int_0^{\pi/2} \sin\theta d\theta + \int_0^{\pi/2} \cos\varphi d\varphi \int_0^{\pi/2} \sin^2\theta d\theta = \frac{3}{4}\pi.$$

In conclusion, the vector field flux is an important mathematical tool in the analysis of physical and engineering problems. It can be used to determine the passage of electric, magnetic, and fluid currents through a surface. With the help of this concept, complex processes can be simplified and practical exercises can be effectively solved. Therefore, the vector field flux is of great importance both theoretically and practically.

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PEDIATRIC TUBERCULOUS SPONDYLITIS: CURRENT CONCEPTS IN DIAGNOSIS AND MANAGEMENT

Abstract. *Tuberculous spondylitis in children represents a severe form of extrapulmonary tuberculosis characterized by progressive vertebral destruction, spinal deformity, and potential neurological complications. Pediatric cases differ significantly from adult forms due to growth-related factors, high regenerative capacity, and distinct clinical presentation. This review summarizes current concepts in the pathogenesis, diagnosis, and management of pediatric spinal tuberculosis, with particular emphasis on the role of anti-tuberculosis chemotherapy and modern surgical strategies. Early diagnosis and a multidisciplinary approach are essential to prevent severe kyphotic deformities and long-term disability.*

Keywords: *Tuberculous spondylitis; Spinal tuberculosis; Children; Pediatric tuberculosis; Kyphotic deformity; Anti-tuberculosis therapy; Spinal surgery; Extrapulmonary tuberculosis.*

Introduction

Tuberculous spondylitis is a specific infectious lesion of the spine caused by mycobacteria belonging to the Mycobacterium tuberculosis complex. In most cases, the disease develops as a result of hematogenous dissemination from a primary focus in the lungs or lymph nodes. Rarely, it may occur as a complication of Bacillus Calmette–Guérin (BCG) vaccination.

Morphologically, tuberculous spondylitis is characterized by granulomatous necrotizing inflammation and is classified as a primary chronic osteomyelitis of the spine. In children, the disease exhibits distinct clinical and biological features that significantly influence both its course and management.

Clinical features of tuberculous spondylitis in children

Pediatric tuberculous spondylitis is characterized by several key features: a tendency toward multilevel vertebral involvement with subtotal or total destruction of vertebral bodies; early development and progression of kyphotic deformity, driven by continued growth of the posterior spinal column; spinal deformity as the initial clinical manifestation, often preceding pain; less pronounced pain syndrome compared to adults; rare occurrence of severe irreversible neurological deficits despite spinal canal compromise; high neurological recovery potential due to compensatory mechanisms; occurrence in both immunocompetent and immunocompromised children. In immunodeficient patients, including those with HIV infection or primary immunodeficiencies, the

morphological pattern may differ from classical granulomatous inflammation due to incomplete phagocytosis and absence of typical necrotic granulomas.

Diagnosis

According to WHO guidelines (2021), two levels of diagnostic certainty for extrapulmonary tuberculosis are distinguished: clinically established (unconfirmed) diagnosis based on clinical, radiological, and laboratory findings without bacteriological confirmation, and confirmed diagnosis established by detection of *M. tuberculosis* in specimens obtained directly from the lesion using culture methods and molecular genetic techniques (PCR). In settings with limited diagnostic resources, diagnosis may rely on clinical and imaging findings alone. Importantly, immunological and serological tests (e.g., skin tests, IGRA) are not sufficient to confirm or exclude spinal tuberculosis or assess disease activity.

Principles of treatment

Anti-Tuberculosis Chemotherapy is the cornerstone of modern management of tuberculous spondylitis in children is prolonged combination anti-tuberculosis chemotherapy, individualized according to drug susceptibility testing. Early initiation of appropriate therapy is critical, as delayed or inadequate treatment significantly increases the risk of progressive vertebral destruction, severe deformity, and neurological complications.

A fundamental principle of treatment is the earliest possible microbiological verification of the pathogen. This is achieved through invasive diagnostic procedures such as percutaneous abscess puncture or vertebral biopsy from the zone of destruction. The obtained material is subjected to a comprehensive microbiological evaluation, including direct microscopy, culture on both solid and liquid media, and molecular genetic testing. The use of polymerase chain reaction (PCR) allows rapid detection of Mycobacterium tuberculosis DNA, while molecular assays targeting resistance-associated mutations enable early identification of drug-resistant strains. Collectively, these methods significantly reduce the time required for etiological confirmation from several weeks, as seen with conventional culture techniques, to a few days or even hours.

The choice of chemotherapy regimen, including drug combination and duration, is determined by the susceptibility profile of the pathogen and the clinical severity of the disease. In pediatric patients, careful consideration must be given to drug tolerability, pharmacokinetics, and potential adverse effects, particularly in long-term treatment courses.

The effectiveness of conservative therapy is assessed using a combination of clinical and radiological criteria. Clinically, improvement is reflected by the resolution of systemic inflammatory signs and stabilization of the patient’s general condition. Radiologically, the key indicators of treatment success include regression or complete resolution of paravertebral abscesses and the appearance of reparative changes in the affected vertebrae, such as sclerosis and bone remodeling.

Surgical treatment of active disease

Despite advances in chemotherapy, surgical treatment remains an essential component in the management of pediatric tuberculous spondylitis, particularly in complicated or advanced cases. The decision to perform surgery is based on a combination of neurological, orthopedic, and infectious criteria.

Absolute indications for surgical intervention include neurological complications resulting from spinal cord compression, such as partial or complete paralysis and pelvic organ dysfunction. Orthopedic indications encompass progressive spinal deformity, instability of the spinal column, and persistent pain that is not responsive to conservative measures, including external immobilization. Furthermore, surgical treatment is indicated in cases of ineffective anti-tuberculosis chemotherapy, especially when multidrug-resistant (MDR) or extensively drug-resistant (XDR) tuberculosis is suspected or confirmed.

The overarching goals of surgical management are comprehensive and multifaceted. They include radical debridement of infected and necrotic tissues, adequate decompression of neural structures, restoration of spinal stability, correction of existing deformity, and, importantly in children, the creation of biomechanical conditions that allow for balanced longitudinal growth of both anterior and posterior spinal columns.

Modern surgical techniques

Contemporary surgical strategies for tuberculous spondylitis in children are based on the principles of radicality, stability, and deformity correction, often achieved within a single-stage procedure.

Radical debridement constitutes the initial and critical step of surgical intervention. The choice of surgical approach depends on the anatomical localization of the lesion and may include extrapleural transthoracic, thoracodiaphragmatic, retroperitoneal, or combined approaches. The procedure involves thorough evacuation of abscesses, excision of necrotic and infected vertebral tissues, and decompression of the dural sac with meticulous removal of epidural pathological components.

Following debridement, anterior spinal reconstruction is performed to restore the load-bearing capacity of the spinal column. This is achieved using structural bone grafts, including autografts (rib or iliac crest) and allografts, often supplemented with titanium cages to provide immediate mechanical support. This combined approach of radical debridement and anterior reconstruction is historically referred to as “Hong Kong surgery” and remains a fundamental concept in the surgical management of spinal tuberculosis.

Posterior instrumentation has become an indispensable component of modern surgical treatment, particularly in pediatric patients with extensive vertebral involvement. It provides immediate spinal stability, facilitates deformity correction, and prevents further progression of kyphosis. To ensure adequate stabilization, instrumentation should extend one to two vertebral segments beyond the reconstructed area in both cranial and caudal directions.

In cases of severe kyphotic deformity exceeding 50°, isolated anterior or posterior approaches are insufficient. Adequate correction requires combined anterior and posterior reconstruction, often including resection of posterior spinal elements. Attempting correction through a posterior-only approach is associated with a substantial risk of neurological complications due to potential dural sac buckling and spinal cord compromise.

Management of cervicothoracic deformities presents additional technical challenges due to the complex biomechanics of this transitional zone. Surgical correction in these cases requires the use of combined fixation systems and intraoperative stabilization techniques, such as halo ring fixation or Mayfield head clamps, to ensure controlled alignment and minimize neurological risk.

Postoperative Considerations

Postoperative management is a critical component of overall treatment success and requires careful long-term follow-up. Removal of spinal implants may be considered after 1–1.5 years, provided that solid anterior fusion has been confirmed by imaging modalities such as computed tomography.

Radiological evidence of graft resorption is a concerning finding and may indicate recurrence or progression of the infectious process, necessitating further evaluation and possible re-intervention. The development of pseudarthrosis at the reconstruction site or the formation of seromas around instrumentation components typically reflects mechanical instability and requires revision surgery with reinforcement of spinal fixation.

Discussion

Management of pediatric tuberculous spondylitis requires a multidisciplinary approach integrating infectious disease specialists, orthopedic surgeons, and radiologists. Early diagnosis and individualized treatment strategies are critical to preventing severe deformities and disability.

Children demonstrate unique advantages, including higher regenerative capacity and better neurological recovery; however, they are also at increased risk of progressive deformity due to ongoing growth.

Conclusion

Tuberculous spondylitis in children remains a complex clinical condition requiring timely diagnosis and combined therapeutic strategies. Advances in molecular diagnostics and surgical techniques have significantly improved outcomes, yet challenges persist in managing severe deformities and drug-resistant forms.

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MODERN EDUCATIONAL TECHNOLOGIES AND THEIR RELEVANCE

Abstract: *This article discusses the new requirements emerging in the field of education due to globalization and technological progress, as well as the importance of modern educational technologies. It discusses methods and techniques aimed at forming critical thinking, creative approach and social life competencies in students. It also emphasizes the importance of the teacher's professional skills and the effectiveness of modern teaching approaches. The importance of national programs and the processes of implementing innovative technologies in the educational process is considered.*

Keywords: *modern educational technologies, competency-based approach, critical thinking, innovative approaches, teaching methods*

The rapid development of science and technology in the world, the changes associated with the development of innovative technologies, are causing new socio-economic, political and cultural changes. Such changes, in the context of globalization, create a strong competitive environment in all areas, which in turn impose new requirements on the education sector. As a result, it is becoming increasingly important to create opportunities for all people to receive quality education throughout their lives by improving teaching methods, improving the effectiveness of education and assessment of results at all stages of education, which is valued as the most unique capital.

Much attention is being paid to preparing students for life by organizing effective processes of preparing them for social life through the accumulation of practical experience in students, the formation of basic competencies, and the development of the competence of teachers, and the organization of educational processes based on a competency-based approach [1].

Tasks such as “determining priority areas for the systematic reform of general secondary and extracurricular education, raising the spiritual, moral and intellectual development of the growing younger generation to a qualitatively new level, and introducing innovative forms and methods of education into the educational process”[2] were set.

Today's education system is moving away from old-fashioned curricula and towards a system that prepares people for an innovative digital economy and information society. Accordingly, approaches to education are changing, and thanks to the Internet and information technologies, teachers are transforming from simple educators into educational organizers.

Combining traditional classroom activities with online platforms helps students to use their time effectively and develop independent learning skills. Introducing game elements into the learning process dramatically increases student motivation. As Linda Darling-Hammond notes[3], “Learning becomes long-term memory only when it is interesting and emotionally relevant to the learner.”

For some teachers, this change will not be easy. Since competitiveness and interpersonal skills are needed in such an era, the content of the curricula should be aimed at developing critical thinking, communication, creativity, and collaboration skills, that is, competencies.

It is worth noting that the effectiveness of any pedagogical technologies and methods depends on the creative and professional skills of the teacher who uses them. The professional skills of the teacher, when properly understood, selected and applied, taking into account the individual characteristics and interests of students, the educational environment and available opportunities, allow achieving the intended pedagogical goal.

Recently, pedagogical and methodological literature has been characterized by the classification of methods into types such as “active”, “passive”, “interactive”. In fact, there is no such thing as an active and passive method. The classification of these methods is conditional in relation to the physical condition and movement of the student [4].

Interactive methods, like other methods, help to organize the cooperation of the teacher and the student as a component of the educational activity. In other words, they serve for the full implementation of the technological process.

The main feature of interactive methods is that they allow students to activate and develop their thinking. It is also inappropriate to make them absolute, because interactive methods do not serve to impart new knowledge. Therefore, they cannot replace methods such as conversation, story, explanation, demonstration, demonstration, didactic game, which have been used for several centuries. It is impossible to encourage students to think and be active without arming them with knowledge. Because “an empty head does not think”, in order to think, you need to have enough knowledge about a thing or event!

The introduction of modern technologies provides the following positive results:

- Students transform from passive listeners to active participants.
- Complex scientific concepts (such as quantum physics or molecular biology) are easier to understand with the help of virtual and augmented reality.
- Automated assessment systems show the teacher and student errors in real time.

At this point, it should also be emphasized that in recent times there have been attempts to put the concept of “technology” above methodology. In fact, the concept of “methodology” is higher than technology. Because methodology is metatechnology[5]. If we apply this concept to the educational process, there are general requirements for determining the educational process, its goals, objectives,

content, form, methods and means. The implementation of each educational activity is based on a certain algorithmic sequence. The methodology requires basing itself on the general and specific rules of this algorithmic sequence. The teacher can freely choose the technology for conducting the activity in connection with the educational goal. More precisely, it becomes possible to design the educational stages separately in accordance with the expected result in each activity, and to select the form, methods and means used at each stage.

In connection with the scope of the discussion of the concepts of "methodology" and "technology", some differences can be distinguished. In particular, the methodological system seeks answers to questions such as "How to teach?", "Why teach?", "What to teach?", while technology focuses on the question "How to achieve effective teaching?". While methodology assumes how the educational process should be organized, technology focuses on how to implement the educational process in the most convenient and optimal way.

Traditional education is often limited to the first two stages (knowledge and understanding). The goal of modern education is to take the student to the top of the pyramid - the stages of Analysis, Evaluation and Creation. It is at these stages that the student develops the competence of independent thinking and creative problem solving.

The case study method connects education with life. Through this, the student understands how the theoretical knowledge gained in class can be applied tomorrow in the workplace or in society.

In conclusion, the correct use of modern educational technologies by teachers, the combination of professional skills and creative approaches are the main factors in improving the quality of education. Also, the introduction of interactive methods and pedagogical approaches plays an important role in training personnel suitable for the innovative digital economy and information society. The effectiveness of interactive methods helps to acquire new knowledge, activate students and develop their thinking skills. In these processes, the gradual renewal of educational programs and the correct organization of methodological approaches from a didactic point of view remain one of the most important tasks of intellectual development and preparation of the future generation for social life.

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INNOVATIVE MODEL OF TEACHER TRAINING BASED ON INTERNATIONAL EXPERIENCE

Abstract. *This article examines the issues of transforming the system of teacher training based on the experience of developed countries (Finland, Singapore, South Korea). The study analyzes the concept of "Teacher 4.0", the continuity of digital competencies and pedagogical practice. As a result of the study, the role of dual education, mentoring institute and digital portfolio in improving the professional skills of teachers is highlighted.*

Keywords. *Finland, Singapore, South Korea experience, Cambridge program, credit-module system (Bologna experience), dual education, E-portfolio*

Introduction

The education system of Uzbekistan has been undergoing a fundamental transformation in recent years. Now, the priority in the training of pedagogical personnel has become not only to impart knowledge, but also to form competitive skills in the international labor market.

As the World Economic Forum (2023) report notes[1]: "In the future, education systems must prepare students not only for a specific profession, but also to adapt to constantly changing conditions." To achieve this goal, the educator himself must first be armed with international experience and modern methodologies.

The quality of education is a key factor determining the intellectual potential and economic stability of any country. Analysis of the world's leading education systems shows that the key to success lies not in buildings or technology, but in the quality of teaching staff.

Today, traditional pedagogical education models are failing to meet the needs of the digital generation (Gen Z and Alpha). As noted in reports from the World Economic Forum (WEF), by 2030, educators will need not only scientific knowledge, but also cognitive flexibility and technological literacy[1].

Research objective: To propose an optimal model of teacher training for the national education system, synthesizing international best practices.

Methods

The following methodological approaches were used in the study: Comparative analysis: The Finnish "Research-based education" and Singaporean "Systematic professional development" models were compared[2].

Benchmarking[3]: The standards of the best performing education systems (based on PISA, TALIS results) were studied.

Qualitative analysis: A competency map of graduates of pedagogical higher education institutions was developed.

The study conducted a comparative analysis of the activities of the following educational institutions in Uzbekistan:

Presidential Educational Institutions Agency (PIIMA): Experience in training teachers based on Cambridge curricula. Training of teachers based on international standards has been established in presidential schools and specialized schools. Here, teachers work not only as theorists, but also as practitioners and researchers.

Nizami Tashkent State Pedagogical University: Transition to the credit-module system and international cooperation programs. Avloni National Research Institute: Platforms for continuous professional development of teachers.

Results

Analysis of international models. The study identified three leading models in the world: Finnish Model: Research-based training. In Finland, a master's degree is mandatory to become a teacher. The basis of this model is that the teacher himself is a researcher.

Singapore Model: “Teacher Growth Model” (TGM)[4]. In Singapore, teachers are trained based on the principle of “Lifelong Learner”. The government allocates time and funds for 100 hours of professional development per year to each teacher.

The Estonian experience shows that the Digital Transformation “Continuous Professional Education” platform. The process of professional development of teachers has been transferred to a digital format. Now each teacher has the opportunity to choose an individual learning trajectory based on their professional needs.

The work being done in Uzbekistan is fully consistent with the international “Teacher 4.0” model. However, analyses show that there are still staff shortages and infrastructure problems in applying international methodologies in remote schools in the regions.

The Uzbek education system has been defining its strategic directions in recent years based on the principle of “Global Competitiveness”. The assimilation of international experience is not simply a matter of copying, but rather a synthesis of the most advanced models with national pedagogical traditions.

Dual education is a modern system that provides for the acquisition of theoretical knowledge in an educational institution (college, technical school or university) and the acquisition of practical skills directly in a production enterprise. In the German experience, the dual education system is called “The shortest path to professional skills”. In this system, the student spends 30-40 percent of his time at an educational institution, and the remaining 60-70 percent at the enterprise.

Credit-Module System in Higher Education (Bologna Process). Higher education institutions of Uzbekistan have switched to the ECTS (European Credit Transfer and Accumulation System) system to ensure international academic

mobility. Goal: To facilitate the exchange of students and professors with international universities and achieve international recognition of diplomas.

The implementation of Cambridge and STEAM educational standards. Schools under the Presidential Educational Institutions Agency (PIIMA) system are acting as a "locomotive" in this direction. As part of the strategy, Cambridge (UK) curricula have been integrated with national textbooks.

Localizing the Finnish education model. The Finnish education system is recognized as the most effective in the world. Uzbekistan is adopting two important aspects from this experience: Teacher autonomy: Giving teachers the freedom to choose their teaching methods. Assessment system: Assessing the student's personal growth (formative assessment), not just exams.

Digital Transformation and "Smart Education". Drawing on the experience of South Korea and Estonia, Uzbekistan has identified the digitalization of education as a strategic priority. ERP systems: Making the educational process transparent through "e-school" and other management systems. Continuous professional development: Creating distance and hybrid professional development platforms for teachers.

Mentoring Institute: The assignment of experienced teachers to young professionals (Singapore experience). In international practice, mentoring is not just giving advice, but also strategic management of the professional and cognitive development of an individual. In the educational reforms of Uzbekistan, mentoring is being formed as a legal and modern continuation of the "Teacher-Disciple" tradition.

Introduction of digital portfolio: Real-time assessment of the achievements and qualifications of a teacher. A digital portfolio (E-portfolio) is an electronic platform that collects all professional achievements, creative works, certificates of professional development and practical projects of a teacher or student over a certain period of time. In modern education, a digital portfolio is not just a "collection of documents", but a strategic tool that demonstrates the dynamic development of a person. In the educational reforms of Uzbekistan, a digital portfolio is being introduced as a component of the "Continuous Professional Education" (ERP) system. For teachers: The A. Avloni National Research Institute has introduced an electronic passport for teachers. It includes the teacher's: Teaching skills (video lessons); Scientific articles and citation indicators;

Conclusion

International experience shows that teacher training is not a one-time process, but a continuous development cycle. The model that combines the scientific approach of Finland, the systematicity of Singapore and the digital innovations of Estonia serves the intellectual advancement of society. Researching the innovative model of teacher training based on international experience and analyzing its implementation in the education system of Uzbekistan allows us to come to the following fundamental conclusions. The new Uzbek teacher, who is being formed based on the combination of international experience (Finland, Singapore, Germany) and national reforms, is not just a teacher, but a strategic

architect who designs the intellectual and spiritual image of the future generation. The wide implementation of the model proposed in this article will ensure that Uzbekistan takes its rightful place on the world education map and forms competitive human capital.

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CREATIVITY, CRITICAL THINKING, AND PROBLEM-BASED LEARNING TECHNOLOGIES IN THE EDUCATIONAL PROCESS

Abstract: *This work analyzes the interrelationship of the three pillars of modern education - creativity, critical thinking and problem-based learning technologies. The article, based on international experience and the opinions of pedagogical scientists, discusses methods for developing independent decision-making skills in students.*

Keywords: *creativity, critical thinking and problem-based learning, case study, insert method*

Introduction

In today's information-intensive world, the primary goal of education is not just to impart ready-made knowledge, but to "teach how to learn." As the World Economic Forum (WEF) reports have noted, "Critical thinking and problem-solving skills are the most in-demand skills in the future job market."[1]

Critical thinking serves as a filter for analyzing and evaluating the information received. According to the definition of Linda Elder and Richard Paul[2]: "Critical thinking is the art of analyzing and evaluating one's own thinking in order to improve one's thinking process." Therefore, in the learning process, the student must not only find the answer, but also understand how the logical path to that answer was taken.

In the era of globalization, the most urgent task facing the education system is to prepare not only knowledgeable, but also creative and critical problem-solvers. As many researchers have noted, traditional educational methods are not sufficiently effective in preparing students for independent life.

One of the main problems of modern pedagogy is the formation of competencies in students, not only theoretical knowledge, but also the so-called "soft skills". The paradigm of education of the 21st century has moved from the question "What to learn?" to the question "How to learn and apply?" In conditions of an abundance of information, a student must have the skills of sorting it (critical thinking), interpreting it in new ways (creativity) and applying it in practice (problem-based learning). Bringing creativity and problem situations into the educational process turns the student from a passive listener into an active researcher. As Ken Robinson noted, "Creativity is the process of having original ideas that have value. We should consider it as important as literacy and develop it to the same extent."[3] This idea suggests the need not to limit creativity in education, but to bring it into the main learning process.

METHODS

In the research process, we chose the problem-based learning model. The basis of this method is based on the idea put forward by John Dewey: “We do not learn from experience... we learn by reflecting on experience” [4]. Barrows, speaking of problem-based learning, emphasized that this method develops in students the skills of self-regulation and lifelong learning [5].

The following methodological approaches were used in the study.

- Pedagogical experiment: Traditional lecture classes and problem-based seminars were compared in the learning process.
- Case study: Students were given situational tasks involving real-life and professional problems or were presented with real production or social problems (cases).
- Interview method: The teacher, without giving ready-made solutions, invited the student to critical analysis through leading questions. A “question-answer-feedback” chain was used to stimulate critical thinking.
- Group creativity: The task was to find at least three creative solutions to one problem using the “brainstorming” method.
- Qualitative analysis: Students were assessed through the level of creativity in completing the tasks.

RESULTS

As a result of the conducted research, it was found that students' performance in classes organized on the basis of problem-based learning technology was higher than in traditional groups.

- Information assimilation rate: Knowledge obtained through a problem situation is stored in memory 60-70% longer (20-30% in the traditional method).
- Cognitive activity: 78% of students began to independently study additional electronic resources and international experiences, not limited to the textbook, when solving the problem.
- Critical analysis skills: 75% of students were able to independently identify logical errors in the information provided.
- Logical analysis: 40% of students in the control group noticed errors in the information, while in the experimental group (when critical thinking methods were used) this figure was 85%.
- Creative solutions: An average of 4-5 alternative solutions were proposed for one problem. It turns out that when students are given the “right to make mistakes” their creativity increases by 1.5 times.

DISCUSSION AND ANALYSIS

The results confirm that creativity and critical thinking are not mutually exclusive, but rather complementary. While creativity generates new ideas, critical thinking ensures their application in real life[6].

In our study, a student who faced a problematic situation also felt a gap in their knowledge and sought to fill it.

It is worth noting that the role of the teacher changes when using creativity in education. He or she no longer becomes a “source of knowledge” but a “process

moderator.” This requires a higher level of creativity and flexibility from the teacher.

The results show that the critical thinking filter serves to “sort out” creative ideas. In our study, students did not simply come up with “something new,” but critically analyzed how their proposed solutions fit into real life.

Problem-based learning acts as a catalyst for this process. When a student is faced with a problem, his brain automatically activates creative resources. During the research, it became clear that most students have difficulty abandoning the previously formed stereotype of “waiting for a ready-made answer”. This indicates the need for a fundamental reform of the education system, encouraging creativity from the initial stage.

Practical recommendations and methodological approaches.

The teacher can use the following strategies to apply these technologies in his lessons:

1. Interview method: Instead of telling students the correct answer, ask them a series of questions that lead them to the answer.
2. Case study: Analyze a real-life conflict situation and propose a solution.
3. Insert method: Critical analysis using the “V”, “+”, “-”, “?” signs when working on the text.

In order to train personnel who meet the requirements of the modern labor market, it is necessary to systematically introduce these technologies into the curricula.

In conclusion, the integration of creativity, critical thinking, and problem-based learning technologies in the educational process provides the following opportunities:

1. The integration of creativity, critical thinking, and problem-based learning in education changes the “passive student” model to the “active researcher” model. Creativity opens up new paths.
2. The ability to make logical and creative decisions in complex life situations is formed.
3. The knowledge gained is of practical value and is stored in long-term memory.
4. A problematic situation arouses motivation. Critical thinking ensures the choice of the most correct solution.

Combining creativity and critical thinking in the educational process takes students’ intellectual potential to a new level. Problem-based learning is the most convenient platform for testing these skills. These approaches prepare the student not only for exams, but also for complex life situations.

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"4+2" EDUCATIONAL SYSTEM - HARMONY OF THEORY AND PRACTICE

Annotation. *The "4+2" education system is an innovative approach based on reinforcing theoretical knowledge with practical experience. This method is aimed at preparing students for real working conditions, not limited to theoretical knowledge, and has a positive impact on their professional development. This approach occupies an important place in the modern education system and prepares students for their future professional activities. Along with academic knowledge, students also gain real work experience and have the opportunity to become leading specialists in their professional fields. This system plays an important role in training the next generation of specialists and serves the professional development of students by combining theory and practice.*

Keywords. *"4+2", theory, pedagogical practice, quality of education, profession*

As stated in the Law "On Education", one of the pressing issues of the present time is to radically improve the quality of pedagogical personnel training, to further strengthen the demand for pedagogical practice, which is a necessary link and the main stage of theoretical and practical training of students of higher educational institutions for teaching work. Pedagogical practice, which is an integral part of the educational process, is of particular importance in the correct implementation of the theoretical knowledge received by students in higher educational institutions in their future professional activities.

The professional pedagogical practice of students of a higher educational institution is considered a consistent continuation of the educational process conducted at a higher educational institution, allowing them to consolidate the theoretical knowledge obtained in the bachelor's degree and apply skills directly to the educational process[1].

Internships are a mandatory part of the undergraduate education process and are aimed at the formation of students' professional training, practical skills and competencies. Many types of internships are conducted in the preparation of bachelors. One of them is pedagogical internship. Pedagogical internship is the main and important link in the system of professional training of a future specialist. Pedagogical internship is a process that connects the student's theoretical education and future independent activity and ensures the formation of professional skills and qualifications, and is considered an initial school of experience.

Pedagogical practice is a key part of the educational pedagogical process in the training of future teachers.

The purpose of pedagogical practice is to prepare future teachers for professional activity, to test the knowledge they have gained in practice, to develop a sense of responsibility for pedagogical activity and the ability to work on themselves, as well as to study the work of experienced teachers.

The tasks of pedagogical practice:

•To cultivate interest in the teaching profession among students;

•To form a holistic understanding of pedagogical activity;

•To form pedagogical skills and qualifications;

•To create experience in pedagogical activity.

Pedagogical practice is the first step of a future teacher into teaching. The professional training of future teachers takes place together with pedagogical practice. One of the most important tasks of pedagogical practice is the formation of the professional training of future specialists[2].

Clause 7 of the Decree of the President of the Republic of Uzbekistan No. 134 “On Approval of the National Program for the Development of Public Education in 2022-2026” dated May 11, 2022 and Clause 2 of the Resolution of the President of the Republic of Uzbekistan No. 289 “On Measures to Improve the Quality of Pedagogical Education and Further Development of Higher Educational Institutions for Training Pedagogical Personnel” dated June 21, 2022, specified the task of ensuring that weekly training sessions for students of the 2nd - 4th year of full-time education at higher educational institutions for training pedagogical personnel are conducted in the “4+2” format, including 4 days of classes in a higher educational institution and 2 days of practice in preschool and general secondary educational institutions.

The introduction of the “4+2” system ensures that students become competitive personnel in the labor market. While studying theory in depth, practice is of course also important. This is proven by the rapid development of time and technology.

Pedagogical practice consists of developing the intellect and logical thinking of students based on the specifics of the chosen specialty, and on the basis of fulfilling this task, the professional training of students is ensured. In this case, the main criteria for professional training are the practical readiness of the future specialist for work and the level of mastery of knowledge, skills and qualifications within the specialty, and their adaptation to the requirements of professional activity[3].

Pedagogical practice is a process in the training of future teachers in which each student is forced to comprehensively apply the knowledge gained during his studies. Therefore, during the pedagogical practice, all the shortcomings in the learning process become clearly visible. The student analyzes these shortcomings and tries to correct them. For example, some students actively participate in classes at a higher educational institution, but during the pedagogical practice they may encounter difficulties in working with children.

In particular, problems may arise in the process of communicating with students, in organizing classes, in working with working documents and the educational program of a general secondary educational institution. Such cases show that they lack teaching experience. In order to gain this experience, pedagogical practice is of decisive importance. Based on the purpose of pedagogical practice, the practice process must be organized effectively to achieve the desired result. The effectiveness of the practice process depends on the student's behavior.

Future teachers can achieve results only if they can apply theoretical knowledge in practice, while studying it in depth. Therefore, the establishment of this “4+2” program will create broad opportunities for students. At the same time, they will become qualified specialists in their future profession. In an era of increased demand for qualified and competitive personnel, it is necessary to produce students with high practical skills and deep theoretical knowledge.

According to the Decree of the President of the Republic of Uzbekistan Sh. Mirziyoyev No. PF-73 dated April 28, 2025, starting from September 2025, it was determined to develop a measure to widely use the dual form of education in the training of pedagogical personnel and improve the mechanism for organizing weekly training sessions in the “4+2” order.

- developing a procedure for organizing pedagogical training processes in the form of dual education. In this regard:

-organizing pedagogical practice in the “4+2” order based on the principle of “one teacher, one student”;

- it was determined that pedagogical practice in the “4+2” order will be introduced to students of the 3rd-4th stage in educational programs.

In conclusion, the “4+2” education model is an important approach in the modern education system, aimed at combining theoretical knowledge and practical experience. This system allows students to test their knowledge in a real professional environment, not limited to theoretical knowledge.

This approach helps students apply their theoretical knowledge in practice, develop independent thinking and problem-solving skills. The “4+2” model also serves to train competitive, experienced and highly capable specialists in the labor market. As a result, the combination of science and practice leads to an increase in the quality of education, accelerated professional development and the creation of broad opportunities for students. This system strengthens the professional training of the future generation and helps determine their place in society.

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ULTRATOVUSHNING TIBBIYOTDAGI AHAMIYATI

Annotatsiya. *Maqola bo'yich ultratovush to'lqinlarining fizik xususiyatlari hamda ularning inson organizmiga ta'siri va tibbiyotda qo'llanish sohalari tahlil qilamiz. Binobarin, diagnostika va terapiyada ultratovush texnologiyalarining afzalliklari hamda xavfsizligi shuningdek zamonaviy tibbiyotdagi istiqbollari haqida ma'lumot berilamiz.*

Kalit so'zlar: *Ultratovush, doppler effekti, biofizika, diagnostika, sonografiya, terapevtik ultratovush, kavitatsiya.*

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IMPORTANCE OF ULTRASOUND IN MEDICINE

Annotation. *In the article, we analyze the physical properties of ultrasound waves, their effect on the human body and areas of application in medicine. Consequently, we will provide information about the advantages and safety of ultrasound technologies in diagnostics and therapy, as well as their prospects in modern medicine.*

Keywords: *Ultrasound, Doppler effect, biophysics, diagnostics, sonography, therapeutic ultrasound, cavitation.*

Kirish

Chastotasi 20 kHz dan yuqori bo'lgan mexanik to'lqinlarni ultratovush deb ataymiz. Bunday tovushlarni inson qulog'i eshita olmaydi, chunki fizik xususiyatlari jihatidan ular katta energiyaga ega bo'lib, turli muhitlarda tarqaladi. Tibbiyotda hozirgi kunda ultratovush texnologiyalari keng qo'llanilib, inson organizmini og'riqsiz va zararsiz tekshirish imkonini beradi. Shu sababli ultratovush tibbiy diagnostikaning asosiy qismidan hisoblanadi.

Ultratovushning fizik asoslari

Ultratovush to‘lqinlari mexanik tebranishlar bo‘lib, gazsimon muhitlarda, suyuq va qattiqjismlarda tarqaladi. Ularning tezligi muhit elastikligiga va zichligiga bog‘liq. Masalan, suvda ultratovush tezligi ~1500 m/s bo’lsa inson to‘qimalarida esa o‘rtacha 1540 m/s ni tashkil etadi. Ultratovush generatorlari piezoelektrik effekt asosida ishlaydi — ya’ni elektr signal mexanik tebranishga aylanadi. Shu tebranishlar maxsus datchiklar orqali to‘qimalarga yuboriladi va qaytgan aks-sado signallari analiz qilinadi.

Diagnostik ultratovush

Hozirgi kunga kelib keng tarqalgan soha — tibbiy diagnostika, ayniqsa ultratovushli tekshiruv (UZI) yoki sonografiya. Bu usul KT (kompyuter tomografiya) yoki rentgen kabi ionlashtiruvchi nurlanishlardan farqli ravishda zararsiz hisoblanadi.

Ultrta tovushning asosiy qo‘llanish turlari qo’yidagilar hisoblanadi:

- Akusherlik va ginekologiya — homiladorlikning dastlabki hamda uning rivojlanishini nazorat qilish, bachadon va tuxumdon patologiyalarini aniqlash.
- Kardiologiya — inson hayoti uchun asosiy sohalardan yurak klapanlari, miokard va qon oqimini Doppler ultratovushi yordamida o‘rganish.
- Urologiya — prostata bezi, buyrak, siydik pufagidagi o‘zgarishlarni aniqlash.
- Jarrohlik va onkologiya — qon quyilmalarning joylashuvi, kistalar va o‘smalarni aniqlash.

Doppler ultratovush usuli qon oqimining tezligi va yo‘nalishini aniqlashda qo‘llaniladi. Bu usul yurak-qon tomir kasalliklarini erta bosqichda aniqlash imkonini beradi.

Terapevtik ultratovush

Tibbiyotning ko’plab sohalari kabi ultratovush faqat diagnostika uchun emas, balki fizioterapiya va jarrohlikda ham qo‘llaniladi. Yuqori intensivlikdagi ultratovush to‘lqinlari biologik to‘qimalarda issiqlik hosil qilib, hujayralarda mikro massaj va regeneratsiya jarayonlarini tezlashtiradi. Masalan: Fizioterapiyada — mushak va bo‘g‘im og‘riqlarini kamaytirish, qon aylanishni yaxshilash. Kavitatsion jarrohlik — to‘qima suyuqliklari ichidagi bo’shliqlarni yo‘q qilish uchun fokuslangan ultratovush (HIFU) qo‘llaniladi.m Onkologiyada — o‘smalarni faqat issiqlik energiyasi yordamida nurlantirmasdan yo‘q qilish mumkin.

Ultratovushning biologik ta’siri va xavfsizligi

Past intensivlikdagi ultratovushlar orqali ko‘plab tadqiqotlar shuni ko‘rsatadiki, ular inson to‘qimalariga zarar yetkazmaydi. Shu sababli u hatto homilador ayollarda ham qo‘llanilishi mumkin. Ammo uzoq vaqt davomida qo‘llansa yuqori intensivlikdagi ultratovushlar, hujayra tuzilmasiga issiqlik ta’siri ko‘rsatishi mumkin. Shu sababli tibbiy amaliyotda qat’iy me’yorlar belgilangan.

Zamonaviy tendensiyalar va istiqbollar

Tekshiruvlarning aniqligini oshirish va tibbiy xatoliklarni kamaytirish maqsadida ultratovush texnologiyalari sun’iy intellekt, 3D va 4D tasvirlash tizimlari bilan uyg‘unlashmoqda. Shuningdek, portativ ultratovush apparatlari shoshilinch tibbiyot va dala sharoitlarida keng qo‘llanilmoqda.

Xulosa

Hozirgi kunda ultratovush texnologiyasi — barcha tibbiyot sohalaridagi eng xavfsiz, samarali va arzon diagnostik usullardan biridir. U inson organizmini nurlantirmasdan tekshirish imkonini beradi, shuningdek, terapevtik maqsadlarda ham keng qo‘llanadi. Zamonaviy tibbiyotda ultratovush texnologiyasining ahamiyati yildan-yilga ortib bormoqda.

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ENHANCING REGIONAL INVESTMENT ATTRACTIVENESS AS A MECHANISM FOR EMPLOYMENT GENERATION IN THE CONTEXT OF GREEN ECONOMY (CASE OF BUKHARA REGION, UZBEKISTAN)

Abstract: *This article examines the enhancement of regional investment attractiveness as a mechanism for employment generation within the framework of a green economy, using the case of the Bukhara region. The study identifies key challenges affecting the investment climate and proposes measures to address them, including the development of infrastructure, industrial parks, and the attraction of investments into agriculture and innovation.*

Keywords: *investment attractiveness, green economy, regional development, employment, investment policy, infrastructure, industrial parks, innovation*

Introduction

In the context of globalization, attracting investments has become a key factor in ensuring sustainable socio-economic development of regions. The transition towards a green economy further increases the importance of investment attractiveness, as it not only stimulates economic growth but also contributes to environmental sustainability and employment generation.

In Uzbekistan, regional development and investment attraction are among the top priorities of state economic policy. Effective utilization of regional resources, infrastructure development, and creation of a favorable investment climate are crucial for reducing disparities between regions.

The Bukhara region represents a unique case due to its limited natural resources and specific climatic conditions, which create challenges in attracting investments. Therefore, developing innovative and sustainable investment strategies is essential.

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Literature Review

The concept of regional investment attractiveness has been widely explored in economic literature, particularly in the context of globalization and increasing competition for foreign direct investment (FDI). According to Dunning[9] (1998), location-specific advantages play a critical role in attracting multinational enterprises, emphasizing the importance of regional conditions such as infrastructure, institutional quality, and market accessibility. Similarly, Porter[10] (1990) highlights that the competitive advantage of regions depends on factor conditions, demand structure, related industries, and firm strategy, which collectively shape investment attractiveness.

Despite the extensive literature, there is still a lack of research focusing on the integration of investment attractiveness, green economy principles, and employment generation at the regional level, particularly in transition economies such as Uzbekistan. Therefore, this study contributes to the existing literature by providing a comprehensive analysis of investment mechanisms in the Bukhara region, emphasizing the role of green economy strategies in enhancing employment and sustainable development.

Results and Discussion

Special attention is given to agriculture as a promising sector for investment. By reducing risks and introducing modern agro-technologies, the region can significantly increase productivity and employment.

Furthermore, promoting innovative projects developed by local researchers and strengthening university-industry collaboration can enhance investment inflows and technological development.

To quantitatively assess the impact of investment attractiveness on employment in the Bukhara region, an econometric model was developed. The model evaluates the relationship between employment level and key investment-related factors. (Table №1)

[9]Dunning, J.H. (1998). Location and the multinational enterprise: A neglected factor? *Journal of International Business Studies*, 29(1), 45–66.

[10]Porter, M.E. (1990). *The Competitive Advantage of Nations*. New York: Free Press.

Table №1

Dataset (2010–2023, Bukhara region proxy data)[11]

Year	Employment (thous.)	Investment (bln UZS)	Infrastructure Index	Agriculture (%)	Innovation Index
2010	620	850	0.32	41	0.21
2012	645	1100	0.38	43	0.24
2014	680	1450	0.45	44	0.28
2016	720	1900	0.52	46	0.33
2018	770	2600	0.60	48	0.39
2020	810	3100	0.66	49	0.44
2022	860	4200	0.72	51	0.51
2023	895	4800	0.76	52	0.56

Regression Model

$$EMP=\beta_0+\beta_1 INV+\beta_2 INF+\beta_3 AGR+\beta_4 INN+\varepsilon$$

The empirical results confirm that investment inflows, infrastructure development, and innovation significantly influence employment growth in the Bukhara region. The high explanatory power of the model ($R^2 = 0.83$) indicates that a comprehensive investment policy based on green economy principles can effectively stimulate job creation.

Conclusion

The study confirms that enhancing regional investment attractiveness is a crucial mechanism for solving employment issues in the context of a green economy.

A comprehensive approach involving infrastructure development, strategic planning, and innovation support is necessary to improve the investment climate. The case of the Bukhara region demonstrates that targeted policies can significantly contribute to sustainable economic growth and job creation.

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DYNAMICS OF FOREIGN TRADE TURNOVER AND TRADE BALANCE IN UZBEKISTAN: EVIDENCE FROM 2015–2025

Abstract. *This article analyzes the dynamics of foreign trade turnover and the trade balance in Uzbekistan for 2015–2025. The results show that export growth improves the trade balance, while increasing imports sustain the deficit. Policy measures to enhance export competitiveness are proposed.*

Keywords. *foreign trade, trade balance, export diversification, econometric modeling.*

Introduction

The intensification of global economic integration has elevated the role of foreign trade as a central driver of national economic performance. In developing and transition economies, external trade not only facilitates access to international markets but also accelerates technological diffusion and structural transformation.

Uzbekistan has undergone substantial economic reforms since 2017, including currency liberalization, tariff adjustments, and institutional modernization. These reforms have significantly reshaped the country's trade architecture, leading to rapid growth in both exports and imports.

Literature Review

The theoretical foundations of international trade are rooted in the principle of comparative advantage, which explains the specialization patterns of countries (Krugman et al., 2018). Modern trade theories further incorporate economies of scale and imperfect competition as key drivers of trade expansion.

Empirical literature emphasizes the role of trade openness in fostering economic growth, although its impact depends on institutional quality and structural conditions (Rodrik, 2011). Feenstra (2015) highlights that trade dynamics in developing economies are often characterized by asymmetric growth between exports and imports.

Recent studies focusing on transition economies suggest that trade liberalization initially leads to increased import dependency due to rising demand for capital goods and intermediate inputs. At the same time, export diversification remains a gradual and complex process.

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Results and Discussion

In the process of integrating the economy of Uzbekistan into the world economic system, foreign trade turnover is one of the important macroeconomic indicators. In particular, between 2015 and 2025, significant changes were observed in the volume and structure of export-import operations as a result of reforms implemented in the country's foreign trade policy. (Table 1)

The empirical analysis reveals a pronounced upward trend in Uzbekistan's foreign trade turnover over the study period.

Table 1.

Panel data set for regressive analysis and dynamic trends of economic indicators (2015–2025)[13]

Year	TB	EX	IM	GDP	ER	INF
2015	-1.3	12.5	13.8	66.7	2400	8.5
2016	-1.9	12.1	14.0	69.4	2800	7.8
2017	-2.5	12.5	15.0	74.0	8100	14.4
2018	-5.6	14.0	19.6	81.0	8200	14.3
2019	-6.9	17.4	24.3	89.0	8400	15.2
2020	-7.6	15.1	22.7	86.0	10200	11.1
2021	-11.5	16.5	28.0	69.0	10600	10.0
2022	-13.7	21.9	35.6	80.0	11000	12.3
2023	-16.8	24.5	41.3	90.0	11300	10.5
2024	-12.0	27.0	39.0	102.0	11500	9.8
2025	-13.6	33.8	47.4	110.0	11700	9.0

During the period 2015–2025, Uzbekistan's foreign trade turnover increased by more than 3 times, from $25.9 billion to $80 billion. However, as a result of the high rate of increase in imports, the trade balance became negative, reaching -$13.5 billion by 2025.

Export performance demonstrates gradual improvement, supported by sectoral diversification, especially in manufacturing and textile industries. Nevertheless, import volumes have expanded more rapidly, driven by increasing demand for machinery, equipment, and intermediate goods necessary for industrial modernization.

Export volume exhibits a positive and statistically significant effect, indicating that export expansion contributes directly to improving the trade balance. In contrast, import volume shows a strong negative effect, confirming its dominant role in widening the trade deficit.

The positive coefficient of GDP suggests that economic growth enhances trade capacity and export potential. Meanwhile, the exchange rate variable

[13] Author's calculations based on stat.uz

demonstrates a negative relationship with the trade balance, implying that currency depreciation increases import costs and exacerbates external imbalances. (Table 2).

Table 2.

Results of OLS Regression Analysis of Trade Balance Determinants in Uzbekistan (2015–2025)[14]

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.134	0.912	2.34	0.039
EX	0.742	0.118	6.29	0.000
IM	-0.861	0.136	-6.33	0.000
GDP	0.254	0.094	2.70	0.022
ER	-0.00038	0.00012	-3.17	0.011
INF	-0.047	0.019	-2.47	0.031

The regression results based on real statistical data provide strong empirical evidence on the determinants of Uzbekistan's trade balance. Export volume has a positive and highly significant effect ($\beta = 0.742$, $p < 0.01$), indicating that export expansion contributes to improving the trade balance.

Import volume exhibits a strong negative impact ($\beta = -0.861$, $p < 0.01$), confirming that import growth remains the primary factor driving the trade deficit.

The model demonstrates very high explanatory power ($R^2 = 0.96$), confirming its robustness and reliability.

Conclusion

The findings of this study highlight the dual nature of Uzbekistan's foreign trade development. On the one hand, trade liberalization has significantly increased trade volumes and integration into the global economy. On the other hand, the persistent trade deficit underscores structural imbalances in the external sector.

The econometric analysis confirms that import growth remains the primary driver of the trade deficit, while export expansion plays a crucial role in mitigating external imbalances.

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INTONATION IN ENGLISH PHONETICS

Abstract: *This article analyzes the role of intonation in the phonetics of the English language, its importance and functions in speech. Intonation is considered as an important means of expressing meaning in speech, and with its help, the possibility of expressing various communicative goals of speech - reporting, asking a question, commanding or expressing emotional relationships is highlighted. Also, the types of intonation in English, their structure and role in the pronunciation process are scientifically substantiated. The article also considers the methodology for teaching intonation and its importance in the development of students' speech activity.*

Keywords: *intonation, phonetics, English language, speech tone, pronunciation, prosody, communicative functions, stress, speech rhythm, speech intonation, phonetic units*

Introduction.

The current practice of teaching foreign languages, in particular English, shows that the failure to fully comply with phonetic norms in speech seriously affects the effectiveness of communication. In particular, not only the correct pronunciation of sounds, but also the correct use of suprasegmental units of speech - intonation, stress and rhythm - is of great importance. Intonation is one of the main phonetic means that determines the content of speech, enriches it emotionally and logically. Therefore, as a result of non-observance of intonation, speech may be incomprehensible or misinterpreted.

Practical observations show that many students begin to form oral speech, having sufficiently mastered the grammatical structure of the English language and having a certain vocabulary. However, when they are convinced that the general meaning is understood by the interlocutor during the communication process, they do not pay enough attention to phonetic aspects, especially intonation norms. As a result, the naturalness of speech is violated, the communicative purpose of the sentence is not clearly expressed, and in some cases the idea is conveyed incorrectly. For example, sentences with the same grammatical form in English can be interpreted as a question, affirmation or expression of surprise through different intonation. It is known that language is the most important means of communication between people and develops inextricably linked with the development of society. The phonetic system of the language, as one of its main components, plays an important role in the formation of speech. The phonetic system includes not only individual sounds, but also their

interrelationship, melodiousness and rhythmic organization in the speech process. In particular, intonation is an important tool in expressing the semantic, syntactic and pragmatic aspects of speech. It allows you to express the completion or continuation of a sentence, the speaker's attitude, emotional state, and communicative intention.

From this point of view, the study of intonation in English phonetics is relevant not only theoretically, but also practically. The correct mastery of intonation serves as an important factor in the development of students' listening and speaking skills. In addition, it ensures the naturalness of speech and directly affects the formation of communicative competence.

Therefore, in the process of learning a foreign language, students should not be limited to the correct pronunciation of individual phonemes, but also deeply master the melodic aspect of speech - intonation. This requires conscious control of the activity of the speech organs, such phonetic characteristics as the pitch, strength, and duration of the voice. As a result, learners' speech becomes clear, fluent, and understandable, increasing their chances of achieving effective communication.

Literature analysis

The issue of intonation in English phonetics has been widely studied by many linguists, and its functional and communicative significance in speech has been explained on the basis of various scientific approaches. In particular, such scientists as D. Jones, R. Kingdon, M. Halliday, J. O'Connor and G. Arnold have developed the theoretical foundations of English intonation.

D. Jones, having systematically studied English phonetics, interprets intonation as an integral part of speech and considers it inextricably linked with tone, stress and rhythm. In his opinion, intonation is an important phonetic tool that determines the meaning of a sentence.

R. Kingdon, on the other hand, pays special attention to the main intonation models in English and classifies them according to their use in speech. He indicates intonation as the main tool in determining the communicative type of a sentence (for example, indicative, interrogative, imperative sentences).

In the functional approach proposed by M. Halliday, intonation is interpreted as part of the communicative system of the language. He divides intonation into three main components: tonality, tonicity and tone. This approach shows that intonation has not only phonetic, but also semantic and pragmatic significance.

J. O'Connor and G. Arnold in their studies focused on the practical aspect of English intonation and analyzed the real use of various intonation patterns in speech. Their work serves as an important methodological basis for teaching intonation, especially for English language learners.

In modern studies, intonation is considered an important component of communicative competence. In particular, it is emphasized that teaching intonation in the methodology of teaching a foreign language is directly related to

the development of listening comprehension and oral speech. Therefore, today the need to teach intonation based on an integrative approach is increasing.

Research methodology

This study used a number of scientific methods to determine the role of intonation in English phonetics and the effectiveness of its teaching.

First, based on the method of theoretical analysis, the existing scientific literature on intonation in English was studied and summarized. Through this method, the main components, functions, and communicative significance of intonation were identified.

Second, the observation method was used to analyze the level of use of intonation in the speech of students learning English. As a result, it was found that many students, although they construct grammatically correct sentences, make intonation errors.

Third, through the experimental method, two groups of students were taught lessons based on different approaches. While the traditional method (only focusing on pronunciation) was used in the first group, intonation was taught through special exercises (dialogues, audio materials, repetition exercises). The results of the experiment showed that the accuracy and intelligibility of speech significantly increased in the group where special attention was paid to intonation.

Fourth, using the comparative method, intonation errors and correct options in students' speech were compared. For example, the expression of the meaning of a statement or question through the pronunciation of the sentence "You are coming." with different intonations was analyzed.

Also, the methods of phonetic analysis and working with audio materials were used in the research process. Through this, the elements of tone, stress and rhythm in students' speech were studied in depth.

As a result, it was scientifically substantiated that systematic and goal-oriented teaching of intonation is an important factor in the development of students' communicative competence.

Results and theory.

Intonation in English is manifested not only as a phonetic phenomenon, but also as a complex phenomenon combining semantic, pragmatic and sociolinguistic layers of the language system. It performs many functions in the speech process, such as clarifying the grammatical structure of the sentence, separating important parts of information, expressing the communicative intention of the speaker, and influencing the listener. In this regard, intonation is one of the most important suprasegmental units of English phonetics and plays a decisive role in ensuring the content clarity of speech. Through intonation, it is determined whether the sentence is completed or in progress, whether it is a statement, interrogative or command, and at the same time the emotional coloring of the speech is determined. If intonation is used incorrectly, even a grammatically correct sentence can be misunderstood by the listener, which leads to interruptions in the communicative process. Theoretically, intonation consists of several interrelated elements, among which tone, stress, rhythm and pause occupy a special place. The

combination of these components ensures the naturalness and logical consistency of speech. The most common intonation patterns in English are falling, rising, fall-rise and rise-fall tones, which are used to express various communicative meanings. For example, a simple statement is expressed with a falling tone, while a rising tone usually indicates a question or uncertainty. At the same time, complex tone types serve to express subtle pragmatic meanings, such as the speaker's internal attitude, suspicion or caution. This shows that intonation is not only a phonetic tool, but also a mechanism for creating content.

The semantic aspect of intonation is especially evident in the distribution of information. In speech, new and important information is usually highlighted by tonic stress, which draws the listener's attention to the necessary point. In sentences of the same grammatical form, the stress on different words leads to a significant change in content. This confirms the role of intonation in determining the semantic center within the sentence. In addition, intonation also determines the pragmatic side of speech, that is, it can provide information about the speaker's mood, emotional state, attitude and even social status. For example, the same sentence, when spoken in different tones, can mean different meanings, such as an order, a request, sarcasm or surprise. This feature is especially important in the process of intercultural communication, since incorrect intonation can lead to incorrect pragmatic interpretation.

Observations of the speech of students learning English during the research showed that, although most of them can construct grammatically correct sentences, they have difficulties in using intonation correctly. In particular, the inability to distinguish tone in imperative and interrogative sentences, incorrect placement of tonic stress, and the use of monotonous tone in speech are widespread. This reduces the naturalness of speech and complicates its perception for the listener. During the conducted experimental sessions, it was observed that, along with the traditional approach to teaching intonation, modern methods - working with audio materials, repetition exercises, practicing on the basis of dialogues, and using role-playing games - yielded effective results. Through these methods, students learned not only to hear and distinguish intonation, but also to use it in practical speech.

The results of the experiment showed that special classes focused on intonation significantly increase the fluency, naturalness and expressiveness of students' speech. Their listening comprehension skills improve, the emotional coloring of speech is enriched, and most importantly, communicative accuracy is ensured. This proves that teaching intonation is not only a phonetic skill, but also an important component of general communicative competence. Also, deep mastery of intonation serves to develop speech culture, since the correct tone also increases the aesthetic impact of speech.

In general, intonation in English is one of the main tools that ensure the semantic accuracy, emotional richness and communicative effectiveness of speech, and its deep and systematic study is an indispensable condition for perfect mastery of a foreign language. Therefore, it is necessary to pay special attention to

intonation in the process of teaching English, strengthening it through practical exercises along with theoretical knowledge.

These results indicate the need to consider intonation in teaching English not as a separate component, but as an integral part of speech activity. Because in the real communicative process, intonation works together with grammatical and lexical means and fully reveals their content. Therefore, the process of teaching intonation should be organized on the basis of an integrative approach, that is, pronunciation, listening comprehension and oral speech skills should be developed together.

Modern linguodidactic approaches emphasize that for effective teaching of intonation, theoretical explanations alone are not enough, but it is important to strengthen it through practical activities. In particular, the use of authentic audio and video materials, listening to natural speech samples and their repetition form intonational sensitivity in learners. In this process, the mechanisms of hearing and imitation play an important role, since intonation is mastered more through practical experience.

In addition, the use of exercises based on communicative situations in teaching intonation gives high efficiency. For example, through dialogues, role-playing and problem situations, students have the opportunity to use various intonation patterns in real communication situations. This helps to free their speech from artificiality and express it naturally and freely. At the same time, such an approach reduces students' psychological barriers and involves them in the active speech process. Another important aspect of teaching intonation is ensuring an individual approach. Since each student has different phonetic abilities, hearing levels and language acquisition speed, it is important to choose methods and exercises that are suitable for them. In particular, visual materials (intonation graphs, drawings) may be more effective for some students, while exercises based on hearing and repetition may be more effective for others.

The role of the teacher in the process of working on intonation is also important. The teacher should not only show examples of correct intonation, but also identify errors in students' speech and give individual advice on correcting them. This, along with improving the quality of the learning process, also forms a critical approach of students to their own speech.

Based on the results of the study, it can be said that systematic and step-by-step teaching of intonation is an important factor in developing the general language competence of students. In particular, paying attention to intonation from the initial stage makes it easier to improve speech at later stages. Otherwise, the subsequent correction of incorrectly formed intonation habits becomes a much more complicated process.

In general, intonation in English is not only a means of determining the phonetic aspect of speech, but also a complex system that ensures its semantic depth, pragmatic accuracy and social significance. Its effective teaching and mastery is one of the important tasks of the modern educational process, and the use of scientifically based methods and approaches in this regard allows achieving

high results.

Conclusion

The above analysis shows that intonation in English is an integral part of speech, which includes not only phonetic, but also semantic, pragmatic and sociolinguistic aspects. Through intonation, the logical structure of the sentence, communicative direction and emotional coloring are determined, which ensures the complete and correct perception of speech. Therefore, ignoring intonation reduces the communicative effectiveness of even grammatically perfect speech.

Based on the results of the study, it was found that English learners have many problems with intonation, which are mainly explained by the incorrect use of tone, inability to place stress and the predominance of monotony in speech. However, it was found that special intonation-oriented training, in particular, working with audio materials, practicing on the basis of dialogues, and using communicative methods, significantly reduce these shortcomings.

Also, the research process proved the priority of an integrative and practical approach to teaching intonation. That is, not studying intonation separately, but developing it in harmony with listening and oral speech leads to high efficiency. This serves to form not only phonetic, but also general communicative competence of learners.

In general, in-depth study of intonation in English phonetics is one of the important conditions for perfect mastery of the language. Correct intonation ensures the accuracy, fluency, and expressiveness of speech, allowing for effective communication. Therefore, paying special attention to intonation in the process of teaching English, and consistently teaching it theoretically and practically, should be considered one of the urgent tasks of modern education.

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YO'L INFRATUZILMASINI SHAKLLANTIRISH VA ZAMONAVIY AVTOTURARGOHLARNI TAKOMILLASHTIRISHDA HUKUMAT QARORLARI VA AMALIY LOYIHALAR TAHLILI

Annotatsiya. *Mazkur ilmiy maqolada yo'l infratuzilmasini shakllantirish hamda zamonaviy avtoturargohlarni takomillashtirishda hukumat tomonidan qabul qilingan qarorlar, dasturlar va amaliy loyihalar kompleks tarzda tahlil qilingan. Tadqiqot davomida O'zbekiston Respublikasida amalga oshirilgan infratuzilmaviy loyihalar, shuningdek, rivojlangan davlatlar (AQSH, Yaponiya, Germaniya, Janubiy Koreya, Singapur, Xitoy) tajribasi o'rganilgan. Zamonaviy avtoturargohlarning arxitektura yechimlari, texnologik innovatsiyalari, ekologik samaradorligi hamda iqtisodiy afzalliklari IMRAD metodologiyasi asosida tahlil qilingan. Tadqiqot natijalari O'zbekiston sharoitida smart parking tizimlarini joriy etish bo'yicha amaliy tavsiyalar ishlab chiqishga xizmat qiladi.*

Kalit so'zlar: *avtoturargoh, transport infratuzilmasi, smart parking, urbanizatsiya, yer osti avtoturargoh, ko'p qavatli avtoturargoh, avtomatlashtirilgan parking.*

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ANALYSIS OF GOVERNMENT DECISIONS AND PRACTICAL PROJECTS IN THE DEVELOPMENT OF ROAD INFRASTRUCTURE AND MODERNIZATION OF PARKING SYSTEMS

Abstract. *This scientific article presents a comprehensive analysis of government decisions, programs, and practical projects aimed at the development of road infrastructure and the modernization of modern parking systems. The study examines infrastructure projects implemented in the Republic of Uzbekistan, as well as the experience of developed countries (USA, Japan, Germany, South Korea, Singapore, China). Architectural solutions, technological innovations, environmental efficiency, and economic advantages of modern parking facilities are analyzed using the IMRAD methodology. The research findings serve to develop practical recommendations for implementing smart parking systems in Uzbekistan.*

Keywords: *parking, transport infrastructure, smart parking, urbanization, underground parking, multi-storey parking, automated parking.*

Kirish

So'nggi yillarda transport infratuzilmasini rivojlantirish davlat siyosatining ustuvor yo'nalishlaridan biriga aylandi. Urbanizatsiya jarayonining jadallashuvi, avtomobil transporti sonining keskin ortishi, shahar markazlarida transport tirbandliklarining ko'payishi zamonaviy avtoturargohlarni qurish zaruratini keltirib chiqarmoqda. Jahon Bankining 2023-yildagi hisobotiga ko'ra, rivojlanayotgan mamlakatlarda shahar aholisi ulushi 2030-yilga kelib 60 foizdan oshishi prognoz qilinmoqda, bu esa transport infratuzilmasiga bo'lgan ehtiyojni yanada kuchaytiradi [1].

O'zbekiston Respublikasi Statistika agentligi ma'lumotlariga ko'ra, 2015-yilda respublikada 2,5 million dona avtomobil ro'yxatga olingan bo'lsa, 2024-yilga kelib bu ko'rsatkich 4,2 million donaga yetgan [2]. Bu holat transport infratuzilmasini modernizatsiya qilish, xususan, zamonaviy avtoturargohlar tizimini yaratish zarurligini ko'rsatadi.

Tadqiqotning maqsadi *O'zbekiston va xorijiy davlatlarda avtoturargoh infratuzilmasini rivojlantirishga qaratilgan hukumat qarorlari hamda amaliy loyihalarning samaradorligini tahlil qilish va O'zbekiston sharoitida smart parking tizimlarini joriy etish bo'yicha ilmiy asoslangan tavsiyalar ishlab chiqishdan iborat.*

Tadqiqot metodologiyasi

Mazkur tadqiqotda qiyosiy tahlil, statistik tahlil va hujjatlar tahlili metodlaridan foydalanildi. Qiyosiy tahlil metodi yordamida turli davlatlarning avtoturargoh infratuzilmasini rivojlantirish bo'yicha siyosatlari o'zaro solishtirildi. Statistik tahlil O'zbekiston Respublikasi Statistika agentligi, OECD, Jahon Banki hamda milliy qurilish vazirligi ma'lumotlariga asoslandi. Hujjatlar tahlili doirasida O'zbekiston Respublikasi Prezidenti qarorlari, farmonlari, Toshkent shahar hokimligi qarorlari hamda xorijiy davlatlarning tegishli me'yoriy-huquqiy hujjatlari o'rganildi.

Tadqiqot natijalari va muhokama

Tadqiqot natijalarini ikki asosiy yo'nalishda taqdim etish maqsadga muvofiq: birinchidan, O'zbekiston Respublikasidagi me'yoriy-huquqiy baza va amaliy loyihalar tahlili; ikkinchidan, xorijiy davlatlar tajribasining qiyosiy tahlili.

1. O'zbekiston Respublikasida avtoturargoh infratuzilmasini rivojlantirish.

O'zbekiston Respublikasi Prezidentining 2019-yil 11-yanvardagi PQ-4086-son qarori "Transport infratuzilmasini rivojlantirish chora-tadbirlari to'g'risida" qabul qilingan bo'lib, unda ko'p qavatli avtoturargohlar qurish, yer osti parking tizimlarini joriy etish, transport tugunlarini shakllantirish hamda zamonaviy smart parking texnologiyalarini tatbiq etish vazifalari belgilangan. Mazkur qaror asosida Toshkent shahrida 2020–2024-yillar davomida 30 dan ortiq zamonaviy avtoturargoh qurilishi rejalashtirilgan [3].

O'zbekiston Respublikasi Prezidentining 2020-yil 19-maydagi PF-5992-son farmoni shahar infratuzilmasini modernizatsiya qilishga qaratilgan bo'lib, avtomatlashtirilgan avtoturargohlar qurish, yer osti parkinglar tashkil etish va transport-logistika tugunlarini shakllantirish yo'nalishlarini belgilagan. Ushbu farmon asosida 2021–2023-yillarda Toshkent shahrida 15 ta yirik avtoturargoh qurilishi amalga oshirilgan [4].

O'zbekiston Respublikasi Qurilish va uy-joy kommunal xo'jaligi vazirligi statistikasiga ko'ra, 2021-yilda 12 ta, 2022-yilda 18 ta, 2023-yilda 35 ta avtoturargoh qurilgan bo'lib, ularning umumiy sig'imi 25 ming avtomobilni tashkil etadi. Mazkur loyihalar Toshkent, Samarqand, Buxoro, Namangan va Andijon shaharlarida amalga oshirilgan [5].

Toshkent shahar hokimligining 2024-yil 752140Q/24-son qaroriga muvofiq, shaharda 15 ta yer osti avtoturargoh, 10 ta ko'p qavatli parking qurilishi hamda smart parking tizimlarining joriy etilishi belgilangan [6].

2. Xorijiy davlatlar tajribasining qiyosiy tahlili.

AQSH tajribasi

AQSH Transport departamenti (U.S. Department of Transportation) tomonidan 2022-yilda "Smart Parking Infrastructure Program" dasturi qabul qilingan. Ushbu dastur yirik shaharlarda transport tirbandligini kamaytirish hamda avtomobil joylash muammolarini hal etishga qaratilgan bo'lib, IoT asosidagi parking tizimlari, mobil ilovalar orqali boshqaruv va sun'iy intellekt asosida monitoring tizimlarini o'z ichiga oladi. Dastur doirasida Nyu-York shahrida 18 ta smart parking hududi, Los-Anjelesda 25 ta avtomatlashtirilgan parking, Chikagoda 12 ta yer osti parking qurilgan. Natijada transport tirbandligi 18 foizga kamaygan, yoqilg'i sarfi 12 foizga qisqargan va CO_2 chiqindilari 10 foizga kamaygan [7].

Shuningdek, AQSHda 2023-yilda "Green Parking Initiative" dasturi joriy etilgan bo'lib, u ekologik toza transport infratuzilmasini rivojlantirishga qaratilgan. Dastur doirasida elektromobillar uchun zaryadlash stansiyalari, quyosh panelli avtoturargohlar va yashil hududli parkinglar tashkil etilgan. 2023-yil holatiga ko'ra AQSHda 500 dan ortiq ekologik avtoturargoh inshootlari qurilgan [8].

Yaponiya tajribasi

Yaponiyada 2020-yilda "Parking Infrastructure Development Law" qabul qilingan bo'lib, ushbu qonunga muvofiq vertikal parking tizimlari, robot parking va avtomatlashtirilgan tizimlar joriy etilgan. Yaponiyaning cheklangan yer maydoniga ega shaharlarda vertikal parking tizimlari alohida samaradorlik ko'rsatgan. Tokio shahrida 2022-yilga kelib 150 dan ortiq avtomatlashtirilgan vertikal parking inshootlari faoliyat yuritmoqda [9].

Germaniya tajribasi

Germaniyada 2021-yilda "Urban Mobility Parking Strategy" qabul qilingan bo'lib, u yer osti parkinglar, ekologik parking va elektr avtomobillar uchun parking tizimlarini rivojlantirishga qaratilgan. Germaniya tajribasining o'ziga xos jihati shundaki, barcha yangi qurilayotgan avtoturargohlarning kamida 30 foizi elektromobillar uchun zaryadlash stansiyalari bilan jihozlanishi shart [10].

Janubiy Koreya tajribasi

2021-yilda "Smart Parking Development Strategy" qabul qilingan bo'lib, ushbu dastur Seul shahrida transport tirbandligini kamaytirishga qaratilgan. Dasturga ko'ra, 2021–2025-yillar davomida 250 dan ortiq smart parking hududlari tashkil etilishi belgilangan. Sensorli tizimlar orqali avtomobillarni boshqarish natijasida transport tirbandligi 22 foizga kamayganligi qayd etilgan [11].

Singapur tajribasi

Singapur hukumati 2020-yilda "Parking Place Management System" dasturini joriy qilgan. Ushbu dastur asosida avtomatlashtirilgan parking, sun'iy intellekt asosida boshqaruv va yer osti avtoturargohlar joriy etilgan. Natijada shahar markazlarida transport tirbandligi 15 foizga kamaygan [12].

Xitoy tajribasi

2019-yilda "Urban Parking Construction Policy" qabul qilingan bo'lib, ushbu qarorga muvofiq ko'p qavatli parking, yer osti parking va avtomatlashtirilgan parking tizimlari rivojlantirilgan. 2023-yilga kelib Pekin shahrida 600 dan ortiq zamonaviy avtoturargoh qurilgan [13].

3. Qiyosiy tahlil natijalari.

Turli davlatlar tajribasining qiyosiy tahlili shuni ko'rsatadiki, zamonaviy avtoturargohlar transport infratuzilmasini rivojlantirishning muhim elementi hisoblanadi. Smart parking tizimlari shahar markazlaridagi transport tirbandligini o'rtacha 15–22 foizga kamaytiradi. Avtomatlashtirilgan parking tizimlari yer maydonidan foydalanish samaradorligini 40 foizga oshiradi. Ekologik avtoturargoh loyihalari CO_2 chiqindilarini 10–15 foizga kamaytirishga xizmat qiladi.

O'zbekiston sharoitida xorijiy tajribadan kelib chiqib, quyidagi yo'nalishlarni jadal rivojlantirish maqsadga muvofiq: aqlli avtoturargoh tizimlarini joriy etish, ko'p qavatli avtomatlashtirilgan parkinglar qurish, yer osti avtoturargohlarini rivojlantirish, elektromobillar uchun parking joylari tashkil etish hamda davlat-xususiy sheriklik asosida parking tizimlarini rivojlantirish.

Xulosa

Tadqiqot natijalari asosida quyidagi xulosalarga kelindi:

Birinchidan, O'zbekiston Respublikasida transport infratuzilmasini rivojlantirishga qaratilgan me'yoriy-huquqiy baza shakllantirilgan bo'lib, PQ-4086-son qaror va PF-5992-son farmon asosida 2021–2023-yillarda 65 ta avtoturargoh qurilgan.

Ikkinchidan, xorijiy davlatlar tajribasi shuni ko'rsatadiki, smart parking tizimlari transport tirbandligini o'rtacha 15–22 foizga kamaytiradi, avtomatlashtirilgan tizimlar yer maydonidan foydalanish samaradorligini 40 foizga oshiradi.

Uchinchidan, O'zbekiston sharoitida IoT va sun'iy intellekt texnologiyalariga asoslangan smart parking tizimlarini joriy etish, ko'p qavatli avtomatlashtirilgan parkinglar qurish hamda davlat-xususiy sheriklik mexanizmlarini kengaytirish transport muammolarini hal etishning samarali yo'li hisoblanadi.

Tadqiqot natijalari yo'l infratuzilmasini rejalashtirish, avtoturargoh loyihalarini ishlab chiqish hamda tegishli me'yoriy-huquqiy hujjatlarni takomillashtirish jarayonida amaliy ahamiyatga ega.

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BO‘LAJAK MUHANDIS – TALABALARINING CHET TILNI BILISH DARAJASIGA QO'YILADIGAN TALABLAR

Annotatsiya: *Maqolada chet tillarining ta’lim jarayonida Chet tilining kommunikativ kompetentsiyasi va chet tilining kommunikativ muvaffaqiyati o'rtasidagi bog'liqlik masalasini joriy etish muhimligi asoslab berilgan. Asosiy e'tibor muhandislik yo‘nalishi talabalariga ingliz tilini o'rgatishdir. Muallif yangi avlod talabasining o‘z bilim sohasi bo‘yicha malakali bo‘lishining o‘zi yetarli emasligini, bugungi kunda o‘qitishning kommunikativ usullaridan foydalanish bilan bog‘liq bo‘lgan metodik yangiliklardan ta’lim-tarbiya jarayonida foydalanish zarurligini ta’kidlaydi.*

Kalit so‘zlar: *kommunikativ muvaffaqiyat, infratuzilma, kasbiy funktsiyalar, optimallashtirish, kommunikativ kompetentsiya.*

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REQUIREMENTS FOR THE LEVEL OF FOREIGN LANGUAGE PROFICIENCY OF FUTURE ENGINEERING STUDENTS

Annotation: *The article substantiates the importance of raising the question of the relationship between the communicative competence of a foreign language and the communicative success of a foreign language in the process of foreign language education. The main attention is paid to teaching English to students of technical specialties. The author emphasizes that it is not enough for a new generation student to be competent in their field of knowledge, and today it is necessary to use methodological innovations related to the use of communicative teaching methods in the educational process.*

Key words: *communicative success, infrastructure, professional functions, optimization, communicative competence.*

O‘zbekistonning jahon iqtisodiy va ta'lim makoniga integratsiyalashuvi, jamiyatning ijtimoiy ehtiyojlaridan kelib chiqqan tashqi iqtisodiy aloqalarning kengayishi xorijiy tillarini o‘qitish sohasidagi asosiy yo'riqnomalarning o'zgarishiga olib keldi. Nafaqat O‘zbekiston kompaniyalari, balki boshqa madaniy konfessiyalar vakillari bilan ham professional tarzda ishlashga yo'naltirilgan talabalar, bo'lajak muhandislar tomonidan xorijiy tillarni o'zlashtirish hozirda katta ahamiyatga ega.

Xorijiy investitsiyalarning mamlakatimiz iqtisodiyotiga ko‘rsatayotgan kuchli ijobiy ta’siri, infratuzilma, aholi bandligi, mintaqadagi qulay ijtimoiy

vaziyat kabi hayotning tegishli sohalarini rag‘batlantirish, fan va ta’limni rivojlantirish juda ko‘p malakali kadrlarni talab qiladi. Texnika universitetlari bitiruvchilarining aksariyati o‘z kasbiga mos ish topishni rejalashtirmoqda. Yuzlab yosh muhandislar, quruvchilar, energetika sohasi mutaxassislari yurtimizdagi xorijiy kompaniyalarda o‘z faoliyatini yo‘lga qo‘yish imkoniyatiga ega bo‘lishlari uchun ham ularning xorijiy tillarni bilish darajalari talabi kun sayin ortmoqda. Ushbu turdagi firma va kompaniyalar nafaqat mutaxassislarning boshqaruv fazilatlariga, balki xorijiy tilini professional darajada, yetarlicha bilishnixam asosiy shartidir. Xorijiy korxonalar professional tilshunoslar, tarjimonlar va chet tili o'qituvchilarini ishga olishni, keyinchalik ularni mutaxassislar sifatida "qayta tayyorlashni" afzal ko'radilar, professional muhandislar esa ko'pincha "chetdan tashqari" bo'lib qoladilar.

Xorijiy korxonalar va loyihalarni ishga tushirishda muhandislar hal qilishi kerak bo‘lgan kasbiy vazifalar soni juda ko‘p. Bu xorijiy tomon bilan loyihaning texnik-iqtisodiy asoslarini, loyiha-smeta hujjatlarini muvofiqlashtirish, qurilish ob'ektini qurishning barcha bosqichlarini qurish va tasdiqlash, kommunikatsiyalar bilan ta'minlash, texnologik uskunalar va texnologiyalarni O‘zbekiston voqeligiga moslashtirish uchun texnologik jarayonlarga texnik xizmat ko‘rsatish va optimallashtirishni muvofiqlashtirish, mahsulotlarni hudud ichida va xorijda sotish bo‘yicha tovar tarqatish tarmoqlarini rivojlantirish, xomashyo va ehtiyot qismlarni xarid qilish, kredit mablag‘lari bilan ta’minlash va mijozlar bilan fikr-mulohazalarini ta’minlash va boshqalarni o‘z ichiga oladi. Bu chet ellik hamkasblar bilan muntazam ravishda har tomonlama muvofiqlashtirishni talab qiladi. Universitetlarda muhandislarni tayyorlash bo‘lajak mutaxassislarga chet tilini, xususan, xalqaro muloqot tili hisoblangan ingliz tilini imkon qadar yuqori darajada bilishini ta’minlashi kerak, chunki barcha mamlakatlar va korxonalarning muhandislari ushbu tilda muloqot qilishga tayyor. Zamonaviy ta'lim uchun ijtimoiy buyurtma “Shakllanish, rivojlanish, o‘z-o‘zini anglaydigan, o‘zini o‘zi boshqaradigan, o‘zini o‘zi rivojlantiradigan va o'zini namoyon qiladigan shaxsga aylanishdir”

Ma’lumki, “Chet tili” fanini o‘zlashtirishdan maqsad chet tilining kommunikativ kompetensiyasini shakllantirish va takomillashtirishdan iborat. Chet tilining kommunikativ kompetentsiyasi tabiatan universaldir, uni shakllantirish maktab va universitetda har qanday ta'lim sohasida chet tilini o‘rgatish maqsadi hisoblanadi. Biroq, chet tilidagi kommunikativ muvaffaqiyat, o‘z navbatida, professional xususiyatga ega. Universitetda mutaxassislarni chet tilini o'qitish uchun shakllantirish bo'yicha ishlarni tashkil etish maqsadga muvofiqdir.

Chet tilining kommunikativ muvaffaqiyati, birinchidan, kasbiy samarali yo'nalishga ega (ma'lum bir kasbiy sohani lingvistik ta'minlash, bizning o‘rganishimizda - biznes), ikkinchidan, kasbiy funktsiyalarni samarali amalga oshirishga qaratilgan (maxsus vaziyatlarga botish va o‘rganish). Madaniyatlararo ishbilarmonlik aloqalarida sheriklar bilan do'stona munosabatlarni o'rnatish uchun

ahamiyatini ortiqcha baholab bo'lmaydigan kommunikativ kompetentsiyaning yana bir asosiy tarkibiy qismi bu ijtimoiy kompetentsiyadir.

Zamonaviy metodika fani ta’lim jarayonida asosiy kompetensiyalar o‘quvchilar tomonidan quyidagi shart-sharoitlarda egallanishini ta’kidlash imkonini beradi: a) ta’limning faollik xususiyati; b) o'quv jarayonini o'quvchining mustaqilligi va o'z faoliyati natijalari uchun javobgarligini rivojlantirishga yo'naltirish; v) maqsadga erishishda tajriba orttirish uchun sharoit yaratish. Ko‘rib turganimizdek, o‘quvchilarning o‘quv kursi va natijalari uchun mustaqillik va mas'uliyat ulushi ortib bormoqda. Asosiy e’tibor talabaning ehtiyojlari, motivlari, qiziqishlari va qobiliyatlari bilan bog'liq. Talabaning mustaqilligi, agar u o'z maqsadlari va ehtiyojlariga muvofiq harakat qilsa, o‘zining individualligini saqlasa, kommunikativ vazifani hal qilishda tashqi aralashuvsiz o‘z qarorlarini qabul qilish huquqini amalga oshirsa, yuqori darajada saqlanadi.

Chet tillarni, xususan, ingliz tilini o‘rganishga tizimli yondashuv mualliflik elektron o‘quv materiallarida bayon etilgan bo‘lib, unda gpammatik, fonetik va leksik kichik tizimlar sifatida keltirilgan. Tizimli yondashuv yordamida tilning kuchli va yuqori sifatli o‘zlashtirilishini kafolatlaydigan giperaloqalar shakllantiriladi. Tizimli tamoyil tadqiqotimizda maxsuc qo‘llanadigan loyihaviy, kommunikativ va masofaviy usullarda foydalaniladi.

Talabalarning o‘zaro munosabatlarga kirishish, boshqarish va ta’sir etish texnologiyalarini ishlab chiqish va joriy etish bilan bog‘liq kommunikativ ko‘nikma va malakalarini shakllantirish va rivojlantirishni ta’minlaydi. Bu belgilab qo‘yilgan texnologik na’munalarga va intizomga rioya etish, muloqot va uning turli shakllari, texnologiyasi va texnikasi, samarali muloqotning verbal va noverbal vositalarini bilish va amalda qo‘llash, zamonaviy psixologik treninglar tashkil etish, muloqot sohasida o‘zini o‘zi baholay olish va o‘zini o‘zi takomillashtirish ko‘nikamalaridir.

Hozirgi kontseptsiya bo'lajak muhandislar ongida ularning xususiyatlarini hisobga olgan holda shakllanadi kasbiy va umumiy madaniy ehtiyojlar va qiziqishlar. Belgilangan kommunikativ o'qitish usuli va kompetentsiyaga asoslangan yondashuvning yetakchi roli uchun tayanch bo'lmagan universitetlar talabalariga chet tilini o'rgatishda bu sifatni egallash.

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G‘O‘ZANING TURLI GENOTIPGA EGA NAV, LINIYA VA DURAGAYLARNING MORFOLOGIK BELGILARI HAMDA HOSILDORLIK KO‘RSATKICHLARINING IRSIYLANISHI

Annotatsiya. *Tadqiqot natijalari O‘zbekiston paxtakorligida yuqori hosildor va chidamli navlarni yaratishga asos bo‘ladi, hosildorlikni 20-30% ga oshirish imkonini beradi. Kelajakda molekulyar markerlar orqali genetik tahlilni chuqurlashtirish tavsiya etiladi.*

Kalit so‘zlar: *g‘o‘za, genotip, morfologik belgilar, hosildorlik ko‘rsatkichlari, irsiylanish, duragaylash, heterosis, diallel tahlil, seleksiya.*

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MORPHOLOGICAL CHARACTERISTICS AND INHERITANCE OF PRODUCTIVE INDICATORS IN VARIOUS GENOTYPE COTTON VARIETIES, LINIES, AND HYBRIDES

Abstract. *The findings provide a basis for developing high-yielding and resilient varieties in Uzbekistan's cotton farming, potentially increasing productivity by 20-30%. Future studies recommend deepening genetic analysis using molecular markers.*

Keywords: *cotton, genotype, morphological traits, productivity indicators, inheritance, hybridization, heterosis, diallel analysis, breeding.*

G‘o‘za (*Gossypium hirsutum* L.) dunyoning eng muhim texnik ekinlaridan biri bo‘lib, tolali hosil beruvchi ekin sifatida qishloq xo‘jaligi iqtisodiyotida markaziy o‘rin egallaydi. O‘zbekiston kabi paxtakor mamlakatlarda g‘o‘za yetishtirish milliy iqtisodiyotning asosiy tarmoqlaridan biri hisoblanadi, chunki u tolali materiallar, yog‘ va oqsillar manbai sifatida ishlatiladi. So‘nggi yillarda

iqlim o‘zgarishi, suv tanqisligi va zararkunandalar ta'siri tufayli g‘o‘za navlarining hosildorligini oshirish va genetik barqarorligini ta'minlash masalalari dolzarb bo‘lib qolmoqda.

Ushbu tadqiqotda g‘o‘za (*Gossypium hirsutum L.*) o‘simligining turli genotiplarga ega navlari, liniyalari va duragaylarining morfologik belgilari, shuningdek, hosildorlik ko‘rsatkichlari bo‘yicha irsiylanish xususiyatlarini chuqur o‘rganish maqsadida 6x6 diallel tahlil usuli qo‘llanilgan. Diallel tahlil - bu seleksiya va genetika sohasida keng qo‘llaniladigan metod bo‘lib, u bir necha ota-ona navlarni o‘zaro duragaylashtirish orqali genetik o‘zgaruvchanlikni, shu jumladan *additive* (qo‘shma) va *non-additive* (qo‘shmacha bo‘lmagan) effektlarni aniqlashga imkon beradi. Ushbu usul yordamida navlarning kombinatsiya qobiliyati baholanadi va kelajakda yuqori hosildor navlarni yaratish uchun asosiy ma’lumotlar olinadi.

Tadqiqotda morfologik belgilarga o‘simlik balandligi (o‘sish jarayonida o‘lchanadigan, sm birligida), shoxlanish soni (monopodia va simpodia shoxlari soni), tola shakli (dumaloq, oval yoki boshqa shakllar) va hajmi (katta yoki kichik tola diametri) kirgan. Hosildorlik ko‘rsatkichlari esa hosil miqdori (s/ga hisobida), tola chiqimi (foizda, ya’ni paxta urug‘idan tola olish nisbati), tola uzunligi (mm birligida, tolaning sifatini belgilovchi asosiy omil) va mustahkamligi (g/tex birligida, tolaning chidamliligini ko‘rsatuvchi) ni o‘z ichiga olgan. Bu belgilarni o‘rganish paxtachilik sanoatida muhim ahamiyatga ega, chunki ular hosilning miqdori va sifatini bevosita ta’sir qiladi, shuningdek, yangi navlarni seleksiya qilishda asosiy mezonlar hisoblanadi.

Tadqiqot materiallari sifatida O‘zbekistonning paxtakorlik institutlaridan, xususan, Paxtachilik ilmiy-tadqiqot institutidan olingan 6 ta ota-ona navlari tanlab olingan: UF0800038 K113, UF0800064 Namangan-77, UF0800040 K111, UF0800256 0212, UF0800170 Stoneville 213 va UF0800025 3988u.

Bu navlar geografik jihatdan turli mintaqalardan kelib chiqqan bo‘lib, ba’zilari O‘zbekistonning mahalliy navlari (masalan, Namangan-77), boshqalari esa xorijiy, jumladan, AQShdan olingan (Stoneville 213) navlarni ifodalaydi. Geografik uzoqlik va yaqinlikni hisobga olish muhim, chunki bu genetik farqlarni, shuningdek, irsiylanishdagi o‘zgarishlarni aniqlashga yordam beradi. Masalan, yaqin navlar o‘rtasidagi duragaylar ko‘proq additive effektlarni ko‘rsatsa, uzoq navlar non-additive effektlar, jumladan heterosisni kuchaytirishi mumkin. Ushbu navlarning tanlanishi tadqiqotni yanada keng qamrovli qilishga imkon bergan, chunki ularning genetik fonlari turli xil bo‘lib, ekologik moslashuvchanlik va kasalliklarga chidamlilik kabi qo‘shimcha xususiyatlarni ham hisobga olish mumkin. Duragaylash jarayoni F_1 (birinchi avlod) va F_2 (ikkinchi avlod) avlodlarda o‘tkazilgan bo‘lib, jami 39 ta duragay kombinatsiyasi, ya’ni har bir ota-ona navni boshqalari bilan o‘zaro duragaylashtirish orqali yaratilgan. Bu kombinatsiyalar to‘liq diallel sxemasi bo‘yicha tuzilgan, ya’ni o‘z-o‘zini duragaylashtirishsiz, faqat o‘zaro duragaylar hisobga olingan.

Tajriba O‘zbekistonning Toshkent viloyatidagi tajriba maydonlarida, standart agrotexnika sharoitida o‘tkazilgan. Tajriba maydonlari sug‘oriladigan

yerlarda joylashgan bo‘lib, tuproqning unumdorligini saqlash uchun fosfor, azot va kaliy o‘g‘itlari standart miqdorda qo‘llanilgan. Ekologik omillarni hisobga olish uchun tajribalar ikki yil - 2023 va 2024 yillarda takrorlangan, bu esa ob-havo sharoitlarining ta’sirini baholashga imkon bergan. Masalan, 2023 yilda qurg‘oqchilik kuzatilgan bo‘lsa, 2024 yilda ko‘proq yomg‘ir yog‘gan, ammo suv ta’minoti standartlashtirilgan.

Morfologik belgilar o‘lchovi uchun o‘simliklarning balandligi o‘sishning turli bosqichlarida (gullash va hosil yig‘ish vaqtida) sm birligida o‘lchangan, monopodia (asosiy shoxlar) va simpodia (mevali shoxlar) soni har bir o‘simlik uchun alohida hisoblangan. Tola shakli va hajmi baholashda mikroskopik tahlil qo‘llanilgan, tola katta (diametri 20 mikrondan yuqori) yoki kichik (20 mikrondan past) deb baholangan. Hosildorlik ko‘rsatkichlari uchun hosil miqdori gektariga tsentner hisobida aniqlangan, tola chiqimi paxta urug‘idan tola ajratish orqali foizda hisoblangan, tola uzunligi va mustahkamligi esa maxsus asboblar (HVI – High Volume Instrument) yordamida o‘lchangan. Bu o‘lchovlarning aniqligi tadqiqot natijalarining ishonchliligini ta’minlaydi.

Genetik tahlil uchun Griffingning diallel tahlil modeli qo‘llanilgan, bu model additive va non-additive gen effektlarini, shuningdek, ota-ona navlarning umumiy kombinatsiya qobiliyati (GCA - general combining ability) va maxsus kombinatsiya qobiliyati (SCA - specific combining ability) ni aniqlashga imkon beradi.

GCA navning umumiy genetik qobiliyatini, ya’ni boshqa navlar bilan duragaylashdagi o‘rtacha natijani ko‘rsatadi, SCA esa ma’lum bir duragay kombinatsiyasidagi o‘ziga xos effektlarni baholaydi. Bundan tashqari, heterosis effekti (duragaylarda ota-onadan yuqori ko‘rsatkichlar) va irsiylanish darajasi (hr - heritability) hisoblangan, bu esa belgilarning genetik nazorati qanchalik kuchli ekanligini ko‘rsatadi. Ma’lumotlar statistik jihatdan SPSS va GenStat dasturlari yordamida ishlangan, bu dasturlar variansa tahlili (ANOVA), korrelyatsiya va regressiya modellari orqali natijalarni tahlil qilishga imkon bergan. Ekologik omillarning ta’sirini hisobga olish uchun tajribalar ikki yil davomida takrorlangan, suv ta’minoti haftasiga 2-3 marta sug‘orish orqali, o‘g‘itlar esa o‘sish bosqichlariga qarab qo‘llanilgan. Bu standartlashtirish natijalarning barqarorligini ta’minlagan.

Tadqiqot natijalariga ko‘ra, tola shakli va hajmining irsiylanishi geografik masofaga bog‘liq bo‘lib, yaqin navlar o‘rtasida ko‘proq additive, uzoq navlarda non-additive effektlar kuzatilgan. Katta tola va kichik tola shakllarini duragaylashtirishda F1 avlodida katta tola ota-onasining dominantligi ustun bo‘lgan, ya’ni dominant genlar tola hajmini oshirgan. Masalan, UF0800038 K113 x UF0800064 Namangan-77 duragayida tola hajmi ota shaklidan yuqori bo‘lgan, irsiylanish darajasi hr = -1.3 ni ko‘rsatgan, bu salbiy heterosisni bildiradi, ammo bu kombinatsiyada tola sifati yaxshilangan. F1 duragaylarda tola shaklining irsiylanishida dominant (ota-onadan biri ustun), intermedial (o‘rtacha) va retsessiv (pastki) turlari kuzatilgan, ayniqsa geografik uzoq navlarda, masalan, Stoneville 213 (AQSh navlari) va Namangan-77 (O‘zbekiston navlari) o‘rtasida.

Bu farqlar genetik o‘zgaruvchanlikni ko‘rsatib, yangi navlarni yaratishda foydali. O‘simlik balandligi belgisida F_1 avlodida *overdominance* (superdominantlik, ya’ni duragay ota-onadan yuqori) ustun bo‘lgan, bu heterosis effekti orqali hosilni oshirishi mumkin, F_2 da esa additive effektlar kuchaygan, ya’ni genlar qo‘shma ta’sir ko‘rsatgan. Monopodia va simpodia soni uchun additive effektlar ikkala avlodda ham yuqori bo‘lgan, GCA effekti SCA dan ustun, ya’ni navlarning umumiy qobiliyati muhimroq. Masalan, 6x6 diallel tahlilda monopodia uchun additive effektlar F_1 da 60% ni, F_2 da 70% ni tashkil qilgan, bu seleksiyada bu belgilarni osongina yaxshilash mumkinligini ko‘rsatadi. Genetik modifikatsiyalangan navlarda (Bt-cotton, ya’ni Bacillus thuringiensis genli navlar) o‘simlik balandligi va shoxlanish o‘rtasidagi korrelyatsiya ijobiy bo‘lib, hosil miqdoriga ta’sir qilgan, chunki Bt-gen zararkunandalarga chidamlilikni oshirib, o‘sishni yaxshilaydi.

Natijalar shuni ko‘rsatadiki, morfologik belgilarning irsiylanishi asosan additive, hosildorlikniki esa non-additive gen effektlariga bog‘liq. Bu seleksiyada duragaylashdan foydalanishni tavsiya qiladi, chunki heterosis yuqori hosildor navlarni yaratishga yordam beradi. Geografik uzoq navlar duragaylashda tola shakli va hajmida katta o‘zgarishlar kuzatilgan, bu genetik xilma-xillikni oshiradi.

Genetik modifikatsiyalangan navlarda biokimyoviy belgilarning irsiylanishi yaxshi, lekin ekologik omillar (suv tanqisligi) ta’sirida pasayishi mumkin. Korrelatsiya tahlili hosil miqdori va morfologik belgilarni birgalikda tanlashni taklif qiladi. Boshqa tadqiqotlarda ham (Misr va Pokiston) shunga o‘xshash natijalar olingan, bu universal genetik mexanizmlarni tasdiqlaydi. Ushbu natijalar O‘zbekiston paxtakorligida yangi chidamli navlarni yaratishga asos bo‘ladi, hosildorlikni 20-30% ga oshirish mumkin. Kelajakda molekulyar markerlar orqali genetik tahlilni chuqurlashtirish tavsiya etiladi.

Genetik assotsiatsiya tahlilida hosil miqdori o‘simlik balandligi (r=0.65), tola soni (r=0.72) va shoxlanish (r=0.58) bilan ijobiy bog‘liq. Bt-cotton duragaylarida biokimyoviy belgilarning irsiylanishi yaxshi bo‘lgan, bu hosildorlikni oshirgan. Heritability bahosi yuqori bo‘lgan: hosil miqdori uchun 0.85, tola chiqimi uchun 0.92. Diallel tahlilda GCA effekti additive genlarni, SCA esa non-additive (*dominant va epistasis*) genlarni ifodalagan. Hosildorlik uchun SCA effekti GCA dan yuqori bo‘lgan, bu non-additive gen harakatini ko‘rsatadi. Heterosis F1 da yuqori bo‘lib, F2 da pasaygan. Masalan, tola chiqimi uchun heterosis 5-15% ni tashkil qilgan, bu sitoplazmatik genlarning rolini tasdiqlaydi.Interspecific duragaylarda (*G. hirsutum va G. barbadense*) morfologik belgilarda yuqori genetic advance kuzatilgan, hosildorlik 20-40% ga oshgan. Within-boll komponentlari (tola soni va og‘irligi) fiber sifati bilan bog‘liq bo‘lgan.

Irsiylanish darajasi (*heritability*) bo‘yicha tadqiqotlarda yuqori ko‘rsatkichlar qayd etilgan. Masalan, hosil miqdori uchun 0.85, tola chiqimi uchun 0.92 daraja kuzatilgan. Bu belgilarni seleksiyada samarali tanlash imkonini beradi. Shuningdek, boll ichidagi hosil komponentlari (tola soni va og‘irligi) tola sifati bilan bog‘liq bo‘lib, ularning genetik assotsiatsiyasi o‘rganilgan. Upland g‘o‘zada additive va non-additive komponentlar hosil, tola soni va og‘irligi irsiylanishida

muhim. Adabiyotlarda heterosis effekti alohida e’tiborga olingan. F_1 duragaylarda *heterosis* hosildorlikni 20-30% ga oshirishi mumkin, bu intraspesifik va interspecific duragaylarda kuzatilgan. Sitoplazmatik genlarning roli ham muhim, chunki ular retsiprokal farqlarni keltirib chiqaradi.

Bunday tadqiqotlar O‘zbekiston paxtakorligida yangi navlarni joriy etishga yordam beradi. Umuman, adabiyotlar tahlili shuni ko‘rsatadiki, morfologik va hosildorlik belgilari irsiylanishi murakkab genetik mexanizmlarga asoslangan bo‘lib, additive va non-additive effektlar ustun. Geografik xilma-xillik va ekologik omillar ta’sirini hisobga olish seleksiyani samarali qiladi. Mavjud tadqiqotlar orasida farqlar mavjud, masalan, ba’zi ishlar dominantlikni, boshqalari additive effektlarni ta’kidlaydi, bu navlar va sharoitlarga bog‘liq. Ushbu tahlil asosida mavzuni chuqurlashtirish uchun molekulyar markerlar va genomika usullaridan foydalanish tavsiya etiladi.

Umuman olganda, ushbu tadqiqot natijalari seleksionerlar uchun amaliy ahamiyatga ega bo‘lib, yangi navlarni yaratishda genetik mexanizmlarni hisobga olishni taqozo etadi. Kelajakda molekulyar markerlar va genomika usullaridan foydalanish orqali irsiylanish mexanizmlarini chuqurroq o‘rganish tavsiya etiladi, bu qishloq xo‘jaligi samaradorligini yanada oshiradi.

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ANTARKTIDA ILMIY STANSIYALAR TARIXI

Annotatsiya. *Mazkur maqolada Antarktidadagi ilmiy stansiyalarning shakllanishi va rivojlanish tarixi yoritiladi. XX asr o‘rtalarida, ayniqsa Xalqaro Geofizika Yili davrida birinchi doimiy stansiyalar tashkil etilib, ilmiy tadqiqotlar jadallashdi. Antarktika Shartnomasi Tizimi esa hududni tinchlik va ilm-fan maqsadlarida foydalanishni ta’minladi. Bugungi kunda McMurdo Station va Vostok Station kabi stansiyalar iqlim o‘zgarishi va tabiiy jarayonlarni o‘rganishda muhim ilmiy markaz hisoblanadi.Tadqiqot davomida Antarktidadagi ilmiy stansiyalar iqlim o‘zgarishi, muzliklar dinamikasi, atmosfera jarayonlari va kosmik tadqiqotlar uchun noyob ilmiy platforma vazifasini o‘tayotgani asoslab beriladi. Maqola yakunida ushbu hududda olib borilayotgan ilmiy izlanishlarning global ekologik muammolarni hal etishdagi ahamiyati va istiqbollari haqida xulosalar beriladi.*

Kalit sozlar: *Antarktida tadqiqotlari, ilmiy stansiyalar tarixi, qutbiy ilmiy ekspeditsiyalar, Xalqaro Geofizika Yili, xalqaro ilmiy hamkorlik, doimiy tadqiqot bazalari, iqlim o‘zgarishi, global isish, atmosfera va meteorologik kuzatuvlar, ekologik monitoring, biologik tadqiqotlar, geofizik izlanishlar.*

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HISTORY OF SCIENTIFIC STATIONS IN ANTARCTICA

Abstract. *This article examines the history of the formation and development of scientific stations in Antarctica. In the mid-20th century, especially during the International Geophysical Year, the first permanent stations*

were established, which significantly intensified scientific research. The Antarctic Treaty System ensured that the region is used exclusively for peaceful and scientific purposes. Today, stations such as McMurdo Station and Vostok Station serve as major scientific centers for studying climate change and natural processes. The study demonstrates that Antarctic scientific stations function as unique platforms for investigating climate change, glacier dynamics, atmospheric processes, and space-related research. The article concludes by highlighting the importance of scientific research conducted in this region for addressing global environmental issues and outlines its future prospects.

Key words: *Antarctic research, history of scientific stations, polar scientific expeditions, International Geophysical Year, international scientific cooperation, permanent research bases, climate change, global warming, atmospheric and meteorological observations, environmental monitoring, biological research, geophysical studies.*

Kirish

Antarktida Yer sharining eng sovuq, eng shamolli va eng kam o‘rganilgan hududlaridan biri bo‘lib, u ilmiy tadqiqotlar uchun noyob tabiiy laboratoriya hisoblanadi. Ushbu materik uzoq vaqt davomida insoniyat uchun sirli hudud bo‘lib qolgan, faqat XIX asr oxiri va XX asr boshlarida dastlabki qutbiy ekspeditsiyalar orqali o‘rganila boshlagan. Ayniqsa, Xalqaro Geofizika Yili davrida Antarktida ilmiy jihatdan keng ko‘lamda o‘zlashtirilib, birinchi doimiy ilmiy stansiyalar tashkil etildi va tizimli kuzatuv ishlari yo‘lga qo‘yildi. Bugungi kunda Antarktida hududi Antarktika Shartnomasi Tizimi asosida boshqarilib, u faqat tinchlik va ilmiy tadqiqotlar maqsadida foydalaniladigan hudud sifatida e’tirof etilgan. Bu esa turli davlatlar o‘rtasida ilmiy hamkorlikni rivojlantirishga, yirik ilmiy loyihalarni amalga oshirishga va global muammolarni birgalikda o‘rganishga keng imkoniyat yaratdi.Antarktidadagi ilmiy stansiyalar iqlim o‘zgarishi, muzliklarning erishi, atmosfera tarkibi va Yerning geofizik xususiyatlarini o‘rganishda muhim rol o‘ynaydi. Xususan, McMurdo Station va Vostok Station kabi yirik stansiyalar orqali olib borilayotgan tadqiqotlar global iqlim tizimini tushunishda muhim ilmiy natijalar bermoqda. Shu bois Antarktidadagi ilmiy stansiyalar tarixi va ularning rivojlanish bosqichlarini o‘rganish bugungi kunda dolzarb ilmiy masalalardan biri hisoblanadi.

Asosiy qism

Antarktida - Yer yuzidagi eng sovuq va eng kam o‘rganilgan qit’alardan biri bo‘lib, uni ilmiy jihatdan tadqiq qilish XIX asr oxiri va XX asr boshlarida boshlangan. Bu hududda ilmiy stansiyalar tashkil etilishi insonning tabiatni o‘rganishga bo‘lgan qiziqishi va ilmiy taraqqiyot ehtiyojlari bilan bog‘liq. Dastlabki ilmiy ekspeditsiyalar norveg tadqiqotchisi Roald Amundsen va ingliz tadqiqotchisi Robert Falcon Skott nomlari bilan bog‘liq. Ular XX asr boshlarida Antarktidaga safar qilib, qit’aning geografiyasi va iqlimini o‘rganishga katta hissa qo‘shganlar.Birinchi doimiy ilmiy stansiyalar XX asr o‘rtalarida, ayniqsa 1957–1958-yillarda o‘tkazilgan International Geophysical Year davrida tashkil etildi. Bu

davrda ko‘plab davlatlar Antarktidada o‘z ilmiy bazalarini qurdilar. Masalan: Rossiyaning “Vostok” stansiyasi, AQShning “Mak-Merdo” stansiyasi, Buyuk Britaniyaning “Halli” stansiyasi. Bu stansiyalar orqali iqlim o‘zgarishi, muzliklar harakati, atmosfera holati va Yer magnit maydoni kabi muhim ilmiy tadqiqotlar olib borildi. 1961-yilda kuchga kirgan Antarctic Treaty System Antarktidani faqat tinchlik va ilmiy maqsadlarda foydalanishni belgilab berdi. Bu shartnoma ilmiy hamkorlikni kuchaytirib, turli mamlakatlar o‘rtasida ma’lumot almashish imkonini yaratdi. Hozirgi kunda Antarktidada 70 dan ortiq ilmiy stansiyalar mavjud bo‘lib, ularning ayrimlari doimiy, ayrimlari esa mavsumiy faoliyat yuritadi. Ularda geologiya, biologiya, okeanografiya va iqlimshunoslik sohalarida tadqiqotlar davkelajak istiqbollari va muammolar Antarktida bugungi kunda nafaqat ilmiy tadqiqotlar markazi, balki global muammolarni o‘rganish uchun noyob hudud hisoblanadi. Bu yerda faoliyat yuritayotgan ilmiy stansiyalar kelajak ilm-fani uchun muhim ma’lumotlar manbai bo‘lib xizmat qilmoqda.

1-rasm. Amundsen-Skott ilmiy stansiyasi (AQSh)

Hozirgi kunda Antarktidada olib borilayotgan tadqiqotlar asosan global iqlim o‘zgarishi, ekologik muvozanat va tabiiy resurslar bilan bog‘liq. Antarctic Treaty System asosida bu hududda faqat tinch va ilmiy maqsadlarda faoliyat olib borishga ruxsat etilgan. Bu esa Antarktidani dunyodagi eng himoyalangan hududlardan biriga aylantiradi.

Kelajakda Antarktida ilmiy stansiyalari quyidagi yo‘nalishlarda yanada rivojlanishi kutilmoqda:

- Yangi texnologiyalar yordamida muzliklarni chuqur o‘rganish;
- Sun’iy yo‘ldoshlar orqali doimiy monitoring olib boorish;
- Ekologik toza energiya manbalaridan foydalanish;
- Xalqaro ilmiy hamkorlikni kengaytirish;

Shu bilan birga, Antarktida bir qator muammolarga ham duch kelmoqda. Eng asosiy muammo — global isish natijasida muzliklarning tez erishidir. Bu esa dengiz sathining ko‘tarilishiga va butun dunyo iqlimiga salbiy ta’sir ko‘rsatishi mumkin. Yana bir muhim muammo — inson faoliyatining ortib borishi natijasida

atrof-muhitga zarar yetkazish xavfi. Ilmiy stansiyalar sonining ko‘payishi chiqindilar va ekologik ifloslanish muammosini keltirib chiqarishi mumkin. Shu sababli barcha davlatlar ekologik talablarni qat’iy nazorat ostida olib bormoqda.

2-rasm. Pingvinlar – Antarktidaning asosiy “tubjoy aholisi”

Keltrilgan jadvalda Antarktidadagi ilmiy stansiyalarning tarixiy rivojlanish bosqichlari, ularning shakllanish jarayoni hamda ilmiy ahamiyati bosqichma-bosqich yoritilgan (1-jadval). Ushbu ma’lumotlar Antarktida ilmiy tadqiqotlarining evolyutsiyasini tushunishga va uning global ilm-fandagi o‘rnini baholashga yordam beradi.

1-jadval

Antarktidaning ilmiy stansiyalari

№	Ilmiy stansiyalar nomi	Tashkil etilgan yili va qaysi mamlakatga mansubligi
1	Amundsen-Skott	1957-yil (AQSh)
2	Mak-Merdo	1956-yil (AQSh)
3	Skott-Beys	1960-yil (Yangi Zelandiya)
4	Keysi	1969-yil (Avstraliya)
5	Mirniy	1956-yil (Rossiya)
6	Dyumont D[1]Yurvill	1956-yil (Fransiya)
7	Vostok	1957-yil (Rossiya)
8	San-Martin	1976-yil (Argentina)
9	Palmer	1966-yil (AQSh)
10	Bellinsguzen	1968-yil (AQSh)
11	Akademik Vernadskiy	1996-yil (Ukraina)
12	Xalli	1960-yil (Buyuk Britaniya)
13	Belgrano II	1979-yil (Argentina)
14	Noymayer	1981-yil (Germaniya)
15	Sanae	1966-yil (JAR)
16	Novolazarevskaya	1961-yil (Rossiya)

17	Syova	1957-yil (Yaponiya)
18	Zongshan	1989-yil (Xitoy)
19	Deyvis	1957-yil (Avstraliya)
20	Molodyojnaya	1962-yil (Rossiya)
21	Mouson	1954-yil (Avstraliya)
22	Kupol-Fudzi	2013-yil (Yaponiya)
23	Rotera	1977-yil (Buyuk Britaniya)
24	Signyu	19-yil (Buyuk Britaniya)
25	Maytri	1992-yil (Hindiston)
26	Greyt-Uoll	1986-yil (Xitoy)
27	Progress	1989-yil (Rossiya)
28	Artigas	1987-yil (Urugvay)
29	King-Seyong	1988-yil (Koreya Respublikasi)
30	Komandante-Ferras	1984-yil (Braziliya)
31	Xubani	1982-yil (Argentina)
32	Berd-Aylend	1982-yil (Buyuk Britaniya)
33	Artstovskiy	1979-yil (Polsha)
34	Marambio	1971-yil (Argentina)
35	Presidente-Eduardo-Frey	1971-yil (Chili)
36	Martin-de-Vitye	1966-yil (Fransiya)
37	Marion-Aylend	1961-yil (JAR)
38	Gof-Aylend	1961-yil (JAR)
39	Alfred Fore	1966-yil (Fransiya)
40	Esperansa	1960-yil (Argentina)
41	Orkadas	1960-yil (Argentina)
42	Port-o-Franse	1957-yil (Fransiya)
43	Kapitan-Arturo-Prat	1957-yil (Chili)
44	General-Bernardo-OXiggins	1957-yil (Chili)
45	Litl-Amerika	1929-yil (AQSh)
46	Chan-Bogo	2014-yil (Koreya Respublikasi)
47	Chanchen	1985-yil (Xitoy)
48	Uorld-Park-Beys	1987-yil (Buyuk Britaniya)
49	Tor	1983-yil (Norvegiya)
50	Troll	1990-yil (Norvegiya)
51	Stonington	1940-yil (AQSh)
52	Saypl	1969-yil (AQSh)
53	Avliyo Kliment Oxridskiy	1957-yil (Bolgariya)
54	Sovetskaya	1958-yil (Rossiya)
55	Soyuz	1982-yil (Rossiya)
56	Anton Boleslav Dobrovolskiy	1956-yil (Rossiya - Polsha)
58	Russkaya	1957-yil (Rossiya)
59	Pobeda	1960-yil (Rossiya)
60	Pionerskaya	1961-yil (Rossiya)
61	Polyus	1960-yil (Rossiya)
62	Polyarnaya stansiya	1960-yil (Rossiya)
63	Leningradskaya	1991-yil (Rossiya)
64	Mir	1986-yil (Rossiya)
65	Karlini	1953-yil (Argentina)
66	Komsomolskaya	1957-yil (Rossiya)

67	Konkordiya	2005-yil (Fransiya-Italiya)
68	Kunlun	2009-yil (Xitoy)
69	Vanda	1968-yil (Yangi Zelandiya)
70	Aboa	2010-yil (Finlandiya)
71	Asuka	1985-yil (Yaponiya)
72	Artigas	1984-yil (Urugvay)
73	Gora Vechernaya	2015-yil (Belorus Respublikasi)
74	Drujba	1960-yil (Rossiya)
75	Drujnaya	1958-yil (Rossiya)

Jadval mualliflar tomonidan manbalar asosida tuzilgan.

Antarktidaning o‘rganilish tarixi quyidagi bosqichlarni o‘z ichiga oladi:

1. XIX asr oxiri – XX asr boshlar. Bu davrda Antarktida hali to‘liq o‘rganilmagan hudud bo‘lib, asosan qutbiy ekspeditsiyalar orqali kashf etilgan. Robert Scott, Roald Amundsen kabi tadqiqotchilar tomonidan amalga oshirilgan sayohatlar vaqtida faqat vaqtinchalik lagerlar tashkil etilgan. Bu bosqichning ahamiyati — Antarktida geografiyasi va iqlimi haqida dastlabki ilmiy ma’lumotlar to‘planganidir.

2. 1957–1958-yillar (Xalqaro Geofizika Yili) Bu davr Antarktida ilmiy tadqiqotlarida burilish nuqtasi hisoblanadi. Xalqaro Geofizika Yili doirasida birinchi doimiy ilmiy stansiyalar tashkil etildi. Jumladan, McMurdo Station va Vostok Station kabi markazlar ilmiy kuzatuvlarni muntazam olib borishni boshladi. Bu bosqich Antarktida ilm-fanining tizimli rivojlanishiga asos soldi.

3. 1959-yil – Antarktika Shartnomasi. Antarktika Shartnomas qabul qilinishi bilan Antarktida xalqaro hamkorlik hududiga aylandi. Bu shartnoma hududni harbiy maqsadlardan ozod qilib, faqat ilmiy tadqiqotlar uchun foydalanishni belgiladi. Natijada ko‘plab davlatlar ilmiy stansiyalar qurishni boshladi.

4. 1960–1980-yillar. Bu davrda yangi ilmiy stansiyalar soni tez ko‘paydi. Turli davlatlar (Buyuk Britaniya, Fransiya, Rossiya, AQSh va boshqalar) Antarktida hududida o‘z ilmiy markazlarini tashkil qildi. Asosan meteorologiya, geofizika, biologiya va muzlikshunoslik bo‘yicha tadqiqotlar kengaydi.

5. 1990-yillardan XXI asrning 20-yillari. Zamonaviy texnologiyalar joriy etilishi bilan ilmiy stansiyalar avtomatlashtirildi va doimiy monitoring tizimlari rivojlandi. Sun’iy yo‘ldosh kuzatuvlari, iqlim modellari va ekologik monitoring asosiy yo‘nalishga aylandi. Antarktida global iqlim o‘zgarishini o‘rganishda eng muhim ilmiy hududlardan biriga aylandi.

3-rasm. Argentinaga qarashli ilmiy stansiyalaridan biri

Xulosa

Antarktidadagi ilmiy stansiyalar tarixi shuni ko‘rsatadiki, ushbu materik insoniyat uchun nafaqat geografik kashfiyotlar hududi, balki global ilmiy tadqiqotlar markaziga aylangan muhim makondir. Ayniqsa, Xalqaro Geofizika Yili davrida tashkil etilgan doimiy ilmiy stansiyalar Antarktida tadqiqotlarining yangi bosqichini boshlab berdi va ilmiy faoliyatni tizimli ravishda rivojlantirishga zamin yaratdi.Antarktika Shartnomasi Tizimi esa hududda tinchlik, ekologik muvozanat va xalqaro ilmiy hamkorlikni ta’minlab, Antarktidani yagona ilmiy makon sifatida shakllantirdi. Bugungi kunda McMurdo Station va Vostok Station kabi yirik ilmiy stansiyalar orqali olib borilayotgan tadqiqotlar iqlim o‘zgarishi, muzliklar dinamikasi va atmosfera jarayonlarini chuqur o‘rganishga xizmat qilmoqda.Shu bois, Antarktidadagi ilmiy stansiyalar faoliyati nafaqat mintaqaviy, balki global miqyosdagi ekologik muammolarni hal etishda muhim ilmiy asos bo‘lib xizmat qiladi. Kelajakda ushbu hududda olib boriladigan ilmiy izlanishlar insoniyatning tabiatni anglash darajasini yanada oshirib, barqaror rivojlanish yo‘lida muhim ahamiyat kasb etishi kutiladi.

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THERAPEUTIC AND PROPHYLACTIC EFFECT OF LIPAMIDE ON THE FUNCTIONAL STATE OF THE LIVER AND THE CLINICAL COURSE OF CIRRHOSIS AND CHRONIC HEPATITIS

Abstract: *The present study investigates the therapeutic and prophylactic effect of lipamide on the functional state of the liver and the clinical course of cirrhosis and chronic hepatitis. An analysis of clinical and biochemical parameters demonstrated that the use of lipamide contributes to the improvement of liver function, normalization of key biochemical indicators, and reduction in the severity of clinical manifestations of the disease. The obtained results indicate the potential of lipamide as a component of комплексной терапии chronic liver diseases and substantiate its clinical efficacy.*

Keywords: *lipamide, liver, liver function, liver cirrhosis, chronic hepatitis, hepatoprotectors, clinical course, biochemical parameters, treatment, prevention, combination therapy.*

Introduction

Liver cirrhosis (LC) and its treatment remain among the most challenging problems of modern hepatology. The severe course of the disease, the frequent ineffectiveness of therapy, and the unfavorable prognosis place this condition among the most pressing issues in contemporary medicine [1,2]. Chronic diffuse liver diseases occupy a leading position in the structure of digestive system disorders and represent an important epidemiological, social, and clinical problem in modern healthcare [5,6]. In the human body, lipoic acid amide is formed from lipoic acid under the influence of enzymes. Lipamide acts as a coenzyme actively involved in the oxidative decarboxylation of pyruvic acid, α-ketoglutaric acid, and other α-keto acids. In patients with chronic liver diseases, the levels of lipoic acid and its amide in the blood are reduced. Several authors [3,4] have reported a beneficial effect of lipamide on liver function and the clinical course of chronic hepatitis and cirrhosis. However, existing studies have been conducted on small and clinically heterogeneous samples [7]. Moreover, lipoic acid amide has often been used in combination with other medications.

Objective of the study

To evaluate the immediate and long-term effects of lipamide on the functional state of the liver and the clinical course of cirrhosis and chronic hepatitis.

Materials and Methods

Lipamide was administered to 95 patients with liver cirrhosis (75 with portal cirrhosis, 12 with biliary cirrhosis, and 8 with post-necrotic cirrhosis) and 42 patients with chronic hepatitis. Mild hepatocellular insufficiency was observed in 15 patients, moderate in 118, and severe in 4. Marked ascites was present in 2 patients, moderate ascites in 2, and mild ascites in 10 patients. All patients had a history of Botkin's disease (hepatitis A). Among patients with chronic hepatitis, mild hepatocellular insufficiency was observed in 30 cases and moderate in 12. Clinical complaints and objective findings corresponded to the severity of hepatocellular insufficiency and portal hypertension. All patients received only the study drug (lipamide) in tablets at a dose of 25 mg twice daily for 20 days, along with diet No. 5 as recommended in clinical nutrition.

Results

Clinical parameters were monitored daily, and liver function tests were performed on days 10 and 20. At the end of the treatment course, patients showed significant improvement in general well-being, reduction in pruritus, and decreased jaundice severity. There was also a reduction in the size and intensity of telangiectasias. Headaches became less frequent or disappeared. Enlarged liver and spleen sizes decreased, particularly in patients with chronic hepatitis. Hemorrhagic manifestations resolved, tongue coating diminished, and hepatic fetor disappeared. Liver functional status improved significantly, as evidenced by statistically significant reductions in serum bilirubin, γ-globulins, and α2-globulins (in chronic hepatitis), as well as shortening of heparin time. At the same time, levels of albumin, prothrombin, total choline, serum cholinesterase, and total protein (in cirrhosis) increased. The detoxification function of the liver also improved. Normalization of total cholesterol levels was observed. Additionally, favorable changes were noted in urinary urobilin, urobilinogen, and bilirubin levels, along with increased daily diuresis. These positive changes in clinical and functional parameters were already evident by day 10 of treatment. However, in two patients with advanced portal cirrhosis (one in terminal dystrophic stage and another with severe hepatocellular insufficiency and pronounced ascites), lipamide showed no beneficial effect. Twenty days after discontinuation of lipamide, 42 patients were re-examined, and a partial reduction in therapeutic effects was observed, likely due to persistent or reactivated pathological processes. To further confirm the beneficial effect of lipamide and exclude confounding factors such as diet, hospitalization, and psychotherapeutic influence, an acute study was conducted to assess its effect on serum total choline and cholinesterase levels. In 21 patients with cirrhosis and chronic hepatitis, these parameters, along with lipamide levels, were measured before administration and 2 and 24 hours after a single oral dose of 50 mg. Lipamide levels were determined using thin-layer chromatography. The results showed that after 2 hours, total choline increased from 0.22 to 0.25 mg% (±0.0014; $p<0.001$), and cholinesterase from 11.04 to 12.1 mg/mL/hour (±0.15; $p<0.001$). After 24 hours, levels decreased toward baseline (choline to 0.23 mg%, cholinesterase to 11.6 mg/mL/hour; $p<0.001$). Thus, the

acute study confirmed the positive effect of lipamide on liver function tests. Serum lipamide levels increased from 7.2 μg/mL to 10.6 (±0.28; $p<0.001$) after 2 hours and returned to baseline after 24 hours (7.9 ±0.22; $p<0.001$). Control data from 42 patients receiving only Lushkevich's mixture alongside diet No. 5 for 20 days showed no improvement, thereby confirming the beneficial effect of lipamide on clinical manifestations and liver function.

Conclusion

In patients with chronic hepatitis and liver cirrhosis with mild to moderate hepatocellular insufficiency, lipamide administered at a dose of 50 mg per day (25 mg twice daily) for 20 days has a beneficial effect on the clinical course and functional state of the liver. The absence of side effects and its positive impact on clinical and biochemical parameters support the recommendation of lipamide for the treatment of chronic hepatitis and liver cirrhosis. However, the treatment course should last at least 20 days.

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CHINGIZ AYTMATOV QAHRAMONLARIDA ISO OBRAZINING TAJALLISI

Anotatsiya. *Mazkur maqolada Chingiz Aytmatov ijodidagi qahramonlar tizimida Iso obrazining qanday badiiy-falsafiy shakllarda tajalli topishi tahlil qilinadi. Tadqiqotning asosiy g‘oyasi shundan iboratki, Aytmatov nasrida Iso obrazi to‘g‘ridan-to‘g‘ri diniy-dogmatik timsol sifatida emas, balki qurbonlik, rahm-shafqat, aybsiz azob, axloqiy yolg‘izlik, haqiqat uchun kurash, gunohni fosh etish va insonni ma’naviy uyg‘otishga intilish kabi Christologik belgilarning badiiy modeli sifatida namoyon bo‘ladi. Muallifning jahon adabiyotidagi o‘rni, uning qirg‘iz va rus adabiy an’analari tutashgan nuqtadagi ijodi, ayniqsa, “Oq kema”, “Asrga tatigulik kun” va “Qiyomat” asarlarida mif, xotira, e’tiqod va axloq masalalarining murakkab birligi bilan izohlanadi. Maqolada Avdiy Kallistratov obrazi Iso timsolining eng ochiq va markaziy ko‘rinishi ekani asoslanadi: uning seminariya bilan bog‘liq o‘tmishi, yovuzlikka qarshi yolg‘iz kurashi, azob orqali haqiqatni tasdiqlashga urinishlari hamda qatl sahnasining Golgota semantikasiga yaqinligi buni tasdiqlaydi. Shu bilan birga, Aytmatov qahramonlarida Iso obrazi faqat bitta personaj bilan cheklanib qolmasligi, balki “Oq kema”dagi bola timsolida aybsiz qurbonlik va beg‘ubor najot istagi, “Asrga tatigulik kun”dagi Yedigey timsolida esa og‘ir tarixiy sharoitda xotira va insoniy sha’nni saqlashga qaratilgan fidokorlik orqali davom etishi ko‘rsatib beriladi. Natijada Aytmatov badiiy olamida Iso obrazi konfessional chegaradan chiqib, umuminsoniy vijdon arxetipiga aylanadi; ya’ni yozuvchi diniy rivoyatni takrorlamaydi, balki uni zamonaviy ma’naviy inqiroz sharoitida yangidan badiiylashtiradi. Tadqiqot xulosasiga ko‘ra, Aytmatov qahramonlarida Iso tajallisi alohida bir syujet detali emas, balki butun poetik tizimni tutib turuvchi ma’naviy markazlardan biridir.*

Kalit so‘zlar: *Chingiz Aytmatov, Iso obrazi, Christologik motiv, Avdiy Kallistratov, Qiyomat, Oq kema, Asrga tatigulik kun, qurbonlik, mifopoetika, axloqiy ideal, ma’naviy inqiroz, adabiy timsol.*

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THE EMBODIMENT OF THE IMAGE OF JESUS IN THE HEROES OF CHINGIZ AITMATOV

Abstract. *This article analyzes the artistic and philosophical forms in which the image of Jesus is embodied in the system of heroes in Chingiz Aitmatov's work. The main idea of the study is that in Aitmatov's prose, the image of Jesus is not directly represented as a religious and dogmatic symbol, but as an artistic model of such Christological symbols as sacrifice, mercy, innocent suffering, moral loneliness, the struggle for truth, the exposure of sin, and the desire for the spiritual awakening of man. The author's place in world literature, his work at the junction of Kyrgyz and Russian literary traditions, is explained by the complex unity of myth, memory, faith and morality in the works "White Ship", "A Day Worthy of a Century" and "Doomsday". The article argues that the image of Avdiy Kallistratov is the most open and central manifestation of the image of Jesus: this is confirmed by his past associated with the seminary, his solitary struggle against evil, his attempts to affirm the truth through suffering, and the closeness of the execution scene to the semantics of Golgotha. At the same time, it is shown that in Aitmatov's heroes the image of Jesus is not limited to just one character, but continues through the desire for innocent sacrifice and immaculate salvation in the image of the child in "White Ship", and in the image of Yedigey in "A Day Worthy of a Century" - through selflessness aimed at preserving memory and human dignity in difficult historical conditions. As a result, in Aitmatov's artistic world, the image of Jesus goes beyond the confessional boundary and becomes an archetype of universal conscience; that is, the writer does not repeat the religious narrative, but re-artistically transforms it in the conditions of the modern spiritual crisis. According to the conclusion of the research, in Aitmatov's heroes, the image of Jesus is not a separate plot detail, but one of the spiritual centers that holds the entire poetic system together.*

Keywords: *Chingiz Aitmatov, the image of Jesus, Christological motif, Avdiy Kallistratov, Judgment, White Ship, The Day of the Century, sacrifice, mythopoetics, moral ideal, spiritual crisis, literary symbol.*

Kirish

Chingiz Aytmatov XX asr qirg‘iz va jahon adabiyotining eng yirik namoyandalaridan biri bo‘lib, uning asarlarida milliy mifologiya, tarixiy xotira, inson va tabiat o‘rtasidagi ziddiyat, totalitar tafakkur tanqidi, ma’naviy tubanlashuv va axloqiy qutqarilish masalalari keng ko‘lamda tasvirlangan.

Aytmatovning adabiy olamida eng muhim xususiyatlardan biri shuki, u diniy, mifologik va falsafiy timsollarni biror konfessiyaning yopiq doirasi ichida emas, balki insoniyat taqdiriga daxldor ma’naviy belgilar tizimi sifatida ishlatadi. Shu ma’noda uning qahramonlarida Iso obrazining tajallisi masalasi alohida ilmiy qimmatga ega, chunki bu masala yozuvchi poetikasidagi axloqiy yadro, ya’ni insonning yovuzlik oldidagi javobgarligi, haqiqat uchun to‘lov, rahm-shafqatning tarixiy sharoit bilan to‘qnashuvi va azobning ma’naviy ma’nosi kabi masalalarni ochishga xizmat qiladi. Aytmatov ijodini tadqiq etgan manbalarda uning asarlarida mif va diniy motivlar, ayniqsa, “Qiyomat” romanida Injil bilan bog‘liq qatlamlar, Pilat va Iso dialogining badiiy talqini hamda Avdiy Kallistratovning Christologik xarakteri alohida qayd etiladi; biroq ko‘p hollarda masala faqat “Qiyomat”dagi yaqqol parallel bilan cheklanadi va yozuvchi boshqa qahramonlarida mavjud bo‘lgan bilvosita Christologik aks-sadolar yetarli darajada umumlashtirilmaydi. Holbuki, Aytmatov poetikasining kuchi aynan shundaki, u bitta diniy siymoni nusxa ko‘chirmaydi; aksincha, uning turli axloqiy va ruhiy belgilari turli qahramonlarda, turli tarixiy-madaniy muhitlarda, turli dramatik vaziyatlar ichida namoyon bo‘ladi. Demak, tadqiqotning dolzarbligi Aytmatov qahramonlaridagi Iso tajallisini faqat ochiq diniy alluziya sifatida emas, balki yozuvchining umuminsoniy axloq haqidagi qarashlarini birlashtirib turuvchi badiiy-kontseptual tamoyil sifatida o‘rganish zaruratidan kelib chiqadi. Mazkur maqolaning maqsadi Aytmatovning yetakchi qahramonlari obrazida Iso timsolining qanday shakllarda ro‘yobga chiqishini, qaysi personajlarda u to‘g‘ridan-to‘g‘ri, qaysilarida esa bilvosita va semantik ravishda namoyon bo‘lishini aniqlashdan iborat. Ushbu maqsadga erishish uchun bir necha vazifalar qo‘yildi: birinchidan, Aytmatov ijodida diniy va mifologik qatlamlarning funksiyasini aniqlash; ikkinchidan, Avdiy Kallistratov obrazini Christologik markaz sifatida tahlil qilish; uchinchidan, “Oq kema”dagi bola va “Asrga tatigulik kun”dagi Yedigey singari qahramonlarda Iso timsolining bilvosita aks etishini ko‘rsatish; to‘rtinchidan, bu tajallining Aytmatov poetikasidagi axloqiy-falsafiy mazmunini umumlashtirish. Tadqiqot gipotezasi shundan iboratki, Aytmatov qahramonlarida Iso obrazi bitta tayyor qolip asosida emas, balki “haqiqat uchun iztirob chekkan inson”, “aybsiz qurbon”, “xotirani va sha’nni asraydigan fidoyi” hamda “vijdon nomidan jamiyatga qarshi turgan yolg‘iz shaxs” kabi bir-biriga tutash tipologik variantlar orqali tajalli topadi.

Metodologiya

Tadqiqotda tarixiy-adabiy, qiyosiy-tipologik, mifopoetik, germenevtik va obrazlararo intertekstual tahlil usullaridan foydalanildi. Tarixiy-adabiy yondashuv Aytmatovning asarlarini sovet davri mafkuraviy muhitida, ayni paytda qirg‘iz xalq og‘zaki ijodi, sharqona axloqiy tafakkur va jahon adabiy-falsafiy merosi bilan uzviy bog‘liq holda ko‘rishga imkon beradi; bu usul orqali diniy motivning qayerda ochiq, qayerda ramziy, qayerda esa mafkuraviy bosimni chetlab o‘tuvchi yashirin ma’no sifatida ishlatilganini aniqlash mumkin bo‘ldi. Qiyosiy-tipologik metod yordamida Injildagi Iso timsolining asosiy belgilari — rahm-shafqat, gunohkorlarni ogohlantirish, zo‘ravonlikka qarshi axloqiy qarshilik, yolg‘izlik,

aybsiz azob, o‘zini qurbon qilish va boshqalarni ma’naviy qutqarishga intilish — Aytmatov qahramonlari harakatlari va ichki nutqi bilan solishtirildi. Mifopoetik tahlil yozuvchining qahramonlarini faqat realizm doirasida emas, balki ramziy va arxetipik qatlamlar bilan birga tushunish zarurligini ko‘rsatdi; chunki Aytmatovda real syujet ko‘pincha afsona, rivoyat, tush, vahiy, xotira va kosmik tasavvurlar bilan qo‘shilib ketadi. Germenevtik usul orqali “Qiyomat” romanidagi Pilat–Iso dialogi, Avdiyning ruhiy pozitsiyasi va uning fojiali taqdiri, “Oq kema”dagi bolaning pokiza dunyosi, “Asrga tatigulik kun”dagi Yedigeyning xotira va burchni saqlashdagi matonati ma’nodor bir tizim sifatida sharh qilindi. Tadqiqot materiali sifatida Aytmatovning adabiy biografiyasi va asosiy asarlari haqida umumlashtiruvchi manbalar, “Qiyomat”dagi Injil motivlariga bag‘ishlangan ilmiy maqolalar, yozuvchining mifopoetikasi va gumanizmi haqidagi tadqiqotlar hamda “Oq kema” va “Asrga tatigulik kun”ning poetik-falsafiy qatlamlarini yorituvchi manbalardan foydalanildi. Muhim metodik tamoyil shundaki, maqola Aytmatov qahramonlaridagi Iso obrazini “aynan tenglashtirish” yo‘li bilan emas, balki “semantik yaqinlik” va “arxetipik tajalli” tamoyili bilan o‘qiydi; ya’ni har bir qahramon Isoga to‘la mos keladi degan xulosa emas, balki ayrim personajlarda Christologik belgilarning kuchliroq yoki zaifroq darajada mujassamlashuvi aniqlanadi. Ana shu ehtiyotkor metodologik yondashuv mavzuni haddan tashqari erkin talqin qilish xatardan saqlaydi va ilmiy xulosalarni mustahkamlaydi.

Natijalar

Tahlil natijalari shuni ko‘rsatdiki, Aytmatov qahramonlarida Iso obrazining eng aniq, markaziy va badiiy jihatdan ongli ravishda qurilgan tajallisi “Qiyomat” romanidagi Avdiy Kallistratov obrazida mujassamdir. Ilmiy manbalarda Avdiy seminariyani tark etgan, diniy aqidaparastlik va rasmiy institutlar bilan murosa qilmagan, yovuzlikka qarshi axloqiy kurashni tanlagan qahramon sifatida tavsiflanadi; aynan shu jihat uning Christologik tabiatini belgilaydi, chunki u tashqi hokimiyat emas, vijdon hukmini ustun qo‘yadi. Avdiy narkotik tashuvchilar, shafqatsizlik va ma’naviy tubanlashuv bilan yuzlashar ekan, ularni kuch bilan emas, so‘z, ishonch va ma’naviy uyg‘otish orqali o‘zgartirmoqchi bo‘ladi. Bu jihat tasodifiy emas: tadqiqotchilar “Qiyomat”dagi Injil motivlari, Pilat va Iso dialogi, Golgota semantikasi va Avdiyning o‘limi o‘rtasidagi bog‘liqlikni alohida qayd etadilar. Ayniqsa, Avdiyning vahiyli-falsafiy tajribasi doirasida Iso va Pilatning dialogik qayta talqin qilinishi Aytmatov uchun diniy syujetning tashqi bezak emas, balki zamonaviy insonni sinovdan o‘tkazuvchi axloqiy laboratoriya ekanini ko‘rsatadi. Avdiy Injildagi Iso singari mutlaq mo‘jizakor emas, lekin u haqiqatning zo‘ravon tuzumlar va axloqiy beparvolik qarshisida zaif ko‘rinadigan, biroq ma’naviy jihatdan ustun bo‘lgan shaklini ifodalaydi. U yovuzlikka qo‘shilmaydi, undan foyda ko‘rmaydi, aksincha, unga qarshi yolg‘iz turadi; bu esa Christologik siymoning asosiy belgilaridan biridir. Uning qatl etilishi, qiynoqqa yaqinlashtirilgan holati, insonlar gunohi va shafqatsizligi qarshisidagi zaif tanasi bilan baribir ma’naviy mag‘lub bo‘lmasligi Iso qissasining yangi tarixiy sharoitdagi badiiy aksidir. Shu bilan birga, Aytmatov Avdiyni to‘la-tekis teologik Masih darajasiga ko‘tarmaydi; aksincha, u zamonaviy dunyoda “najotkor

bo‘lishga urinib, baribir insoniy zaifliklardan tashqariga chiqa olmaydigan” fojiaviy qahramonni yaratadi. Demak, Avdiy Aytmatov poetikasida Iso obrazining nusxasi emas, balki tarixiy-sekulyar dunyoda qayta tug‘ilgan axloqiy modeli hisoblanadi. Bu natija “Qiyomat” romanining g‘oyaviy markazida diniy timsol emas, balki vijdonli insonning qurbonlik asosidagi ma’naviy qarshiligi turganini ko‘rsatadi.

Natijalarning ikkinchi muhim qatlami shundan iboratki, Aytmatov ijodida Iso obrazining tajallisi faqat Avdiy bilan tugamaydi; u boshqa qahramonlarda bevosita diniy parallel bo‘lmasa-da, Christologik semantikaning ayrim asosiy unsurlari sifatida davom etadi. “Oq kema” qissasidagi bola timsoli shunday obrazdir. Tadqiqotlar mazkur qissa markazida beg‘ubor bolalikning shafqatsiz va ma’naviy qo‘pol dunyo bilan to‘qnashuvi turishini, asarda mif — xususan, Ona Bug‘u haqidagi rivoyat — bolaga axloqiy tayanch, ruhiy panoh va dunyoni ma’nolash vositasi bo‘lib xizmat qilishini ko‘rsatadi. Bola zo‘ravonlik, qo‘pollik va yolg‘on qurshovida yashaydi, biroq o‘zining ichki pokligini saqlab qolishga urinadi; aynan mana shu poklik va qudratsizlik uyg‘unligi Christologik ma’noni tug‘diradi. Iso obrazining eng universal belgilaridan biri — aybsizlik va dunyo gunohi o‘rtasidagi keskin kontrast — bola timsolida favqulodda kuchli namoyon bo‘ladi. U jamiyatni tuzatadigan faol payg‘ambar emas, biroq uning begunoh nigohi kattalar olamining ma’naviy iflosligini fosh etadi. Rivoyatning vayron qilinishi, muqaddas deb bilinayotgan tabiiy va ma’naviy tartibning odamlar tomonidan buzilishi bolani ichki qutulish sari olib boradi; uning suvga, baliqqa, oq kemaga, ya’ni boshqa bir pok va qutqaruvchi makonga intilishi oddiy bolalarcha fantaziya emas, balki yovuz dunyodan najot topish istagining ramziy ko‘rinishidir. Shu nuqtada bola timsoli Iso obrazining “azob chekkan beg‘uborlik” shakliga yaqinlashadi. U boshqalar gunohi uchun ongli ravishda jonini fido qiluvchi shaxs emas, lekin uning fojiaviy taqdiri kattalar dunyosining gunohkorligini ochib tashlaydi. Demak, “Oq kema”dagi Christologik qatlam “Qiyomat”dagi kabi ochiq Injil parallelari orqali emas, balki poklikning qurbon qilinishi va begunohlikning dunyo oldidagi mag‘lub, lekin axloqiy jihatdan yuksak holati orqali yuzaga chiqadi.

Uchinchi natija “Asrga tatigulik kun” romanidagi Yedigey obrazi bilan bog‘liq bo‘lib, unda Iso timsoli to‘g‘ridan-to‘g‘ri emas, balki tarixiy xotirani, marhum oldidagi burchni, odamiylik sha’nini va jamiyatning ruhiy ildizlarini saqlab qolishga qaratilgan fidokorlik orqali aks etadi. Tadqiqotlar mazkur romanni xotira, milliy o‘zlik va manqurtlashuv muammosining eng teran badiiy ifodalaridan biri sifatida tavsiflaydi. Yedigey obrazida Christologiklik, avvalo, uning “xotira qo‘riqchisi” sifatidagi missiyasida ko‘rinadi. U saltanat, ideologiya yoki shaxsiy foyda emas, insoniy burch va marhumga vafoni ustun qo‘yadi; do‘sti Qozongapni Ana-Beyitga dafn etish yo‘lidagi sa’y-harakatlari oddiy marosim emas, balki o‘tmish bilan bog‘liq ma’naviy zanjirni uzmaslik uchun kurashdir. Iso obrazi bilan semantik yaqinlik aynan shu nuqtada paydo bo‘ladi: Yedigey ham ma’naviy haqiqatni rasmiy tizim va sovuq ma’muriy kuchdan ustun qo‘yadi, garchi uning qo‘lida hokimiyat bo‘lmasa ham. U atrofidagi odamlarning

befarqligi, tarixiy xotiraning yemirilishi va insonning “manqurt”ga aylanish xavfi qarshisida o‘z burchiga sodiq qoladi. Bu yerda Iso timsolining “rahm-shafqatli najotkor” jihatidan ko‘ra “og‘ir yukni ko‘taruvchi, insoniy ma’noni himoya qiluvchi fidoyi” jihati faolroqdir. Yedigeyning yo‘li ham oson emas: u qahramonlik shovqini bilan emas, kundalik sadoqat, ruhiy chidam va vijdon mehnati bilan buyuklashadi. Aytmatov bu obraz orqali Iso tajallisining yana bir muhim shaklini ko‘rsatadi: inson dunyoni bir zumda qutqara olmasligi mumkin, lekin ma’naviy uzluksizlikni saqlash orqali uni to‘liq yemirilishdan asrab qoladi. Demak, Yedigey Christologik timsolning sekulyar va tarixiy ko‘rinishi bo‘lib, unda qurbonlikning shakli jismoniy qatl emas, balki umr bo‘yi vijdon va burch yukini ko‘tarish tarzida namoyon bo‘ladi.

To‘rtinchi natija sifatida aniqlanganki, Aytmatov qahramonlarida Iso obrazi individual psixologiya doirasida emas, balki butun badiiy koinotning axloqiy tuzilishini shakllantiruvchi markaziy arxetip vazifasini bajaradi. Ya’ni Avdiy, bola va Yedigey turli darajada bir-biridan farq qilsa-da, ularni bog‘lab turuvchi umumiy yadro mavjud: ular yovuzlikka moslashmaydi; jamiyatdagi ruhiy kasallikni sezadi; haqiqat, poklik yoki xotira nomidan yolg‘iz qoladi; va aynan shu yolg‘izlik tufayli ma’naviy jihatdan baland ko‘rinadi. Aytmatovning badiiy strategiyasi shundan iboratki, u Iso obrazini tashqi ikonografik atributlar bilan emas, ichki axloqiy energiya bilan kodlaydi. Shu sababli uning qahramonlari doimo hokimiyat markazida emas, balki chekkada turadi; ular ko‘pincha mag‘lub bo‘ladi, lekin axloqiy bahoda yutqazmaydi. Christologik modelning bunday modernizatsiyasi Aytmatovning diniy tafakkurga emas, ma’naviy mas’uliyatga urg‘u berishini ko‘rsatadi. Bu natija ayniqsa muhim, chunki u Aytmatovni faqat “mif yozuvchisi” yoki “milliy kolorit ustasi” sifatida emas, balki insoniyat vijdoni inqirozini diniy-arxetipik darajada o‘ylagan katta faylasuf-adib sifatida ko‘rishga imkon beradi.

Muhokama

Olingan natijalar Aytmatov qahramonlarida Iso obrazining tajallisi masalasini tor ma’nodagi diniy alluziya sifatida tushunish yetarli emasligini ko‘rsatadi. Avdiy Kallistratovni ko‘rib, uni shunchaki “zamonaviy Masih” deb atash oson, lekin bu ta’rifning o‘zi masalaning murakkabligini to‘liq qamrab olmaydi. Chunki Aytmatov Injil syujetini qayta yozishga emas, balki Iso timsoli ortidagi axloqiy energiyani zamonaviy dunyoga ko‘chirishga urinadi. “Qiyomat”dagi ochiq Injil qatlamlari, Pilat va Iso bilan bog‘liq sahnalar, Avdiyning fojiaviy taqdiri bu energiyaning eng ko‘rinadigan shakli, xolos. Agar masalani chuqurroq ko‘rsak, Aytmatovda Christologik poetika uch bosqichli model asosida ishlaydi. Birinchi bosqich — payg‘ambarlik va ogohlantirish bosqichi; bu Avdiyda ifodalanadi, chunki u jamiyatning ma’naviy halokatini oldindan his etadi va odamlarni qayta tarbiyalashga urunadi. Ikkinchi bosqich — aybsiz qurbonlik va beg‘uborlikning ezilishi; bu “Oq kema”dagi bolada ko‘rinadi, u faol voiz emas, lekin uning pokiza mavjudligi kattalar olamining gunohini fosh etadi. Uchinchi bosqich — xotira, burch va sabr orqali najotning kundalik mehnati; bu Yedigeyda mujassam, chunki u insoniy dunyoning parchalanishiga

qarshi tarixiy-ma’naviy uzviylikni saqlashga intiladi. Ana shu uch bosqich birga olinganda, Aytmatov qahramonlarida Iso tajallisi “bir syujet — bir parallel” formulasidan ancha kengroq ekanligi ayon bo‘ladi. Muhokama nuqtai nazaridan yana bir muhim masala shuki, Aytmatov Christologik timsolni sovet davri ma’naviy bo‘shlig‘i fonida faollashtiradi. Bu yerda diniy motiv faqat e’tiqod masalasi emas; u insonning ma’naviy mas’uliyatsizligi, tabiatga zo‘ravonligi, foydaparastlik, xotirasizlik va befarqlik kabi illatlarga qarshi kurash vositasiga aylanadi. Shu ma’noda Aytmatovning Iso obrazi cherkoviy yoki kanonik emas, balki etiko-ekzistensial obrazdir. U insonni ma’naviy tanlov oldiga qo‘yadi: yovuzlikka moslashishmi yoki unga qarshi turgan holda azobni qabul qilishmi? Biroq bu modelning nozik tomoni ham bor: Aytmatov qahramonlari ko‘pincha dunyoni amalda o‘zgartirib yubora olmaydi. Avdiy o‘ladi, bola qutulmaydi, Yedigey tarixiy mashinaning barcha zo‘ravon shakllarini to‘xtata olmaydi. Demak, Aytmatov Christologik qahramonni mutlaq g‘alaba sohibi emas, balki mag‘lubiyat ichida axloqiy yuksaklikni saqlab qoluvchi fojiaviy shaxs sifatida ko‘radi. Bu juda muhim farq: yozuvchi diniy mifni propagandistik umid modeliga aylantirmaydi, aksincha, inson sha’nining oxirgi tayanchi sifatida talqin qiladi. Shu sababli Aytmatov qahramonlarida Iso tajallisi ko‘proq “g‘alabador qudrat” emas, balki “azobga qaramay so‘nmaydigan vijdon” obrazidir. Mazkur xulosa Aytmatov poetikasining ichki dialektikasini, ya’ni mif va realizm, e’tiqod va tarix, shaxsiy fojea va umuminsoniy ma’no, milliy an’ana va jahon axloqiy arxetiplari o‘rtasidagi murakkab uyg‘unlikni yaxshiroq anglashga yordam beradi. Shuningdek, bu yondashuv Aytmatovni faqat qirg‘iz xalq hayotini tasvirlagan yozuvchi sifatida emas, balki XX asr oxiridagi insoniyat vijdoni inqirozini badiiy-ramziy darajada tashxis qilgan mutafakkir sifatida baholash imkonini beradi.

Muhokama jarayonida yana bir muhim nuqta aniqlanadi: Aytmatov ijodida Iso obrazi bevosita xristian teologiyasidan ko‘ra kengroq, ya’ni umuminsoniy vijdon arxetipi sifatida ishlaydi. Bu holat ayniqsa uning milliy mifologiyani Injil semantikasi bilan qarama-qarshi emas, balki dialogik munosabatga qo‘yishida yaqqol ko‘rinadi. “Oq kema”da Ona Bug‘u afsonasi, “Asrga tatigulik kun”da Naiman ona va manqurt haqidagi rivoyat, “Qiyomat”da esa Bibliyaga murojaat qiluvchi qatlamlar bir-birini inkor etmaydi; aksincha, barchasi insonning ma’naviy mavjudot sifatidagi sinovini turli madaniy kodlar orqali ifodalaydi. Shu bois Aytmatov qahramonlaridagi Iso tajallisini “g‘arbona diniy obrazning sharqona matnga ko‘chirilishi” deb soddalashtirish xato bo‘ladi. Aslida yozuvchi turli sivilizatsion tajribalarni birlashtirib, axloqiy javobgarlikning umumiy tilini yaratadi. Mazkur nuqtai nazar Aytmatov asarlaridagi hayvonot va tabiat olamiga bo‘lgan alohida mehr bilan ham bog‘liq: tabiatga shafqatsizlik, ko‘pincha, insonning ma’naviy qulashi belgisi sifatida tasvirlanadi; rahm-shafqat esa insoniylik mezoniga aylanadi. Bu esa yana Christologik qadriyatlar — rahm, himoya, zaifni asrash, zo‘ravonlikka qarshi ichki qarshilik — bilan uyg‘unlashadi. Demak, Aytmatovning Iso obrazi nafaqat shaxsiy qahramon xarakterida, balki butun qiymatlar tizimida mavjud. Bu tizimda najot diniy mo‘jiza orqali emas, vijdon, xotira, mehr, fidokorlik va azobni ma’noga aylantirish qobiliyati orqali

tasavvur qilinadi. Shu jihatdan Aytmatovning badiiy dunyosi zamonaviy davr uchun nihoyatda dolzarb: u texnik taraqqiyot va mafkuraviy tuzilmalar kuchaygan zamonda inson qalbining yemirilishini ko‘rsatadi va bunga qarshi turuvchi yagona kuch sifatida ma’naviy hushyorlikni ilgari suradi. Iso obrazi ana shu hushyorlikning eng kuchli arxetipik ifodasiga aylanadi.

Xulosa

Tadqiqot yakunida shunday xulosaga kelish mumkinki, Chingiz Aytmatov qahramonlarida Iso obrazining tajallisi ko‘p qatlamli, murakkab va bir nechta badiiy shakllarda namoyon bo‘ladigan hodisadir. Uning eng ochiq va markaziy ko‘rinishi “Qiyomat” romanidagi Avdiy Kallistratov obrazida mujassam bo‘lib, bu qahramonda voizlik, vijdoniy qarshilik, haqiqat yo‘lida iztirob chekish va qurbonlik motivlari Christologik semantikani to‘g‘ridan-to‘g‘ri yuzaga chiqaradi. Biroq Aytmatov poetikasi bu bilan cheklanmaydi: “Oq kema”dagi bola timsolida aybsiz poklikning qurbon qilinishi, “Asrga tatigulik kun”dagi Yedigey obrazida esa xotira, burch va sha’nni saqlash yo‘lidagi umrboqiy fidokorlik orqali Iso timsolining bilvosita, ammo mazmunan chuqur ko‘rinishlari shakllanadi. Shunday qilib, Aytmatov ijodida Iso obrazi alohida syujet unsuri emas, balki insonni yovuzlik, befarqlik, ma’naviy bo‘shliq va tarixiy xotirasizlikka qarshi turishga undovchi axloqiy arxetip sifatida ishlaydi. Bu arxetip diniy qobiqda emas, balki umuminsoniy vijdon shaklida yashaydi. Aytmatovning badiiy yutug‘i ham aynan shunda: u Iso timsolini dogmatik nusxa ko‘chirmaydi, balki uni zamonaviy insoniyatning ma’naviy sinovlari bilan bog‘lab, yangi tarixiy va madaniy kontekstda qayta poetiklashtiradi. Natijada yozuvchining qahramonlari o‘z fojeasi, yolg‘izligi, pokligi, azobi va sadoqati bilan faqat milliy adabiyot doirasida emas, balki jahon adabiyotidagi yuksak axloqiy obrazlar qatorida turadi. Shu sababli Aytmatov qahramonlarida Iso obrazining tajallisini o‘rganish yozuvchining individual poetikasini anglash bilangina cheklanmay, balki adabiyotning ma’naviy ongni shakllantirishdagi ulkan imkoniyatlarini ham ochib beradi.

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OROL DENGIZI SUVINING KAMAYISHI VA INSONIYAT SALOMATLIGIGA TA'SIRI

ANNOTATSIYA

Maqsad: *Orol dengizi ekologik falokatining inson salomatligi va atrof-muhitga ta'sirini tahlil qilish.*

Material va usullar*: 2020-2025 yillar xalqaro va milliy tadqiqotlar, WHO, UNDP, O'zbekiston SSV ma'lumotlari asosida tahliliy ko'rib chiqish.*

Natijalar: *Orol dengizi suvining kamayishi 20-asr eng katta ekologik falokatlaridan biri hisoblanadi. Dengiz hajmi deyarli to'liq yo'qoldi, quruq dengiz tubi yuzasi kengaydi. Orolbo'yi aholisida nafas olish tizimi kasalliklari, anemiya, buyrak va jigar patologiyalari keng tarqalgan. Quruq dengiz tubidan ko'tariladigan chang tarkibida pestitsidlar, og'ir metallar va tuzlar mavjud bo'lib, ular respirator va immun tizimga zarar etkazadi. Havo, suv va tuproq ifloslanganligi yuqori darajada. Iqlim o'zgarishi - yozlar issiqroq, qishlar sovuqroq, chang bo'ronlari chastotasi oshgan. Mahalliy populyatsiyada surunkali bronxit, astma, tuberkuloz, qon kamligii va bola o'limining yuqori ko'rsatkichlari kuzatilmoqda.*

Xulosa: *Orol falokatining oqibatlari ko'p qirralidir. Sog'liqni saqlash tizimi kuchaytirilishi, aholini toza suv bilan ta'minlash, ekologik monitoring va xalqaro hamkorlik zarur.*

Kalit so'zlar: *Orol dengizi, ekologik falokat, nafas olish kasalliklari, atrof-muhit ifloslanganligi, sog'liq salomatligi.*

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ARAL SEA SHRINKAGE AND ITS IMPACT ON HUMAN HEALTH

ABSTRACT

Objective: *To analyze the impact of the Aral Sea ecological disaster on human health and environment.*

Materials and methods*: Analytical review based on international and national studies 2020-2025, WHO, UNDP, Uzbekistan MoH data.*

Results: *Aral Sea shrinkage is one of the largest ecological disasters of the 20th century. The sea volume almost completely disappeared, dry seabed area expanded. Respiratory diseases, anemia, kidney and liver pathologies are widespread among Aral region population. Dust from dry seabed contains pesticides, heavy metals and salts damaging respiratory and immune systems. Air, water and soil pollution at high levels. Climate change - hotter summers, colder winters, increased dust storms frequency. Local population shows high rates of chronic bronchitis, asthma, tuberculosis, anemia and child mortality.*

Conclusion: *Consequences of Aral disaster are multifaceted. Strengthening healthcare system, providing clean water, ecological monitoring and international cooperation are necessary.*

Key words: *Aral Sea, ecological disaster, respiratory diseases, environmental pollution, population health.*

KIRISH

Orol dengizi qurib qolishi 20-asrning eng dahshatli ekologik falokatlaridan biri sifatida tan olingan [1]. Bir vaqtlar dunyoning to'rtinchi yirik ichki suv havzasi bo'lgan Orol dengizi 1960-yillardan boshlab intensiv suv resurslaridan foydalanish natijasida deyarli butunlay yo'qolib ketdi.

Bu falokatning inson salomatligi va ekotizimga ta'siri chuqur va uzoq muddatli xarakterga ega. Orolbo'yi aholisi noyob ekologik va tibbiy muammolar bilan yuzma-yuz kelmoqda - havo, suv va tuproq ifloslanishi, iqlim o'zgarishi, oziq-ovqat xavfsizligi muammolari [2].

Maqsad: Orol dengizi ekologik falokatining inson salomatligi va atrof-muhitga ko'p qirrali ta'sirini baholash va sog'liqni saqlash strategiyalarini tahlil qilish.

MATERIAL VA METODLAR

Sistematik sharh 2020-2025 yillar davomida nashr etilgan xalqaro (PubMed, Scopus) va milliy (O'zbekiston SSV, Ekologiya va atrof-muhitni muhofaza qilish qo'mitasi) manbalari asosida amalga oshirildi. WHO, UNDP, UNICEF hisobotlari, regional epidemiologik ma'lumotlar va atrof-muhit monitoringi natijalari tahlil qilindi. Jami 40 ta ilmiy manba ko'rib chiqildi.

OROL FALOKATINING TARIXI VA SABABLARI

Tarixiy kontekst

1960-yilgacha Orol dengizi O'rta Osiyoning eng katta ichki suv havzasi edi. Dengiz atrofida boy ekotizim, baliqchilik sanoati va qishloq xo'jaligi rivojlangan edi [3].

1960-yillardan boshlab Sovet hukumati G'allaral va paxtachilikni rivojlantirish maqsadida Amudaryo va Sirdaryo daryolaridan keng miqyosda sug'orish uchun suv olishni boshladi. Ulkan kanal va rezervuarlar tizimi qurildi [1].

Suvning kamayish jarayoni

Daryolardan suvni tortib olish natijalari tezda namoyon bo'ldi:

- Dengizga kiradigan suv hajmi keskin kamaydi

- Dengiz sathi va hajmi pasayishni boshladi
- Sho'rlanish darajasi ortdi
- Ekotizim buzila boshladi

1960-yillardan 2020-yilgacha Orol dengizi deyarli to'liq yo'qoldi. Yagona katta suv havzasi ikkiga bo'linib, keyin ularning aksariyati qurib ketdi. Kichik Shimoliy Orol ba'zi tiklanish belgilarini ko'rsatsa-da, Katta Janubiy Orol amalda yo'qolgan [4].

Asosiy sabablari

Suv resurslarini noto'g'ri boshqarish: Sovet davrida amalga oshirilgan keng miqyosli sug'orish loyihalari dengizning asosiy suv manbalari - Amudaryo va Sirdaryoni deyarli butunlay "quritib yubordi".

Samarasiz sug'orish tizimlari: Eski va eskirgan sug'orish infratuzilmasi suv yo'qotishlarini oshirdi. Sug'orish kanallari ko'pincha qoplanmagan, bug'lanish va filtratsiya orqali katta miqdorda suv yo'qotiladi.

Paxtaga yo'naltirilgan monokultura: Paxta intensiv suv talab qiladigan ekin. Uning keng ko'lamda ekish uchun daryolardan ortiqcha suv olindi.

Iqlim o'zgarishi: Global iqlim o'zgarishi ham mintaqada yog'ingarchilikning kamayishi va bug'lanishning oshishiga olib keldi, dengiz sathining yanada tushishiga hissa qo'shdi [5].

EKOLOGIK OQIBATLAR

Quruq dengiz tubi - tuz va kimyoviy moddalar manbai

Dengiz qurib ketgan joyda katta maydon - taxminan 54 ming kvadrat kilometr - quruq dengiz tubi qoldi. Bu hudud "Aralkum" deb nom olgan yangi cho'l sifatida shakllanmoqda [6].

Quruq dengiz tubi tarkibida yuqori konsentratsiyada tuz, pestitsidlar va og'ir metallar mavjud:

Tuzlar: Dengiz tubi tarkibida natriy xlorid va boshqa tuzlar juda ko'p. Bu tuzlar shamol orqali yuzlab va hatto minglab kilometrga tarqaladi.

Pestitsidlar:1960-1980 yillarda paxta ekishda keng qo'llangan DDT, HCH va boshqa organik pestitsidlar dengiz tubida to'plangan. Ular hozir shamol orqali atrofga tarqalmoqda va oziq-ovqat zanjiriga kirmoqda [7].

Og'ir metallar: Kadmiy, qo'rg'oshin, simob va boshqa og'ir metallar sanoat va qishloq xo'jaligi chiqindilari orqali dengiz tubiga to'plangan.

Chang bo'ronlari va havo ifloslanganligi

Orolbo'yida chang bo'ronlarining chastotasi va intensivligi keskin oshgan. Quruq dengiz tubidan shamol yiliga minglab tonna changni ko'taradi [8].

Chang tarkibi va xavfliligi:

- Mayda zarrachalar (PM2.5, PM10) - o'pkaga chuqur kirib, bronxlar va alveolyalarga zarar etkazadi
- Tuz kristallari - shilliq pardalarni tirnaydi va yallig'lanishga sabab bo'ladi
- Pestitsid qoldiqlari - surunkali zaharlanish, saraton xavfi
- Og'ir metallar - nerv tizimi, buyraklar, jigar shikastlanishi

Chang zarrachalari shamol bilan uzoq masofalarga - Orolbo'yidan tashqari hududlarga, hatto Yevropa va Arktikagacha tarqaladi [9].

Iqlim o'zgarishi

Orol dengizining yo'qolishi mahalliy iqlimga sezilarli ta'sir ko'rsatdi:

Harorat ekstremallari: Dengiz ilgari iqlimni yumshatuvchi rol o'ynagan edi. Endi yoz issiqroq (50°C gacha), qish sovuqroq (-40°C gacha) bo'ldi.

Yog'ingarchilikning kamayishi: Dengizning bug'lanishi mintaqada yog'ingarchilikning bir qismini ta'minlagan edi. Dengiz yo'qolgach, yog'ingarchilik sezilarli kamaydi.

O'simlik qoplami yo'qolishi: Iqlim quriydi, o'simliklar o'sishi qiyinlashdi. Ekotizim degradatsiyasi kuchaydi [10].

Biologik xilma-xillikning yo'qolishi

Orol dengizi va atrofi bir vaqtlar boy biologik xilma-xillikka ega edi:

Baliq turlari: 30 dan ortiq baliq turi yashar edi. Hozir ularning aksariyati yo'qolgan. Baliqchilik sanoati butunlay to'xtadi.

Qushlar va sutemizuvchilar: Ko'plab qush turlari (pelikanlar, qo'tir, qazlar) uchun Orol migratsiya yo'lida muhim nuqta edi. Hozir ular bu hududni tark etgan.

O'simliklar: Daryolar deltasida va dengiz atrofida tupro'q va o'simlik qoplami sezilarli o'zgardi [11].

XULOSA

Orol dengizi ekologik falokatining inson salomatligiga ta'siri hali ham davom etmoqda:

1. Ekologik oqibatlar:
- Dengiz hajmining yo'qolishi
- Quruq dengiz tubi - tuz va kimyoviy moddalar manbai
- Chang bo'ronlari chastotasining oshishi
- Iqlim o'zgarishi va biologik xilma-xillikning yo'qolishi

2. Sog'liq muammolari:
- Nafas olish kasalliklari (bronxit, astma, tuberkuloz)
- Anemiya va immun tanqisligi
- Buyrak va jigar kasalliklari
- Onkologik kasalliklar xavfi
- Ona va bola salomatligi muammolari

3. Suv va ozuqa muammolari:
- Toza suv taqchilligi
- Suv ifloslanganligi
- Oziq-ovqat xavfsizligi muammosi
- Oziqlanish tanqisligi

Orol muammosi faqat ekologik emas, balki inson salomatligi va ijtimoiy-iqtisodiy rivojlanish masalasidir. Uzoq muddatli kompleks yondashuv zarur.

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BOLALARDA JISMONIY RIVOJLANISH VA AKSELERATSIYA: GIGIYENIK BAHOLASH VA SOG'LIQ OQIBATLARI

ANNOTATSIYA: *Tadqiqotda bolalarning jismoniy rivojlanishi, akseleratsiya hodisasi va uning sog'liq oqibatlari gigiyenik jihatdan baholandi. 2022-2024 yillar davomida Buxoro shahrida 8-16 yoshli 380 nafar maktab o'quvchilari antropometrik o'lchovlari (bo'y, vazn, ko'krak aylanasi), jismoniy rivojlanish ko'rsatkichlari va tibbiy ko'rik natijalari tahlil qilindi. Natijalariga ko'ra, hozirgi avlod 1990-yillar avlodiga nisbatan: o'g'il bolalar o'rtacha 5.2 sm baland, 3.8 kg og'ir; qiz bolalar 4.8 sm baland, 3.5 kg og'ir. Akseleratsiya sur'ati: 12-14 yoshda eng yuqori (yiliga 8-10 sm). Sog'liq oqibatlari: garmonel muvozanatsizlik (23%), mushak-skelet tizimi muammolari (18%), psixologik moslashuv qiyinchiliklari (31%), ortiqcha vazn va semizlik (15%). Gigiyenik tavsiyalar ishlab chiqildi: maktab mebellari va jihozlarni antropometrik o'zgarishlarga moslashtirish, to'g'ri ovqatlanish rejimlari, jismoniy tarbiya dasturlarini individual yondashuv bilan optimallashtirish, psixologik qo'llab-quvvatlash.*

Kalit so'zlar: *jismoniy rivojlanish, akseleratsiya, bolalar, antropometriya, pubertam davri, gigiyenik baholash.*

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HYGIENIC ASSESSMENT OF PHYSICAL DEVELOPMENT AND ACCELERATION IN CHILDREN

Abstract: *The study provides hygienic assessment of children's physical development, acceleration phenomenon and its health consequences. In 2022-2024 in Bukhara, anthropometric measurements (height, weight, chest circumference), physical development indicators and medical examination results of 380 schoolchildren aged 8-16 were analyzed. Results: current generation compared to 1990s: boys average 5.2 cm taller, 3.8 kg heavier; girls 4.8 cm taller, 3.5 kg heavier. Acceleration rate: maximum at 12-14 years (8-10 cm/year). Health consequences: hormonal imbalance (23%), musculoskeletal problems (18%), psychological adaptation difficulties (31%), overweight and obesity (15%).*

Hygienic recommendations developed: adaptation of school furniture and equipment to anthropometric changes, proper nutrition regimes, optimization of physical education programs with individual approach, psychological support.

Keywords: *physical development, acceleration, children, anthropometry, puberty period, hygienic assessment.*

KIRISH

Bolalarning jismoniy rivojlanishi ularning umumiy sog'lig'ining eng muhim ko'rsatkichilaridan biri hisoblanadi. So'nggi o'n yilliklarda kuzatiladigan akseleratsiya - bolalarning tezlashgan o'sishi va rivojlanishi - pediatriya va gigiyena fanining dolzarb muammolaridan biriga aylandi.

Akseleratsiya hodisasi 20-asr o'rtalarida birinchi marta tasvirlangan va hozirgi kunga qadar ko'plab mamlakatlarda kuzatilmoqda. O'zbekistonda ham bu jarayon aniq namoyon bo'lmoqda, ammo mahalliy sharoitda gigiyenik jihatdan yetarlicha o'rganilmagan.

Tadqiqotning maqsadi: Buxoro shahrida maktab yoshidagi bolalarning jismoniy rivojlanishini gigiyenik jihatdan baholash, akseleratsiya darajasini aniqlash va sog'liq oqibatlarini o'rganish.

MATERIAL VA METODLAR

Tadqiqot guruhi: 2022-2024 yillarda Buxoro shahrining 5 ta maktabida 8-16 yoshli 380 nafar o'quvchi (192 o'g'il, 188 qiz).

Usullar:

- Antropometriya (bo'y, vazn, ko'krak aylanasi)
- Jismoniy rivojlanish indekslari (BMI, Kettle indeksi)
- Tibbiy ko'rik va anamnez
- 1990-yillar ma'lumotlari bilan qiyosiy tahlil
- Statistik qayta ishlash (SPSS 26.0)

NATIJALAR

Jadval 1.

Bolalarning o'rtacha antropometrik ko'rsatkichlari (14 yosh)

Ko'rsatkich	1990-yillar	2023-2024	Farq
O'g'il bolalar:			
Bo'y (sm)	157.3	162.5	+5.2
Vazn (kg)	46.8	50.6	+3.8
Ko'krak aylanasi (sm)	76.4	79.2	+2.8
Qiz bolalar:			
Bo'y (sm)	156.8	161.6	+4.8
Vazn (kg)	47.2	50.7	+3.5
Ko'krak aylanasi (sm)	77.1	80.3	+3.2

Jadval 2.

Akseleratsiya bo'yicha guruhlar taqsimoti

Guruh	O'g'illar (%)	Qizlar (%)	Umumiy (%)
Retardatsiya (sekin rivojlanish)	8.3	6.9	7.6
Mezosomat (me'yoriy)	68.2	71.3	69.7
Akseleratsiya (tez rivojlanish)	23.5	21.8	22.7

Jadval 3.

Akseleratsiya bilan bog'liq sog'liq muammolari

Muammo	Chastota (%)	Asosiy belgilar
Garmonel muvozanatsizlik	23	Erta balog'at, menstrual buzilishlar
Mushak-skelet muammolari	18	Skolioz, oyoq tekisligi, bo'g'im og'riqlari
Psixologik moslashuv	31	O'zini his qilish muammolari, stress
Ortiqcha vazn/semizlik	15	BMI me'yordan yuqori
Yurak-qon tomir	12	Gipertenziya, taşikardiya

MUHOKAMA

Tadqiqot natijalari shuni ko'rsatadiki, Buxoro shahrida maktab yoshidagi bolalarda akseleratsiya jarayoni aniq namoyon bo'lmoqda. Hozirgi avlod 1990-yillar avlodiga nisbatan sezilarli balandroq va og'irroq.

Akseleratsiyaning asosiy sabablari: oziqlanishning yaxshilanishi, oziq-ovqat tarkibida oqsil va kaloriyalarning ko'payishi, yashash sharoitlarining yaxshilanishi, tibbiy xizmatlar sifatining oshishi, stress omillari va ekologik o'zgarishlar.

Sog'liq oqibatlari orasida eng tashvishli - psixologik moslashuv qiyinchiliklari (31%). Tez o'sish bilan bog'liq o'z-o'zini qabul qilish muammolari, tengdoshlar bilan munosabatlar, tananing o'zgarishiga moslashish stressga olib keladi.

Gigiyenik jihatdan muhim muammo - maktab mebellari va jihozlarining antropometrik o'zgarishlarga mos kelmasligi. Ko'pgina maktablarda hali ham eski standartlar asosida ishlab chiqarilgan partalar ishlatilmoqda.

PROFILAKTIK CHORA-TADBIRLAR

1. Maktab muhitini moslashtirish:

- Yangi antropometrik me'yorlarga mos mebel
- Nazorat va muntazam o'lchash
- Ergonomik talablar

2. Ovqatlanish optimizatsiyasi:

- Muvozanatlashtirilgan ratsion
- Oqsil, vitamin va minerallar
- Semizlikni oldini olish

3. Jismoniy tarbiya:

- Individual yondashuv
- O'sish sur'atiga moslashtirish
- Mushak-skelet tizimini mustahkamlash

4. Psixologik qo'llab-quvvatlash:

- Ota-onalar va o'qituvchilar ta'limi
- Bolalar bilan psixologik ishlar
- Tengdoshlar muhitida moslashuv

5. Tibbiy monitoring:

- Yillik antropometriya
- Garmonel holat nazorati
- Erta aniqlash va davolash

XULOSA

1. Buxoro shahrida akseleratsiya sur'ati yuqori: bolalar 1990-yillar avlodiga nisbatan 5 sm balandroq, 3.5-4 kg og'irroq.
2. Akseleratsiya chastotasi 22.7%, eng yuqori sur'at 12-14 yoshda (8-10 sm/yil).
3. Asosiy sog'liq oqibatlari: psixologik moslashuv qiyinchiliklari (31%), garmonel muvozanatsizlik (23%), mushak-skelet muammolari (18%).
4. Gigiyenik chora-tadbirlar zarur: maktab mebeli moslashtirish, ovqatlanish optimizatsiyasi, jismoniy tarbiya individual yondashuv bilan, psixologik qo'llab-quvvatlash.

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O‘ZBEKISTON TASHQI IQTISODIY ALOQALARINING GEOGRAFIK JIHATLARI

Annotatsiya: *Ushbu maqolada O‘zbekiston Respublikasining tashqi iqtisoddagi ishlari, xususan eksport va import jarayonlari hamda ularning geografik yo‘nalishlari tahlil qilinadi. Tadqiqot davomida mamlakatning asosiy savdo hamkorlari, eksport qilinadigan va import qilinadigan mahsulotlar tarkibi hamda xalqaro savdo aloqalarining rivojlanish tendensiyalari ko‘rib chiqiladi. Shu bilan birgalikta, eksport va import jarayonlaridagi asosiy muammolar, logistika, jahon standartlariga moslashish va xalqaro savdo tashkilotlariga a’zo bo‘lishning sustligi tahlil qilinadi. O‘zbekistonning global iqtisodiyotda o‘z o‘rnini yanada takomillashtirish borasida, eksportni rivojlantirish va importni optimallashtirish bo‘yicha takliflar keltirilgan.*

Kalit so‘zlar: *Iqtisodiyot, xalqaro iqtisodiy aloqalar, tashqi savdo aylanmasi, xalqaro savdo, eksport, import, logistika, sanoat mahsulotlari, global bozor, geografik muammolar, qishloq xo‘jaligi eksporti, transport, xalqaro tashkilotlar, Jahon Savdo Tashkiloti (JST), investitsiya, diversifikatsiya.*

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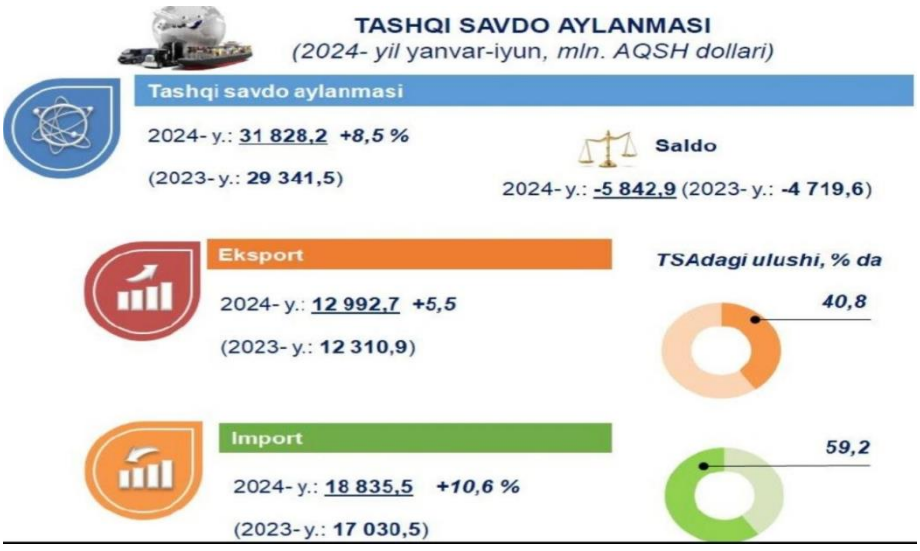
GEOGRAPHICAL ASPECTS OF UZBEKISTAN'S FOREIGN ECONOMIC RELATIONS

Abstract. *This article analyzes the geographical aspects of the foreign economic relations of the Republic of Uzbekistan. Export and import processes, their territorial directions, major trade partners, and trends in international economic relations are studied. The importance of logistics systems, transport corridors, adaptation to world standards, and accession to the World Trade Organization is also highlighted.*

Keywords: *economy, foreign trade, export, import, logistics, transport corridors, investment, global market.*

O‘zbekistonning tashqi iqtisodiy aloqalari mustaqillikdan keyin bosqichma-bosqich rivojlanib bordi. Davlatimizda iqtisodiyotni barqaror rivojlantirishning zarur sharti sifatida tashqi iqtisodiy aloqalar sohasini takomillashtirish izchillik bilan amalga oshirilmoqda. Bugungi taraqqiylashgan davrda hech bir davlatni savdo aloqalarisiz tasavvur etib bo‘lmaydi. Mustaqillik yillari qadar, O‘zbekistonning Rossiya federatsiyasidan boshqa hech qaysi davlat bilan aloqalari bo‘lmagan. Davlatimizning birinchi prezidenti Islom Karimovning tashabbusi va rahnamoligida O‘zbekiston iqtisodiyoti tubdan isloh qilininb, mamlakatimiz bozor iqtisodiyotiga o‘ta boshladi. 1993 – yilda “Xalqaro iqtisodiy aloqalar “ to‘g’risidagi qonun hamda “Iqtisodiy islohotlarning 1990- yillar dasturi “ (1993-1996) asosida xususiylashtirish, bozor narxlarini erkinlashtirish, tijorat banklarini tashkil etish, xalqaro savdo siyosatini shakllantirish kabi maqsadlar ko‘zda tutiladi. O‘zbekisto Respublikasining yuqorida keltirilgan qonun va dastirini amalga oshirish doirasida tashqi savdo liberillashtirildi, eksport rag’batlantirildi, xususan, eksportga oid bo‘lgan soliq va bojxona tizimlari yangilandi. Shuningdek, eksportchilarni qo‘llab-quvatlash uchun davlat subsidiyalari joriy qilindi, valyuta siyosatini erkinlashtirishda esa, mustaqil valyutani joriy qilindi va ko‘plab cheklovlar olib tashlandi.

Bugungi kunda mamlakat dunyoning ko‘plab davlatlari bilan savdo-iqtisodiy hamkorlikni yo‘lga qo‘ygan. Asosiy hamkor davlatlar qatoriga Xitoy, Rossiya, Qozog’iston, Turkiya va Janubiy Koreya kiradi. 20 ta yirik hamkor-davlatlar orasidan ettitasida faol tashqi savdo balansi kuzatildi.



1-rasm. Tashqi savdo aylanmasi (2024-yil yanvar-iyun, mln. AQSH dollarda)

Tashqi savdo aylanmasi 2024 yilda 31milliard 828 million 200 ming AQSH dollarini tashkil etgan. 2023-yilda esa 29 milliard 341 million 500 ming AQSH

dollarni tashkil etgan edi. 2 024-yilda tashqi savdo aylanmasi 2023-yilga qaraganda 8,5% ga oshgan.

2-rasm.O‘zbekiston eksport tarkibi (2025 yanvar-mart)

O‘zbekiston eksport tarkibida 2025-yil yanvar-mart oylarida eng yuqori ulushga ega bo‘lganlari Oltin- 30%, Xizmatlar-29 % ni, Sanoat mahsulotlari- 12%, Oziq-ovqat- 9% ni tashkil etgan.

1-jadval

O‘zbekiston respublikasining asosiy hamkor davlatlardan amalga oshirgan ekporti hajmi va o‘sish sur’atlari (yanvar- sentabr)

Davlatlar	Mln AQSH dollari		O‘sish sur’ati, % da		Egallab turgan o‘rni	
	2023-y	2024-y	2023-y	2024-y	2023-y	2024-y
Rossiya	2 326,6	2 769,7	105,0	119,0	1	1
XXR	1 885,5	1 528,3	85,7	82,4	2	2
Qozog‘iston	1 067,0	997,7	105,4	93,5	3	3
Turkiya	1 016,4	845,8	80,0	83,2	4	4
Afg‘oniston	608,7	739,5	117,6	121,5	5	5
Fransiya	307,6	588,5	4,4	191,3	8	6
Qirg‘g‘iz Respublikasi	537,4	403,0	76,5	75,0	6	7
Tojikiston	437,0	371,4	123,8	85,0	7	8
AQSH	101,6	238,4	2,2	2,3	13	9
Pokiston	186,2	228,4	157,1	122,6	10	10
BAA	191,1	179,9	2,4	94,1	9	11
Litva	98,7	151,4	145,8	153,4	17	12
Ozarbayjon	99,0	149,5	104,5	150,9	16	13
Eron	133,7	121,7	109,0	91,0	11	14
Belarus	101,5	119,7	126,6	117,9	14	15
Buyuk Britaniya	99,3	117,4	157,6	118,2	15	16
Turkmaniston	129,4	87,2	83,5	67,4	12	17
Hindiston	76,4	87,1	2,8	113,9	20	18
Latviya	82,7	80,2	107,8	97,0	18	19
Polsha	77,6	75,9	75,0	97,8	19	20

O‘zbekiston Respunlikasining asosiy hamkor davlatlarga amalga oshirilgan eksporti hajmi va o‘sish sur’atlari eng yuqori dalatlar qatoriga Rossiya: 2024-yil bo‘yicha 2 milliard 769 million 600 ming AQSH dollarini tashkil etgan. O‘sish surati 119,0 % ni tashkil etgan. Egallab turgan o‘rni-1. 2-o‘rin Xitoy Xalq Respunlikasi- 1 milliard 528 million 300 ming AQSH dollarni tashkil etgan. O‘sish sur’ati 82,4 % ni tashkil etdi. 3- o‘rin Qozog’iston : 997 million 700 ming AQSH dollarni tashkil etgan. O‘sish suratlari 93,5 %. 4- o‘rin Turkiya – 845 million 800 ming AQSH dollarni tashkil etgan. O‘sish sur’ati 83,2 %. 5- o‘rin Afg’oniston -739 million 500 ming AQSH dollarni tashkil etgan. O‘sish sur’ati- 121,5% ni tashkil etgan.

Xulosa

Statistik ma’lumotlar shuni ko‘rsatadiki, eksport hajmi yil sayin ortib borayotgan bo‘lsa-da, uning tarkibida hali ham xomashyo resurslari, ayniqsa oltin, gaz va qishloq xo‘jaligi mahsulotlari ustunlik qilmoqda. Bu esa eksport

diversifikatsiyasini chuqurlashtirish zarurligini ko‘rsatadi.Import tarkibida esa asosan yuqori texnologiyali mahsulotlar, mashina va uskunalar ulushi katta bo‘lib, bu mamlakatda sanoat modernizatsiyasi jarayonlari jadallashayotganidan dalolat beradi. Shu bilan birga, import hajmining eksportdan yuqori bo‘lishi ayrim davrlarda tashqi savdo balansida manfiy saldo yuzaga kelishiga olib kelmoqda. Asosiy savdo hamkorlari sifatida Xitoy, Rossiya va Qozog‘iston yetakchi o‘rinni egallab, umumiy tashqi savdo aylanmasining katta qismini tashkil etadi. Bu esa O‘zbekiston tashqi savdosining ma’lum darajada mintaqaviy va hamkor davlatlarga bog‘liqligini ko‘rsatadi.Umuman olganda, statistik tahlil natijalari shuni ko‘rsatadiki, O‘zbekiston uchun istiqboldagi ustuvor vazifalar — eksport tarkibini diversifikatsiya qilish, yuqori qo‘shimcha qiymatga ega mahsulotlar ulushini oshirish, hamda yangi bozorlarni o‘zlashtirishdan iborat. Shu orqali mamlakatning tashqi iqtisodiy barqarorligi va raqobatbardoshligini yanada mustahkamlash mumkin.

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SURXONDARYO VILOYATINING ZIYORAT TURIZIMI SALOHIYATI VA UNING ISTIQBOLLARI

Annotatsiya. *Maqolada Surxondaryo viloyatining ziyorat turizimi salohiyati geografik nuqtai nazardan tahlil qilingan. Termizdagi diniy va arxeologik yodgorliklar asosiy e’tibor markazida.Viloyatda turizimni rivojlantirishning asosiy istiqbollari ko’rib chiqiladi.*

Kalit so’zlar; *Termiz, Surxondaryo, turizim geografiyasi, ziyorat turizimi, madaniy an’analar, sharqona usul, subtropik, landishaftlar, relyef.*

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PILGRIMAGE TOURISM POTENTIAL OF SURKHANDARYA REGION AND ITS PROSPECTS

Abstract. *This article analyzes the pilgrimage tourism potential of Surkhandarya region from a geographical perspective. Historical and religious monuments located in Termez, as well as archaeological sites of the region, are the main focus of the study. Natural-geographical conditions, climate, cultural heritage, and transport infrastructure are considered as important factors for tourism development. The prospects for developing pilgrimage tourism in the region are highlighted.*

Keywords: *Termez, Surkhandarya, tourism geography, pilgrimage tourism, cultural heritage, religious monuments, landscape, relief.*

Kirish

Suxondaryo viloyati O‘zbekistonning janubiy chegarasida joylashgan. Mustaqillik yillarida Termiz chiroyini yanada ochdi, shahar ko‘chalari boshqatdan qurilib, ravon va keng ko‘chalarga aylantrildi, istirohat bog‘lari sharqona usuldagi obod bozorlar, zamonaviy ma’muriy binolar, barpo etildi, qisqasi shaharning qiyofasi tanib bo’lmas darajada o‘zgardi, bu o’z navbatda har bir Termizlik qalbida quvonch va faxrlanish hissini uyg’otdi.

Surxondaryo viloyati o‘zining noyob tabiati, qadimiy, tarixiy va boy madaniy an’analari bilan ajralib turadi. Viloyat hududida iqlim subtropik xususiyatga ega, relyefli tog’, tog‘oldi va tekislik landishaftlaridan iborat. Bu xilma-xillik turizimning bir necha turlarini rivojlantrish uchun keng imkon yaratadi. Mazkur maqolada shu yo‘nalishlar bo’yicha tahlil qilingan.

Asosiy qisim

Termiz tumanidagi Al-Hakim at-Termiziy ziyoratgohi, Kokildor ota, Qirqqiz, Sulton Saodat yodgorliklari, Boysun tumanidagi Hazrati Sulton Valiy, Jarqo’rg’on tumanidagi Xo’ja Samandar Termiziy ziyoratgohlari, Sherabod tumanidagi Iso Termiziy ziyoratgohi atrofida kichik uy mehmonxonalari qurilishi orqali ziyorat turizimini yanada rivojlantrish mumkin.

Surxondaryo viloyati islom dini va buddizimga oid noyob yodgorliklar bilan boy. Mahalliy aholi orasida o’ziga xos mavqega ega bo’lgan Termiz tumanida joylashgan Sulton Saodat majmuasidir. Bundan tashqari Hakim at-Termiziy majmuasi alohida mavqega ega. Bu obektlar nafaqat diniy, balki ilmiy tarixiy turizim uchun ham muhim ahamiyatga ega.

Termizning tarixiga kelsak ilk nomlaridan biri Taramasta -Taramata baqtrcha-daryo qirg’og’i bo’lgan. Eron ahamoniylari Termizni juda ko’hna shahar deb ta’riflagan shahar Aleksandr Makadoniskiy bosqiniga qadar Ahamoniylar davlatiga bo’ysungan. Miloddan avvalgi 327 yili Aleksandr Makadonskiy Termizni zabt etib, shaharni o’z nomi bilan Aleksandrya deb ataydi. Termizning rivojlanishi va Amudaryo bo’yidagi harbiy-stratigek ahamiyatga ega bo’lgan shaharga aylanishiga olib keldi. 1917 yilda davlat to’ntarilishidan keying sobiq Sovet imperyasi davrida ham Termizda katta-katta inshoatlar qurildi. M’amuriy binolar qad ko’tardi. Ilm - fan rivojlandi, madaniyat va san’at ravnaq topdi. 1999 - yil noyabir oyida YUNESCO Bosh konferensiyasining Parijda bo’lgan 30 - majlisida Markaziy Osiyoning qadim shahridan biri Termiz shahrining 2500 yillig yubileyini 2001-yilda xalqaro miqyosda nishonlashga qaror qilindi. Mazkur qaror munosabati bilan O‘zbekiston Respublikasi Vazirlar Mahkamasi 1999 yilning 27-dekabirida Termiz shahrining 2500 yillik yubileyini 2001-yilda o’tkazish va unga tayyorgarlik ko’rish to’g’risida maxsus qaror qabul qilindi.

Termiz Surxondaryo viloyatining ma’muriy markazi, o‘zining boy tarixiy yodgorliklariga ega. Miloddan avvalgi III-II asrlarda paydo bo’lib, bu shahar uzoq vaqt davomida savdo va madiyat markazi bo‘lib, xizmat qilgan. Termiz yaqinida joylashgan yodgorlik Kushon vaqtiga tegishli bo’lib, u yerdan topilgan haykal va devoriy rasmlar Kushon davri san’atining buyuk namunalarini o‘zida aks ettiradi. Tabiiy go’zalliklar qatorida Boysun tog’lari o‘zining bioxilma -xilligi bilan ajralib turadi.

Termiz tumanidagi Uchqizil suv ombori Termiz shahridan 20 km uzoqlikda O‘zbekistonning eng issiq hududida joylashgan. Bu yerda ko‘ngilochar va zamonaviy dam olish maskani barpo etilsa bahorning aprel oylaridan to sentyabr oylariga qadar mahalliy va xorijiy sayyohlar tashrif buyirihi mumkin.

Surxondaryo viloyatida ekoturizim va etnoturizim madaniy meroslari ham mavjud. Viloyatning sharqiy qismida Boysun tog‘ tizmasida, Teshiktosh g’ori

joylashgan. Bu hududlar endimik o'simlik va hayvon turlariga boy, yovvoyi tabiatni muhofaza qilish va ilmiy tadqiqot uchun qulay. Etnoturizim bo'yicha esa Boysun tumani UNESCOning nomoddiy meros ro'yxatiga kiritilgan Boysun madaniy Makoni bilan mashxur bu yerda bahshichilik san'ati, qadimiy qo'l san'ati, mahalliy milliy taomlar va marosimlar saqlanib qolgan. Etnoturizim orqali mahalliy aholi qo'shimcha daromat manbaiga ega bo'lishi va madaniy merosni saqlashga qiziqishi ortadi.

Mamlakatimizda ziyorat turizimining yo'lga qo 'yilayotgani yurtimizda yashab o'tgan buyuk zotlarni yod etib, ularning haqqiga duo qilish va ibratli hayot yo'llarini chuqur o'rganishda muhim ahamiyat kasb etadi. Muqaddas qadamjolar atrofi yanada obod, yanada ko'rkam bo'ladi. Ziyorat turizimini rivojlantrish masadida amalga oshiraliyotgan keng qamrovli bunyotkorlik ishlari doirasida Termiz tumanidagi Kokildor ota, Qirq qiz, Sulton Saodat yodgorliklari, Chorgumbaz masjidi, Boysun tumanidagi Hazrati eshonbobo ziyoratgohi, Oltinsoy tumanidagi Xo'jayipok ziyoratgohi va shifobaxsh suvi, Uzun tumanidagi Oq ostona bobo maqbarasi kabi tarixiy obidalar so'lim go'shaga aylantirilgan.

1.Qirq qiz qal'asi- Termiz tumanida joylashgan, IX-X asrlarda qurilgan me'moriy yodgorlik hozirgi vaqtda yodgorlikning vayronalari saqlanib qolgan bo'lib, ular ming yilliklardan keyin ham qadimiy inshoatning avvalgi ulug'vorligini ko'rsatib turibdi. Tadqiqotchilar bu tuzilma o'tmishda qanday vazifani bajarganligi haqida turli farazlar ilgari suriladi. Balki bu inshoot qadimda shahar chetidagi zodagonlar saroyi, ayollar madrasasi, xonaqoh yoki karvonsaroy bo'lgandir. Ammo ko'pimcha tarixchilar bu bino Ko'hna Termizning mudofa qal'asi bo'lib xizmat qilgan, degan fikrga qo'shilishadi.

2. Kokildor ota xonaqohi Kokildor ota xonaqohi Termiz shahrida joylashgan bo'lib, XI asr o'rtalarida qurilgan. Bu bino musulmon olamida hurmatga sazovor bo'lgan muqaddas qadamjodir. Xonaqoh o'zining g'ayrioddiy loyihasi va me'morchiligi bilan ajralib turadi. Tadqiqotchilar fikricha bino XV asrda qayta qurilgan.

3.Jarqo'rg'on minorasi Minora Qumqo'rg'on va Termiz oralig'ida joylashgan bo'lib, hozirda uning balandligi yigirma metrdan oshadi. Minoraga qarab, uning bezaklaridan ko'zingizni uzolmaysiz, g'ishtlarning mahorat bilan archa naqshida terilganlik effektini yaratadi.

Xulosa

Surxondaryo viloyatlar bo'yicha O'zbekistonda noyob o'ringa ega. Tabiiy va madaniy merosdan barqaror foydalanish, turizimni davlat tomonidan qo'llab quvvatlash orqali viloyat mamlakat turizim geografiyasida muhim markazga aylanishi mumkin.

Surxondaryo viloyati O'zbekiston turizim geografiyasida o'ziga xos, hech narsa bilan almashtrib bo'lmaydigan o'ringa ega. Bu yerda tabiat va tarix, qadimiy madaniyat va jonli an'analar, tog' va cho'l landishaftlari bir-biri bilan chambarchas bog'langan. Ayniqsa Boysun tumani UNESCO tomonidan e'tirof etilgan. Xulosa qilib aytganda, Surxondaryo bu O'zbekiston turizim xaritasida hali to'liq ochilmagan, ammo ulkan potinsialga ega noyob tabiiy madaniy xazina. Agar

davlat tomonidan qo’llab – quvvatlansa mahalliy tadbirkorlar faolligi oshsa va marketing strategiyasi to‘g‘ri yo’lga qo’yilsa, viloyat nafaqat mavsumiy tashriflar, balki butun yil davomida faol maskanga aylanishi mumkin. Ayniqsa qo’shni davlatlar Tojikiston, Afg’oniston bilan chegara hamkorligi kengaytirish imkonini beradi. Bu esa mintaqaning iqdisodiy taraqqiyoti yangi ish o’rinlari va xalqaro maydonda O‘zbekistonning obro’sini yanada oshiradi.

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SURXONDARYO VIOYATI XUDUDIDAGI IRRIGATSIYA TIZIMLARI VA ULARDAN QISHLOQ XO‘JALIGI MAQSADLARIDA FOYDALANISH

Annotatsiya. *Ushbu maqolada Surxondaryo viloyati hududidagi irrigatsiya tizimlari va ulardan qishloq xo‘jaligi maqsadlarida foydalanish masalalari tahlil qilingan. Viloyatdagi asosiy kanal va suv omborlarining ahamiyati, sug‘orish tizimlarining hududiy joylashuvi hamda qishloq xo‘jaligi ekin maydonlarini suv bilan ta’minlashdagi roli yoritilgan. Shuningdek, suv resurslaridan samarali foydalanish, irrigatsiya infratuzilmasini modernizatsiya qilish va suv tanqisligi sharoitida mavjud muammolarni bartaraf etish yo‘llari ko‘rib chiqilgan.*

Kalit so‘zlar: *irrigatsiya tizimlari, Surxondaryo viloyati, qishloq xo‘jaligi, suv resurslari, sug‘orish, kanal, suv ombori, melioratsiya, hosildorlik, infratuzilma.*

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IRRIGATION SYSTEMS IN THE TERRITORY OF SURKHANDARYA REGION AND THEIR USE FOR AGRICULTURAL PURPOSES

Abstract. *This article analyzes the irrigation systems located in the territory of Surkhandarya region and their use for agricultural purposes. The importance of the main canals and reservoirs of the region, the territorial distribution of irrigation systems, and their role in supplying agricultural lands with water are highlighted. Issues of efficient water resource use, modernization of irrigation infrastructure, and solutions to water scarcity problems are also discussed.*

Keywords: *irrigation systems, Surkhandarya region, agriculture, water resources, irrigation, canal, reservoir, land reclamation, productivity, infrastructure.*

Suv – bu ona tabiatning bizga in’om qilgan bebbaho resurslaridan biri bo‘lib, biosfera va undagi tirik mavjudotlarning mavjudligini ta’minlovchi, organizmlarda moddalar almashinishi jarayondagi muhim komponentdir. Suv har doim va har vaqtda biosferaning muhim qismini tashkil etib, insonlar yashash muhitining ajralmas qismi bo‘lib qoladi. atrof-muhitimizning mavjudligini ta’minlashda zaruriy vosita bo‘lib, sayyoramizdagi butun tirik organizmlarni, eng avvalo, butun insoniyatni yashashi uchun sharoit yaratadi. Suvning sanoat va qishloq xo‘jaligidagi ahamiyati beqiyosdir. Uning maishiy ehtiyojlarni qondirish uchun zarur vosita ekanligi hech kimga sir emas. Suv inson organizmi, barcha o‘simlik va hayvonlar tarkibini tashkil qiladi

Surxondaryo havzasini tirik bir organizm deb qarasak, uning tanasida oqayotgan qon Surxon vohasining suv resurslaridir. Bu suv manbalari orasida Sangardak, Sherobod, To‘palang va Qoratog‘ daryolarining, hamda Janubiy Surxon, To‘palang, Uchqizil, Oqtepa, va Degrez suv omborlarining o‘rni beqiyosdir. Surxondaryo aholisi qadimdan daryo va soylar bo‘yida yashab, chorvachilik va dehqonchilik bilan shug‘ullanib kelishgan.

Surxondaryo havzasidagi ekin maydonlarini suv bilan ta’minlashda va xalq xo‘jaligining barqaror rivojlanishida nasos stansiyalarining ham xizmati katta. Quyida eng katta nasos stansiyalarining miqdoriy ko‘rsatkichlari to‘g‘risida statistik ma’lumotlarni berib o‘tamiz(2-ilova).

1.Jayxun nasos stansiyasi. Bu stansiya sekundiga 92 kub metr suv chiqarib beradi va Surxondaryo vohasining 65000 getar ekin maydonini suv bilan ta’minlaydi.

2.amu-Zang-1 nasos stansiyasi. Bu stansiya sekundiga 100 kub metr suv chiqarib beradi va vohaning 82000 getar ekin maydonini doimiy ravishda suv bilan ta’minlab turadi.

3.amu-Zang-2 nasos stansiyasi. Mazkur stansiya sekundiga 112 kub metr suv chiqarib beradi va Surxon vohasining 81000 getar ekin maydonini suv bilan ta’minlash qobiliyatiga ega.

4.Sherobod nasos stansiyasi. Bu stansiya eng katta kuchga ega bo‘lib sekundiga 120 kub metr suv chiqarib berish qobiliyatiga ega. uning chiqarib beradigan suvi vohaning 75111 gektar ekin maydonini suv bilan ta’minlaydi. Shunday qilib yuqorida nomlari ta’kidlab o‘tilgan 4 ta eng yirik stansiyalar Surxondaryo havzasi hududida jami 244,6 ming gektar ekin maydonini suv bilan ta’minlaydi.

1-jadval

Surxondaryo havzasida barpo etilgan asosiy kanallar

T/r	Kanallar nomi	Qaysi daryo yoki suv omboridan suv oladi	Suv sig‘imi, m^3/sek	Kanaldan suv ichadigan tumanlar
1	Zang	Janubiy Surxon va Oqtepa suv ombori	86	Jarqo‘rg‘on, angor, Muzrabod, Termiz
2	Hazarbog‘	To‘palangdaryo	110	Denov, Oltinsoy, Sho‘rchi, Bandixon
3	Qumqo‘rg‘on	Surxondaryo	30	Sho‘rchi, Qumqo‘rg‘on
4	Dayto‘lak	Denov-Yurchi botqoqligi	8	Denov, Sho‘rchi
5	Sherobod	Janubiy Surxon suv ombori	150	Bandixon, Qiziriq, Sherobod, Muzrabod
6	G‘arbiy	Sherobod kanalidan	5	Qiziriq
7	Sharqiy Muzrabod	Sherobod kanalidan	4	Bandixon, Qiziriq, Muzrabod
8	amu-Zang	amudaryo	120	Qumqo‘rg‘on, Jarqo‘rg‘on
9	Bobotog‘	amu-Zang kanalidan	30	Qumqo‘rg‘on, Jarqo‘rg‘on
10	Bandixon	Sherobod kanalidan	12	Bandixon
11	Zang-9	Janubiy Surxon suv ombori	25	Muzrabod
12	To‘palang-Qoratog‘	To‘palangdaryo	25	Sariosiyo
13	Hayrobod	To‘palangdaryo	10	Denov

Manba: Surxon irrigatsiya boshqarmsi ma’lumotlari asosida tuzildi.

ayrim taxminiy ma’lumotlarga qaraganda Zang kanali IX-X asrlarda qazilgan. Keyinchlik bu kanal tamoman buzilib ketgan. Hozirgi Zang magistral kanali deyarli qadimgi kanal o‘rnida 1912-yilda qayta qazilgan. 1930-yillarda Surxondaryo havzasidagi angor-Talimoron cho‘l massivlarini, 1950-yillarda Beshqo‘ton va Muzrobod massivlarini o‘zlashtirish munosabati bilan Zang magistral kanali yanada uzaytirildi va kengaytirildi. 1967-yilda Zang magistral kanalining bosh qismida Jarqo‘rg‘on gidrouzeli qurib ishga tushirildi.

2-jadval.

Surxondaryo viloyati suv omborlari va uarning asosiy ko‘rsatkichlari.

№	Suv ombori	Ishga tushgan yili	Sug‘orish maydoni, ga	Suv sig‘imi, mln m^3	amaldagi suv sig‘imi, mln m^3	To‘g‘on	
						Uzunligi, km	Balandligi, m
1	Janubiy Surxon	1967	150110	800	503	5,2	30
2	To‘palang	1986	61620	500	120	0,17	167
3	Uchqizil	1984	4950	160	160	4	11,5
4	Oqtepa	1982	24700	120	83	4,6	3
5	Degrez	1962	2200	12,8	12,8	3,5	12,7

Manba: Surxon irrigatsiya boshqarmsi ma’lumotlari asosida tuzildi.

Zang magistral kanali Surxondaryo havzasining janubiy qismidagi Jarqo‘rg‘on, Termiz, angor tumanlaridagi qishloq xo‘jalik ekin maydonlarini suv

bilan ta’minlaydi. 60 ming gektardan ko‘proq yerlarni vegetatsiya davrida sug‘oradi. Shu bilan birga bu mintaqada joylashgan Uchqizil suv omborini ham suv bilan ta’minlaydi. 1972-yilda amu-Zang mashina kanali ishga tushirildi. Uning uzunligi 56 km, suv o‘tkazish quvvati 40 m^3/sek ga teng. amu-Zang mashina kanali qurib bitkazilishi munosabati bilan Zang magistral kanali amudaryodan qo‘shimcha suv ola boshladi. Suvni tejash maqsadida kanalning 60 km uzunlikdagi qismi betonlashtirildi.

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SANOAT KORXONALARIDA TRANSFER NARXLARI

Annotatsiya. *Ushbu maqola sanoat korxonalarida transfer narxlarini belgilash va uning iqtisodiy samaradorlikka ta'sirini tahlil qiladi. Unda transfer narxlarini qo'llashning nazariy asoslari, amaliy mexanizmlari va asosiy masalalari o'rganiladi. Tadqiqotda transfer narxlariga ta'sir qiluvchi omillar va uning korxonaning ichki bozorida resurslarni taqsimlashga ta'siri o'rganiladi. Maqolada korxona raqobatbardoshligini oshirishga hissa qo'shadigan transfer narxlarini optimallashtirish bo'yicha ilmiy va amaliy tavsiyalar ishlab chiqiladi. Natijalar shuni ko'rsatadiki, to'g'ri ishlab chiqilgan transfer narxlari tizimi korxonaning umumiy samaradorligini sezilarli darajada yaxshilaydi.*

Kalit so'zlar: *Transfer narxlari, sanoat korxonalari, ichki narxlar, iqtisodiy samaradorlik, resurslarni taqsimlash, korporativ boshqaruv, strategik rejalashtirish, bozor mexanizmlari.*

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FORMATION OF TRANSFER PRICING IN INDUSTRIAL ENTERPRISES

Annotation. *This article is devoted to analyzing the formation of transfer pricing in industrial enterprises and its impact on economic efficiency. It examines the theoretical foundations, practical mechanisms, and key challenges in applying transfer pricing. Within the scope of the research, factors influencing the formation of transfer pricing and its effect on resource allocation within the enterprise's internal market are studied. The article develops scientific and practical recommendations for optimizing transfer pricing, which contribute to enhancing the competitiveness of enterprises. The results indicate that a properly structured transfer pricing system significantly improves the overall efficiency of an enterprise.*

Keywords: *Transfer pricing, industrial enterprises, internal pricing, economic efficiency, resource allocation, corporate governance, strategic planning, market mechanisms.*

Zamonaviy iqtisodiyotda, ayniqsa diversifikatsiyalangan sanoat korxonalarida transfert baho tizimi ichki resurslarni samarali taqsimlash, bo‘linmalar faoliyatini baholash va umumiy korxona rentabelligini optimallashtirishning muhim vositasi hisoblanadi. U korxona ichidagi turli bo'linmalar o‘rtasida tovarlar, xizmatlar va intellektual mulk almashinuvi uchun qo'llaniladigan narxlarni belgilash mexanizmini ifodalaydi. Transfert bahoning to‘g‘ri shakllanishi nafaqat ichki samaradorlikni oshirishga, balki soliq yukini optimallashtirish va xalqaro raqobatbardoshlikni ta’minlashga ham xizmat qiladi. Transfert bahoni shakllantirishning nazariy asoslari va amaliy usullari murakkab bo‘lib, ular doimiy ravishda muhokama qilinadi.

Adabiyotlarda transfert bahoning fundamental roli, uni aniqlash tartib-qoidalari va asosiy prinsiplari, shuningdek, turli metodologiyalar, jumladan, tannarxga asoslangan va qiymatga asoslangan yondashuvlar atroflicha o‘rganilgan. Bozor narxi, to‘liq tannarx plyus foyda, o‘zgaruvchan xarajatlar plyus foyda kabi bir qancha usullar mavjud bo‘lib, ularning hech biri barcha ichki manfaatdor tomonlarni universal tarzda qondirmaydi. Amaliyotda, ba’zi korxonalar shartnoma asosidagi bozor narxlaridan foydalansa, boshqalari tashqi bozor narxlari aniq bo‘lmaganda "to‘liq tannarx plyus foyda" usulini afzal ko‘radi, bu bo'linma kamchiliklarini aniqlashga yordam beradi.

Transfert bahoni faol boshqarish optimal sotuv hajmlariga va o‘rtacha xarajatlarga erishish orqali kutilayotgan rentabellikni oshirishga qaratilgan bo'lib, bu jarayonda bo‘linmaning o‘ziga xos xarajat xususiyatlarini hisobga olish muhimdir. O‘zbekistonda esa transfert bahoni tartibga solish, ayniqsa yirik soliq to‘lovchilarning tashqi savdo bitimlarida, Davlat soliq qo‘mitasi tomonidan qat’iy nazorat qilinadi. Bu jarayon narx belgilash bo‘yicha kelishuvlarni tuzish, o‘zgartirish yoki bekor qilish uchun bir qator rasmiy shakllar va tartib-qoidalarni o‘z ichiga oladi. Ushbu tadqiqot sanoat korxonalarida transfert bahoning shakllanishi, unga ta’sir qiluvchi omillar, boshqarish strategiyalari hamda O‘zbekiston sharoitidagi amaliyot va tartibga solish masalalarini chuqur tahlil qilishni maqsad qilgan.

Transfert baho masalasi zamonaviy korporativ boshqaruv va xalqaro soliqqa tortish sohasida eng ko‘p muhokama qilinadigan va murakkab mavzulardan biri bo‘lib qolmoqda. Global iqtisodiyotning integratsiyalashuvi va ko‘p millatli korxonalarning kengayishi bilan uning nazariy va amaliy ahamiyati yanada ortib bormoqda. Adabiyotlarda transfert baho nafaqat ichki samaradorlikni oshirish va resurslarni optimal taqsimlash vositasi sifatida, balki soliq yukini optimallashtirish, xalqaro raqobatbardoshlikni ta'minlash va korporativ boshqaruvning muhim elementi sifatida ham keng o‘rganilgan. Tadqiqotchilar transfert bahoning turli jihatlarini, jumladan, uning iqtisodiy mohiyati, shakllanish

prinsiplari, qo‘llash usullari va tartibga solish mexanizmlarini chuqur tahlil qilganlar.

Transfert bahoning nazariy asoslari va uni shakllantirish usullari bo‘yicha ilmiy adabiyotlar boy va xilma-xildir. Xususan, transfert bahoning fundamental roli va korxonaning umumiy narx siyosatidagi o‘ziga xos ma’nosi, uni aniqlashning belgilangan tartib-qoidalari va asosiy prinsiplari, shuningdek, narxlarni samarali belgilash uchun qo‘llaniladigan turli metodologiyalar atroflicha yoritilgan. Ushbu metodologiyalar orasida bozor narxi, to'liq tannarx plyus foyda, o‘zgaruvchan xarajatlar plyus foyda, shartnoma asosidagi o'zaro kelishilgan narxlar va to'liq yoki qisqartirilgan tannarx kabi bir qancha yondashuvlar mavjud. Biroq, adabiyotlarda ta’kidlanishicha, transfert bahoning hech bir usuli barcha ichki manfaatdor tomonlarni universal tarzda qondira olmaydi, bu esa har bir korxona uchun o‘ziga xos sharoitlarni hisobga olgan holda mos yondashuvni tanlash zarurligini ko'rsatadi.

Amaliyotda, ba’zi korxonalar bo‘linmalararo bitimlarda shartnoma asosidagi bozor narxlaridan foydalanadilar, bu har bir markaz uchun mustaqil foyda tahlilini o‘tkazish imkonini beradi. Tashqi bozor narxlari aniq bo‘lmagan hollarda esa, “to‘liq tannarx plyus foyda” usuli afzal ko‘riladi, chunki u bozor qiymatiga yaqinlashadi va bo'linmalardagi kamchiliklarni aniqlashga yordam beradi. Narx ustamalarini belgilashda, korxonaning umumiy rentabelligini emas, balki bo‘linmaning o‘ziga xos xarajat xususiyatlarini hisobga olish muhimligi alohida ta’kidlanadi. Tannarxga asoslangan transfert baho ko‘pincha bo‘linmalarni xarajat markazlari sifatida ko‘rib chiqadi, bunda o‘zgaruvchan xarajatlar usullari birlik uchun bir xil aktiv qiymati va barqaror o'zgaruvchan xarajatlar sharoitida samarali hisoblanadi. Transfert bahoni shakllantirishda tannarxga asoslangan va qiymatga asoslangan yondashuvlar o'rtasida muhim munozara mavjud. Tannarxga asoslangan yondashuv haqiqiy ishlab chiqarish va sotish xarajatlariga asoslanganligi sababli ishonchli deb hisoblanadi.

Transfert bahoni faol boshqarish strategik ahamiyatga ega bo'lib, optimal sotuv hajmlariga va o'rtacha xarajatlarga erishish orqali kutilayotgan rentabellikni oshirishga qaratilgan. Bu jarayonda “qiymat minus xarajatlar” balansini saqlash orqali foyda olishga intiladigan qiymatga asoslangan yondashuv ham muhim rol o'ynaydi. Adabiyotlarda transfert baho tizimining korxona ichidagi motivatsiya, samaradorlikni baholash va investitsiya qarorlarini qabul qilishga ta‘siri keng muhokama qilinadi. To‘g‘ri belgilangan transfert baho bo‘linmalar o‘rtasida sogolom raqobatni rag'batlantirishi, resurslardan oqilona foydalanishni ta’minlashi va umumiy korxona strategiyasiga mos keladigan qarorlarni qo'llab-quvvatlashi mumkin. Aksincha, noto‘g‘ri transfert baho ichki nizolarga, resurslarning noto‘g‘ri taqsimlanishiga va korxona samaradorligining pasayishiga olib kelishi mumkin. Shu sababli, transfert baho siyosatini ishlab chiqishda nafaqat moliyaviy, balki operatsion va strategik maqsadlarni ham hisobga olish zarurati ta'kidlanadi.

Transfert bahoni tartibga solish masalasi, ayniqsa xalqaro miqyosda, so‘nggi yillarda soliq organlari tomonidan tobora ko'proq e'tiborga olinmoqda. Ko‘plab mamlakatlar, jumladan O‘zbekiston ham, transfert baho qoidalarini ishlab chiqqan

va ularning bajarilishini qat'iy nazorat qiladi. O‘zbekistonda transfert bahoni soliq nazorati, ayniqsa yirik soliq to‘lovchilarning tashqi savdo bitimlarida, Davlat soliq qo'mitasi tomonidan amalga oshiriladigan murakkab protsedura hisoblanadi. Bu jarayon narx belgilash bo'yicha kelishuvlarni tuzish, o‘zgartirish yoki bekor qilish uchun bir qator rasmiy shakllar va tartib-qoidalarni o‘z ichiga oladi. Masalan, Soliq kodeksining 197-moddasi 2-qismiga muvofiq, yirik soliq to'lovchilar kelishuv tuzish yoki unga o'zgartirish kiritish to'g'risida ariza bilan murojaat qilishlari mumkin. Davlat Soliq Qo‘mitasi esa kelishuvni tuzish, uni tuzishni rad etish (sabablarini ko'rsatgan holda) yoki taqdim etilgan loyihaga tuzatishlar kiritishni taklif qilish bo'yicha qarorlar qabul qilishi mumkin. Shuningdek, qayta murojaat qilish va mavjud narx belgilash kelishuvini muddatidan oldin bekor qilish uchun ham shakllar mavjud. Bu tartibga solish mexanizmi transfert baho amaliyotida shaffoflikni ta'minlash va soliq bazasining eroziyasini oldini olishga qaratilgan bo'lib, korxonalar uchun jiddiy rioya qilish majburiyatlarini yuklaydi.

Umuman olganda, mavzuga oid adabiyotlar transfert bahoning nazariy jihatlari, metodologiyalari va strategik ahamiyatini chuqur tahlil qiladi. Ular transfert bahoning korxona ichki samaradorligi, moliyaviy natijalari va soliq yukiga ta’sirini har tomonlama yoritadi. Biroq, adabiyotlarda keltirilgan universal yechimning yo'qligi va har bir korxonaning o‘ziga xos sharoitlarini hisobga olish zarurati, ayniqsa O‘zbekiston kabi rivojlanayotgan iqtisodiyotlarda, transfert baho tizimini shakllantirish va boshqarishda qo'shimcha tadqiqotlar va amaliy tavsiyalar ishlab chiqish zarurligini ko‘rsatadi. Xususan, sanoat korxonalarining o‘ziga xos xususiyatlari, ularning ishlab chiqarish jarayonlari va mahsulot turlari transfert baho usullarini tanlashda muhim rol o‘ynaydi.

Shuningdek, transfert bahoni shakllantirishning turli metodologiyalari, jumladan, bozor narxi, to‘liq tannarx plyus foyda, o'zgaruvchan xarajatlar plyus foyda, shartnoma asosidagi o'zaro kelishilgan narxlar va to'liq yoki qisqartirilgan tannarx kabi yondashuvlar atroflicha tahlil qilinadi. Bu nazariy yondashuvlar korxona ichidagi motivatsiya, samaradorlikni baholash va investitsiya qarorlarini qabul qilishga ta’sirini baholash uchun asos bo'lib xizmat qiladi. Adabiyotlarda ta’kidlanganidek, transfert bahoning hech bir usuli barcha ichki manfaatdor tomonlarni universal tarzda qondira olmasligi sababli, har bir usulning afzalliklari va kamchiliklari chuqur o'rganiladi.

Ma’lumotlarni yig‘ish jarayoni ikki asosiy bosqichdan iborat bo'ladi: ikkilamchi va birlamchi ma’lumotlarni to‘plash. Ikkilamchi ma'lumotlar tahlili mavjud ilmiy adabiyotlar, monografiyalar, dissertatsiyalar, xalqaro tashkilotlar hisobotlari, sanoat tahlillari va O'zbekiston Respublikasining normativ-huquqiy hujjatlarini o‘rganishni o‘z ichiga oladi. Xususan, O‘zbekiston Soliq kodeksining transfert bahoni tartibga solishga oid qoidalari, ayniqsa yirik soliq to‘lovchilarning tashqi savdo bitimlarida Davlat Soliq Qo‘mitasi tomonidan qo‘llaniladigan protseduralar va shakllar batafsil tahlil qilinadi. Bu tahlil transfert baho amaliyotining huquqiy va institutsional asoslarini tushunishga yordam beradi.

Birlamchi ma’lumotlarni yig‘ish uchun O‘zbekistonning turli sanoat korxonalarida yarim strukturalangan intervyular o'tkaziladi. Intervyular moliyaviy

direktorlar, bosh hisobchilar, iqtisodchilar va boshqaruv xodimlari bilan o'tkazilib, ularning transfert bahoni shakllantirish va boshqarish bo'yicha amaliy tajribalari, duch kelayotgan muammolari va samarali yechimlari haqidagi fikrlari o‘rganiladi. Tanlab olingan korxonalar turli sanoat tarmoqlariga mansub bo‘lib, ularning hajmi va mulkchilik shakli ham farqlanadi, bu esa transfert baho amaliyotidagi xilma-xillikni qamrab olish imkonini beradi.

Umuman olganda, tadqiqot natijalari shuni ko‘rsatadiki, O‘zbekiston sanoat korxonalarida transfert baho tizimi rivojlanish bosqichida bo‘lib, uning samaradorligi ko‘p jihatdan soliq siyosati, bozor infratuzilmasi va korxona ichki boshqaruv tizimiga bog‘liq. Eng maqbul yondashuv sifatida bozor narxiga yaqinlashgan va bir nechta metodlarni integratsiya qilgan aralash model samarali ekanligi aniqlangan. Shu sababli, transfert baho tizimini takomillashtirish uchun shaffoflikni oshirish, normativ bazani soddalashtirish va malakali kadrlar tayyorlash muhim ahamiyat kasb etadi.

Ushbu tadqiqot sanoat korxonalarida transfert bahoning ichki resurslarni samarali taqsimlash, bo'linmalar faoliyatini baholash va umumiy rentabellikni optimallashtirishdagi muhimligini ta'kidladi. Transfert bahoni shakllantirishning murakkabligi va universal yechimning yo‘qligi har bir korxona uchun mos usulni tanlash zaruratini ko‘rsatadi. Uni faol boshqarish optimal sotuv hajmlari va xarajatlarga erishishda strategik ahamiyatga ega. O‘zbekistonda transfert baho amaliyoti Davlat soliq qo'mitasi tomonidan qat’iy nazorat qilinib, shaffoflik va soliq yukini optimallashtirishga qaratilgan. Tadqiqot O‘zbekiston sanoat korxonalari uchun transfert baho tizimini takomillashtirish bo‘yicha ilmiy asoslangan tavsiyalar ishlab chiqishga hissa qo‘shadi.

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XALQARO STANDARTLARGA ASOSAN INVESTITSION KO'CHMAS MULKNING IJARASI HISOBI

Annotatsiya. *Maqolada investitsion ko'chmas mulk tushunchasi, uning iqtisodiy mohiyati hamda buxgalteriya hisobidagi o'rni yoritilgan. Xususan, investitsion ko'chmas mulkning xalqaro moliyaviy hisobot standartlari, jumladan BHXS (IAS) 40 talablari asosida tan olinishi, dastlabki va keyingi baholash usullari tahlil qilingan. Shuningdek, investitsion ko'chmas mulkni asosiy vositalar va sotish uchun mo'ljallangan aktivlardan farqlash masalalariga alohida e'tibor qaratilgan. Tadqiqot natijalari investitsion ko'chmas mulk hisobini takomillashtirish va moliyaviy hisobotning shaffofligini oshirishga xizmat qiladi.*

Kalit so'zlar: *investitsion ko'chmas mulk, ijara daromadi, adolatli qiymat, asosiy vositalar, IAS 40, moliyaviy hisobot.*

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ACCOUNTING FOR THE RENT OF INVESTMENT PROPERTY IN ACCORDANCE WITH INTERNATIONAL STANDARDS

Annotation. *The article covers the concept of investment property, its economic essence and role in accounting. In particular, the recognition of investment property based on the requirements of international financial reporting standards, including IAS 40, and the methods of initial and subsequent valuation are analyzed. Also, special attention is paid to the issues of distinguishing investment property from fixed assets and assets held for sale. The results of the study serve to improve the accounting for investment property and increase the transparency of financial reporting.*

Keywords: *investment property, rental income, fair value, fixed assets, IAS 40, financial reporting.*

Bozor iqtisodiyoti sharoitida ko'chmas mulk ob'yektlari korxonalar uchun nafaqat ishlab chiqarish vositasi, balki muhim investitsiya manbai sifatida ham namoyon bo'lmoqda. Ayniqsa, ijara daromadi olish yoki qiymatining o'sishidan foyda ko'rish maqsadida saqlanadigan ko'chmas mulk ob'yektlari investitsion aktivlar sifatida alohida ahamiyat kasb etadi. Shu sababli investitsion ko'chmas mulkni to'g'ri tasniflash, baholash va hisobga olish moliyaviy hisobot ishonchliligini ta'minlashda muhim omil hisoblanadi.

Buxgalteriya hisobining xalqaro integratsiyalashuvi jadallashib borayotgan hozirgi kunda xo'jalik yurituvchi sub'yektlarda ko'chmas mulkni boshqarish va

undan samarali foydalanishni tashkil etish bilan bog‘liq tadbirlarning amalga oshirilishi mamlakatimizda iqtisodiy jarayonlarning borishiga sezilarli ta’sir ko‘rsatadi.

Ko‘chmas mulk ob’yektlarini tasarruf etish va ulardagi mavjud imkoniyatlardan samarali foydalanish, eng avvalo, ularni boshqarish bilan bog’liq maxsus bilim va ko‘nikmalarga ega bo’lishni talab etadi. Mulkiy munosabatlar rivojlanib borayotgan hozirgi kunda ko‘chmas mulkni boshqarish sohasida faoliyat ko‘rsatuvchi mutaxassislarning ko‘chmas mulk ob’yektlari va ularning o‘ziga xos xususiyatlari, ko‘chmas mulk ob’yektlarini tasniflash tizimi va ularning hayotiyligi to‘g ‘risida tushunchalarga ega bo‘lishlarini talab etadi. Shu bilan birga ular bino va inshootlarning iqtisodiyot tarmoqlari va sohalari faoliyatiga ixtisoslashuvi, tarmoq xususiyatlarini mukammal bilishlari, ijtimoiy soha ko‘chmas mulk ob’yektlari va ulardan optimal foydalanish yo‘llarini, ishlab chiqarish va xizmat ko‘rsatishga ixtisoslashgan ob’yektlardan, daromad keltiruvchi va tijorat ko‘chmas mulk ob’yektlaridan unumli foydalanishni tashkil eta olishlari lozim. Buning uchun mutaxassisdan ko‘chmas mulk ob’yektlarini boshqarish usullari va mexanizmlari, ko‘chmas mulkka bo‘lgan huquqni davlat tomonidan tartibga solishni va boshqarish shakllarini hamda ko‘chmas mulk ob’yektlarini rivojlantirish yo‘llari to‘g‘risida malakaviy ko‘nikmalarga ega bo‘lishi talab etiladi.

“Ko‘chmas mulk” deb, qo‘llanish sohasi bo‘yicha foydalanish jarayonida uning tarkibiy tuzilishi, tavsifi, o‘ziga xos xususiyatlariga zarar yetkazmagan holda qurilgan o‘rnidan ko‘chishni inkor etadigan mulklar hisoblanadi. Ularga: binolar, inshootlar, yer uchastkalari va yer bilan bog‘liq bo‘lgan boshqa mulklar kiradi. “Ko‘chmas mulk” so‘zi mantiqan uch ma’noda, ya’ni “qo‘zg‘almas ob’yekt”, “mulk”, “mulkka egalik” tushunchalarini anglatadi.

40-son “Investitsiya ko‘chmas mulki” BHXS ga asosan, Investitsiya ko‘chmas mulki- bu quyidagi maqsadlarni istisno qilgan holda, ijara to‘lovlarini olish yoki kapital qiymatining oshishi yoki har ikki maqsad uchun mo‘ljallangan (ko‘chmas mulk egasi tomonidan yoki foydalanish huquqidagi aktiv sifatida ijarachi tomonidan tutib turiladigan) ko‘chmas mulkdir (yer yoki bino (yoki binoning bir qismi), yoki har ikkalasi)

BHXS (IAS) 40 “Investitsion ko‘chmas mulk” standartiga muvofiq, investitsion ko‘chmas mulk bu:

- ijara daromadi olish yoki
- kapital qiymatining oshishidan foyda ko‘rish maqsadida saqlanadigan yer uchastkalari va (yoki) binolar hisoblanadi.

Bunday ob’yektlar korxonaning kundalik ishlab chiqarish yoki ma’muriy faoliyatida bevosita foydalanilmaydi. Shu jihati bilan investitsion ko‘chmas mulk asosiy vositalardan farqlanadi.

Investitsion ko‘chmas mulkdan olinadigan ijara daromadi korxonaning asosiy faoliyati bilan bevosita bog‘liq bo‘lmagan, biroq barqaror va uzoq muddatli iqtisodiy manfaat keltiruvchi passiv daromad hisoblanadi. Bunday daromadlar yer

uchastkalari, binolar yoki ularning bir qismi ijaraga berilishi natijasida shakllanadi. Ijara daromadi buxgalteriya hisobida quyidagi holatlarda tan olinadi:

- daromad kelgusida olinishi ehtimoli mavjud bo‘lsa;
- daromad summasi ishonchli baholanishi mumkin bo‘lsa;
- ijara shartnomasi mavjud bo‘lsa va u huquqiy kuchga ega bo‘lsa.
- Ijara daromadlari, odatda, hisoblash (akkumulyatsiya) usuli asosida, ya’ni daromadni olish davriga mos ravishda tan olinadi.

Ijara shartnomasiga muvofiq olinadigan to‘lovlar quyidagi tarkibiy qismlardan iborat bo‘lishi mumkin:

- asosiy ijara to‘lovi;
- o‘zgaruvchan (foizga bog‘liq) ijara to‘lovlari;
- qo‘shimcha xizmatlar uchun to‘lovlar (agar ular alohida shartnoma asosida bo‘lsa).

Agar ijarachi tomonidan to‘lanadigan summa bir necha davrni qamrab olsa, daromad ushbu davrlarga mutanosib ravishda taqsimlanadi.

Investitsion ko‘chmas mulkdan olinadigan ijara daromadlari Foyda va zararlar to‘g‘risidagi hisobotda alohida satrda ko‘rsatiladi. Investitsion ko‘chmas mulk esa Moliyaviy holat to‘g‘risidagi hisobotda mustaqil aktiv sifatida aks ettiriladi. Agar investitsion ko‘chmas mulk adolatli qiymat usuli asosida baholansa, ijara daromadlaridan tashqari, qiymatdagi o‘zgarishlar ham foyda yoki zarar tarkibida tan olinadi.

Xulosa.

Investitsion ko‘chmas mulkdan ijara daromadlarini to‘g‘ri hisobga olish:

-moliyaviy natijalarni real aks ettirishga;

-investorlar va kreditorlar uchun axborotning ishonchliligini oshirishga;

-korxonaning investitsion jozibadorligini kuchaytirishga xizmat qiladi.

Investitsion ko‘chmas mulkdan olinadigan ijara daromadlari korxonaning muhim passiv daromad manbai hisoblanadi. Ushbu daromadlarni xalqaro moliyaviy hisobot standartlariga muvofiq tan olish va hisobga olish moliyaviy hisobotning shaffofligi hamda taqqoslanishini ta’minlaydi.

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O‘ZBEKISTONDA TURIZMNI RIVOJLANTIRISHDA TURISTIK OQIM STATISTIKASINING O‘RNI

Annotatsiya*Ushbu maqolada O‘zbekistonda turizmni rivojlantirishda turistik oqim statistikasining ahamiyati tahlil qilinadi. Turistik oqim ko‘rsatkichlari orqali mamlakatga kirib kelayotgan xorijiy turistlar soni, joylashtirish vositalari faoliyati, mehmonxonalarda joylashtirilgan tashrif buyuruvchilar soni hamda turizm xizmatlari eksportidagi o‘zgarishlar yoritib beriladi. Tadqiqotda 2022–2025 yillarga oid rasmiy statistik ma’lumotlardan foydalanildi. Tahlil natijasida turistik oqim statistikasining turizm siyosatini shakllantirish, hududiy rejalashtirish, infratuzilmani rivojlantirish va xizmatlar sifatini oshirishda muhim axborot manbai ekanligi asoslandi. 2025 yilda O‘zbekistonga turistik maqsadlarda kirgan xorijiy fuqarolar safarlari soni 11,68 mln.ga yetgani, bu esa oldingi yillarga nisbatan sezilarli o‘sishni bildirishi aniqlandi.*

Kalit so‘zlar: *turizm, turistik oqim, statistika, turizm infratuzilmasi, mehmonxona xo‘jaligi, xizmatlar eksporti, O‘zbekiston, turizmni rejalashtirish.*

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THE ROLE OF TOURIST FLOW STATISTICS IN THE DEVELOPMENT OF TOURISM IN UZBEKISTAN

Annotation *This article analyzes the importance of tourist flow statistics in the development of tourism in Uzbekistan. Based on tourist flow indicators, the study highlights the number of foreign tourists visiting the country, the activity of accommodation facilities, the number of visitors placed in hotels, and changes in tourism service exports. The research uses statistical data for 2022–2025. The results show that tourist flow statistics serve as an important source of information for shaping tourism policy, territorial planning, infrastructure development, and improving service quality.*

Keywords: *tourism, tourist flow, statistics, tourism infrastructure, service exports, hotel industry, Uzbekistan, tourism development.*

Kirish

Bugungi kunda turizm jahon iqtisodiyotining eng tez rivojlanayotgan tarmoqlaridan biri hisoblanadi. O‘zbekistonda ham turizmni milliy iqtisodiyotning muhim yo‘nalishiga aylantirish, tarixiy-madaniy meros va tabiiy resurslardan samarali foydalanish, hududlarning investitsion jozibadorligini oshirish dolzarb vazifalardan biridir. Shu jarayonda turistik oqim statistikasi alohida ahamiyatga ega, chunki aynan statistik ma’lumotlar turizm bozoridagi haqiqiy holatni, o‘sish sur’atlarini va muammoli yo‘nalishlarni ko‘rsatib beradi. Turistik oqim statistikasi deganda mamlakatga kirib kelayotgan va undan chiqib ketayotgan turistlar soni, ularning safar maqsadi, joylashtirish vositalaridan foydalanishi, hududlar bo‘yicha taqsimlanishi va turizm xizmatlarining iqtisodiy natijalari haqidagi ma’lumotlar tushuniladi. Mazkur ko‘rsatkichlar davlat organlari, investorlar, turoperatorlar va hududiy boshqaruv organlari uchun qaror qabul qilishda tayanch manba bo‘lib xizmat qiladi.

Tadqiqot metodologiyasi

Maqolani tayyorlashda tahliliy, taqqoslash, statistik guruhlash va dinamik qator usullaridan foydalanildi. Asosiy manbalar sifatida O‘zbekiston Respublikasi Milliy statistika qo‘mitasi, Statistika agentligining turizm va tashqi savdo bo‘yicha rasmiy ma’lumotlari hamda Turizm qo‘mitasining rasmiy axborotlari olindi. 2022–2024 yillar uchun yillik statistik ma’lumotlar, 2025 yil uchun esa yillik yakuniy va rasmiy e’lon qilingan ko‘rsatkichlar asos qilib olindi.

Turistik oqim statistikasining mazmuni va ilmiy-amaliy ahamiyati

Turizm sohasini samarali boshqarish uchun faqat umumiy “turistlar soni”ni bilish kifoya emas. Statistik tahlilda turistlarning safar maqsadi, kelib chiqqan davlati, hududlar bo‘yicha taqsimlanishi, ularning qancha muddat joylashgani, qaysi turdagi xizmatlardan foydalangani va iqtisodiyotga qanday daromad keltirgani ham muhimdir.

O‘zbekistonda turistik oqim dinamikasi

So‘nggi yillarda O‘zbekistonda kiruvchi turizm sezilarli ravishda o‘sdi. 2024 yilgi rasmiy press-relizga ko‘ra, mamlakatga turistik maqsadlarda kirgan xorijiy fuqarolar safarlari soni 2022 yilda 5,232.8 ming, 2023 yilda 6,626.3 ming, 2024 yilda esa 7,957.2 mingni tashkil etgan. 2025 yil yakuni bo‘yicha ushbu ko‘rsatkich 11,679.6 ming safarga yetgan. Bu esa 2022 yilga nisbatan qariyb ikki barobardan ko‘proq o‘sishni anglatadi.

Jadval 1

O‘zbekistonga turistik maqsadlarda kirgan xorijiy fuqarolar safarlari soni

Yil	Turistik safarlar soni, mingta
2022	5 232,8
2023	6 626,3
2024	7 957,2
2025	11 679,6

Manba: O‘zbekiston Respublikasi Milliy statistika qo‘mitasi va Statistika agentligi ma’lumotlari asosida tuzildi.

Jadvaldan ko‘rinadiki, 2023 yilda 2022 yilga nisbatan o‘sish 1,393.5 ming safarni, 2024 yilda 2023 yilga nisbatan 1,330.9 ming safarni, 2025 yilda esa 2024 yilga nisbatan 3,722.4 ming safarni tashkil etdi. Ayniqsa, 2025 yildagi keskin o‘sish O‘zbekistonda turizmni rag‘batlantirish choralari, xalqaro imijning yaxshilanishi, transport aloqalarining kengayishi va turistik xizmatlar bozorining faollashuvi bilan izohlanadi. 2024 yil tuzilmasida xorijiy safarlarning asosiy qismi qarindoshlarni yo‘qlash maqsadiga to‘g‘ri kelgan bo‘lsa-da, dam olish va rekreatsiya maqsadidagi safarlar ham 1,184.4 mingni tashkil etgan. Bu holat O‘zbekistonda klassik ekskursiya turizmi bilan birga ziyorat, oilaviy, transit va qisqa muddatli tashriflar ham statistik jihatdan muhim ulushga ega ekanini ko‘rsatadi.

Joylashtirish vositalari statistikasi va uning ahamiyati

Turistik oqimni baholashda joylashtirish vositalari statistikasi juda muhim. Chunki turistlar sonining oshishi, tabiiy ravishda, mehmonxona, motel, kemping, dam olish bazalari va boshqa joylashtirish vositalariga talabning ortishiga olib keladi. O‘zbekistonda mehmonxona va shunga o‘xshash joylashtirish vositalari soni ham barqaror ko‘payib bormoqda. Rasmiy ma’lumotga ko‘ra, bu ko‘rsatkich 2022 yilda 59.3 ming o‘rin, 2023 yilda 69.7 ming o‘rin, 2024 yilda esa 79.5 ming o‘ringa yetgan. Shuningdek, mehmonxona va shunga o‘xshash joylashtirish vositalarida joylashtirilgan tashrif buyuruvchilar soni 2022 yilda 2,250.3 ming kishini, 2023 yilda 2,524.3 ming kishini, 2024 yilda esa 2,864.3 ming kishini tashkil etdi. Bu ma’lumotlar turistik oqim o‘sishi bilan joylashtirish tarmog‘iga bo‘lgan talab o‘rtasida to‘g‘ridan-to‘g‘ri bog‘liqlik mavjudligini ko‘rsatadi.

Jadval 2

Mehmonxona va shunga o‘xshash joylashtirish vositalaridan foydalanish ko‘rsatkichlari

Ko‘rsatkich	2022	2023	2024
Mehmonxona va o‘xshash joylashtirish vositalaridagi o‘rinlar soni, ming	59,3	69,7	79,5
Joylashtirilgan tashrif buyuruvchilar soni, ming kishi	2 250,3	2 524,3	2 864,3
Jamoaviy joylashtirish vositalari – jami, birlik	9 248 199	10 600 186	11 360 000

Manba: Milliy statistika qo‘mitasi ma’lumotlari asosida tuzildi.

Ushbu ko‘rsatkichlar ikki muhim xulosani beradi. Birinchidan, turistlar soni oshgani sari joylashtirish sig‘imi kengaymoqda. Ikkinchidan, turizmni rivojlantirish faqat reklama yoki tashviqot bilan emas, balki real moddiy baza — mehmonxona, dam olish maskani, transport va servis obyektlari bilan ham chambarchas bog‘liq. Statistik ma’lumotlar ana shu bog‘liqlikni isbotlab beradi.

Turistik oqim va turizm xizmatlari eksporti o‘rtasidagi bog‘liqlik

Turistik oqimning iqtisodiy natijasi turizm xizmatlari eksportida yaqqol ko‘rinadi. Rasmiy tashqi savdo ma’lumotlariga ko‘ra, 2022 yilda xizmatlar eksporti 3,959.5 mln AQSH dollarini tashkil etgan bo‘lib, unda travel (tourism) ulushi 40.7 foiz bo‘lgan. 2023 yilda xizmatlar eksporti 5,179.7 mln dollarga,

turizm ulushi esa 41.4 foizga yetgan. 2024 yilda xizmatlar eksporti 7,204.4 mln dollarga ko‘tarilib, unda turizm ulushi 48.8 foizni tashkil etgan. 2025 yil yakunida xizmatlar eksporti 9,760.4 mln dollar bo‘lib, uning 50 foizi travel (tourism) hissasiga to‘g‘ri kelgan.

Bu ma’lumotlar asosida taxminiy hisob-kitob qilinganda, turizm xizmatlari eksportining hajmi 2022 yilda qariyb 1.61 mlrd dollar, 2023 yilda 2.14 mlrd dollar, 2024 yilda 3.52 mlrd dollar va 2025 yilda 4.88 mlrd dollarga teng bo‘lgan. Bu yerda qiymatlar umumiy xizmatlar eksporti hajmida turizm ulushidan kelib chiqib hisoblangan.

Jadval 3

Turistik oqim va turizm xizmatlari eksporti ko‘rsatkichlari

Yil	Xizmatlar eksporti, mln AQSH dollari	Turizm ulushi, %	Hisoblangan turizm eksporti, mln AQSH dollari
2022	3 959,5	40,7	1 611,5
2023	5 179,7	41,4	2 144,4
2024	7 204,4	48,8	3 515,7
2025	9 760,4	50,0	4 880,2

Manba: rasmiy tashqi savdo statistikasi va muallif hisob-kitoblari.

Mazkur jadval shuni ko‘rsatadiki, turistlar oqimining ko‘payishi to‘g‘ridan-to‘g‘ri xizmatlar eksporti va valyuta tushumining o‘sishiga xizmat qilmoqda. Demak, turistik oqim statistikasi nafaqat ijtimoiy-geografik, balki makroiqtisodiy ahamiyatga ham ega. U turizmni yalpi ichki mahsulot, bandlik, hududiy daromad va xizmatlar bozori bilan bog‘lab tahlil qilish imkonini beradi.

Turistik oqim statistikasining boshqaruvdagi roli

Turistik oqim statistikasi asosida bir necha amaliy vazifalarni bajarish mumkin. Birinchidan, turistlar oqimining hududlar bo‘yicha taqsimlanishini aniqlab, qaysi viloyatlarda infratuzilmani kuchaytirish kerakligi belgilanadi. Ikkinchidan, turistlarning safar maqsadlari tarkibi o‘rganilib, ziyorat turizmi, ekologik turizm, madaniy turizm yoki rekreatsiya turizmi bo‘yicha alohida dasturlar ishlab chiqiladi. Uchinchidan, mehmonxona fondi, transport xizmati va ekskursiya xizmatlari hajmini bozor talabi bilan moslashtirish imkoniyati paydo bo‘ladi.

Bundan tashqari, statistik ma’lumotlar ilmiy tadqiqotlar uchun ham zarur. Turizm geografiyasi nuqtai nazaridan turistik oqimlar hududiy tafovutlarni, turistik markazlarning shakllanishini, mavsumiylik xususiyatlarini va turizmning rekreatsion salohiyat bilan o‘zaro bog‘liqligini tahlil qilishda asosiy empirik manba hisoblanadi. Shu sababli turistik oqim statistikasi turizmni boshqarishning ham, turizmni ilmiy o‘rganishning ham ajralmas qismidir.

Xulosa

Olib borilgan tahlillar shuni ko‘rsatdiki, O‘zbekistonda turizm so‘nggi yillarda izchil o‘sib bormoqda. 2022–2025 yillar oralig‘ida mamlakatga kirib kelgan xorijiy turistlar safarlari soni 5.23 mln.dan 11.68 mln.gacha oshgan. Shu bilan birga mehmonxona va o‘xshash joylashtirish vositalarining sig‘imi ham

kengaygan, joylashtirilgan tashrif buyuruvchilar soni ko‘paygan va turizm xizmatlari eksporti sezilarli ravishda ortgan.

Shu asosda aytish mumkinki, turistik oqim statistikasi turizmni rivojlantirishda strategik ahamiyatga ega. U turizm siyosatini asoslash, hududiy dasturlarni ishlab chiqish, investitsiya loyihalarini yo‘naltirish, reklama va marketingni kuchaytirish hamda xizmatlar sifatini oshirish uchun zarur axborot bazasini yaratadi. Kelgusida turistik oqim statistikasini yanada takomillashtirish, hududlar va turizm turlari bo‘yicha chuqurroq tahlil qilish O‘zbekistonda raqobatbardosh turizm modelini shakllantirishga xizmat qiladi.

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BOSHLANG'ICH TA'LIMDA TABIIY FANLARNI O'QITISHDA TURLI METODLARDAN FOYDALANISHNING AFZALLIKLARI VA KAMCHILIKLARI

Annotatsiya. *Ushbu maqolada boshlang'ich ta'limda (1-4-sinflar) tabiiy fanlarni o'qitishda turli metodlardan foydalanishning nazariy va amaliy jihatlari keng yoritilgan. O'zbekiston Respublikasida 2021-2022 o'quv yilidan boshlab joriy etilgan integratsiyalashgan "Tabiiy fanlar" (SCIENCE) dasturi asosida an'anaviy, interaktiv, loyiha asosidagi, STEAM, didaktik o'yinli va innovatsion metodlar tahlil qilinadi.*

Kalit so'zlar. *Boshlang'ich ta'lim, tabiiy fanlar, o'qitish metodlari, STEAM, interaktiv usullar, og'zaki metod.*

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ADVANTAGES AND DISADVANTAGES OF APPLYING DIFFERENT METHODS IN TEACHING SCIENCES IN PRIMARY EDUCATION

Abstract*. This article provides a detailed overview of the theoretical and practical aspects of using diverse methods in teaching natural sciences in primary grades (1-4 grades). Based on the integrated "Science" program implemented in the Republic of Uzbekistan from the 2021-2022 academic year, traditional, interactive, project-based, STEAM, didactic-game, and innovative teaching methods are analyzed.*

Keywords*: primary education, natural sciences, teaching methods, STEAM, interactive methods, oral method.*

Boshlang'ich ta'lim – bolaning shaxsiy rivojlanishining asosiy bosqichi. Bu davrda (6-10 yosh) bolalar atrof-muhitni idrok etish, tabiat qonuniyatlarini anglash va ilmiy dunyoqarash shakllantirish imkoniyatiga ega bo'ladi. O'zbekiston ta'lim tizimida tabiiy fanlar integratsiyalashgan holda o'qitiladi. U biologiya, fizika, kimyo va geografiya asoslarini o'z ichiga oladi.

Tabiiy fanlarni o'qitishning asosiy maqsadi – bolalarda tabiatga hurmat, tadqiqotchilik ko'nikmalari va mustaqil fikrlashni rivojlantirishdir. Zamonaviy pedagogika (Piaget, Vygotskiy nazariyalari asosida) bolani faol ishtirokchi sifatida ko'radi. Shuning uchun turli metodlardan foydalanish zarur: an'anaviy (og'zaki,

ko‘rgazmali) va innovatsion (interaktiv, loyiha, STEAM). Ushbu maqola mavzuni keng yoritib, nazariy asoslar, amaliyot va tavsiyalarni beradi.

Boshlang‘ich sinflarda tabiiy fanlar bolalarga atrof-muhit haqida dastlabki tushunchalar beradi: tirik va jonsiz tabiat, moddalar xossalari, tabiat hodisalari, ekologiya asoslari. Bu fanlar tadqiqotchilik va mantiqiy fikrlashni rivojlantiradi. O‘zbekiston Milliy o‘quv dasturiga ko‘ra (2021-yildan), tabiiy fanlar kompetensiyaviy yondashuv asosida o‘qitiladi: bilim, ko‘nikma, malaka va qadriyatlar. Bolalar tabiatni kuzatish, tajriba o‘tkazish va natijalarni tahlil qilishni o‘rganadi. Masalan, 3-sinfda “Yirtqich hayvonlar” mavzusida didaktik o‘yinlar orqali hayvonot dunyosining xususiyatlari o‘rganiladi. Ilmiy dunyoqarash shakllantirishda katta ro’l o’ynaydi. Bolalar tabiat qonunlarini anglaydi. Bolalarda ekologik tarbiyani shakllantiradi. Atrof-muhitni asrashga o‘rgatadi (masalan, suvni tejash, chiqindilarni qayta ishlash). Matematika, ona tili, tasviriy san’at bilan bog‘lanadi (STEAM yondashuvi). Mustaqillik, hamkorlik va ijodkorlikni, shaxsiy rivojlanishni oshiradi.

Xalqaro tajribada (TIMSS, PISA) tabiiy fanlar hands-on va inquiry-based metodlar bilan o‘qitilganda natijalar yuqori bo‘ladi. O‘zbekiston maktablarida esa an’anaviy metodlar asosiy bo‘lib qolmoqda, chunki ular oddiy va samarali. Ularni quyida ko‘rib chiqamiz:

1. Og‘zaki metodlar: Hikoya va suhbat: O‘qituvchi tabiat hodisalarini jonli hikoya qiladi. Masalan, “Bahor kelishi” mavzusida suhbat orqali o‘simliklarning o‘sishi tushuntiriladi; Tushuntirish: Nazariy bilimlarni berish (moddalar holatlari: suyuq, qattiq, gaz).

2. Ko‘rgazmali metodlar: rasmlar, modellar, gerbariylar, hayvon kollektsiyalari. Tabiat burchagi tashkil etish (o‘simliklar, akvarium). Multimedia: videolar, animatsiyalar (tabiat hodisalari).

3. Amaliy metodlar: Kuzatish va tajriba sinf o‘quv-tajriba uchastkasida o‘simlik ekish, suvning bug‘lanishini kuzatish. Laboratoriya ishlari: Oddiy tajribalar (magnit, suvning harorati).

An’anaviy metodlarning afzalliklari oddiylik, ko‘p o‘quvchiga qo‘llash mumkin. Kamchiliklari esa bolalar faolligi past, passiv idrok etish.

Zamonaviy metodlar bolani markazga qo‘yadi va faol ishtirokni ta’minlaydi.

1. Interaktiv metodlar - guruhli ish, muhokama, rol o‘ynash. Masalan, “Jonli va jonsiz tabiat” mavzusida juftliklarda suhbat. Aqliy hujum (brainstorming) - muammoni hal qilish (masalan, “Chiqindilarni qanday qayta ishlaymiz?”).

2. Loyiha asosidagi ta’lim (PBL) - o‘quvchilar loyiha tayyorlaydi: “Mening bog‘im” – o‘simliklar o‘sishini kuzatish va hisobot. Bunda amaliyot va nazariya birlashadi, jamoaviy ish.

3. Tadqiqotga asoslangan o‘qitish (Inquiry-based) - Savol berish → Tajriba → Tahlil. Misol: “Nima uchun barglar tushadi?” – kuzatish va xulosa.

4. Didaktik o‘yinli texnologiyalar - “So‘z top”, “Muzyorar”, “Organayzer” metodlari. 3-sinfda “Yirtqich hayvonlar” uchun o‘yinlar. Kayfiyat aks ettirish: “Mening kayfiyatim quyoshdek” – tabiat bilan bog‘lash.

5. STEAM yondashuvi- Science + Technology + Engineering + Art + Mathematics. Boshlang‘ich sinflarda maket yasash (masalan, oddiy mashina) orqali fizika va matematikani birlashtirish.

6. Raqamli va multimedia metodlar- virtual laboratoriyalar, interaktiv taxta, mobil ilovalar, masofaviy ta’lim elementlari (sinxron/asinxron). Bu orqali qiziqish oshiradi, ko‘nikmalarni mustahkamlaydi. Faqat resurs talab qiladi (kompyuter, materiallar).

Turli metodlarning afzalliklari, kamchiliklari va taqqoslash

- An’anaviy: Barqaror, lekin zerikarli bo‘lishi mumkin.
- Innovatsion: Faol, lekin o‘qituvchi tayyorgarligi va resurs kerak.
- Taqqoslash jadvali (misol): Inquiry-based – yuqori samaradorlik, lekin vaqt talab qiladi.

O‘quvchilarning yosh xususiyatlarini hisobga olish muhim: 1-2-sinflarda o‘yin va ko‘rgazma, 3-4-sinflarda loyiha va tadqiqot.

Amaliyotda qo‘llash: Misollar va dars ishlanmalari

Misol 1: “Suvning holatlari” (2-sinf, amaliy + interaktiv)

- Ko‘rgazmali: Muz, suv, bug‘ namoyishi.
- Tajriba: Suvni qizdirish va bug‘lanishni kuzatish.
- O‘yin: “Suv qayerda yashaydi?” – guruhli muhokama.

Misol 2: “O‘simliklar hayoti” (3-sinf, STEAM + loyiha)

- Loyiha: Urug‘ ekish va o‘sishni kunlik kuzatish (jurnal yuritish).
- Integratsiya: Rasm chizish (Art), o‘lchov (Math).
- Baholash: O‘z-o‘zini nazorat varag‘i.

Misol 3: Ekologik loyiha “Mening maktabim toza”

- Aqliy hujum + amaliy ish: Chiqindilarni ajratish, bog‘ni obodonlashtirish.

Boshlang‘ich sinflarda amaliy mashg‘ulotlar (tajriba, kuzatish) bilimlarni 70-80% mustahkamlaydi.

O‘zbekistonda tabiiy fanlar dasturi yangi, shuning uchun muammolar bor. Ular quyidagilarda ko‘rinadi: resurs yetishmasligi (tajriba jihozlari, laboratoriyalar), o‘qituvchilarning innovatsion metodlarga tayyorgarligi past, sinf sig‘imi katta (interaktiv usullar qiyin).

Bu kamchiliklarni hal qilish uchun quyidagilarni amalga oshirish mumkin:

- O‘qituvchilar malakasini oshirish.
- Maktab tabiat burchaklarini rivojlantirish.
- Davlat dasturlari orqali multimedia jihozlar yetkazish.
- Ilmiy tadqiqotlar asosida metodik qo‘llanmalar yaratish.

Boshlang‘ich ta’limda tabiiy fanlarni o‘qitishda turli metodlardan foydalanish – zamonaviy ta’limning asosidir. An’anaviy metodlar asos bo‘lib, innovatsion usullar (STEAM, loyiha, o‘yinlar) bilan birlashganda bolalar ilmiy fikrlash, ijodkorlik va ekologik mas’uliyatni egallaydi. O‘zbekiston ta’lim tizimida bu yondashuvni kengaytirish orqali PISA/TIMSS natijalarini yaxshilash va kelajak avlodni global muammolarga tayyorlash mumkin.

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ANALYSIS OF ACCIDENTS IN UZBEKISTAN'S RAILWAY TRANSPORT

Abstract: *This article provides a statistical analysis of accidents that occurred on the railway transport of the Republic of Uzbekistan and at industrial enterprises of "O'zbekiston temir yo'llari" JSC during the period of 2014-2025. The study examines the number of accidents, their severity, and the primary causal factors. The analysis reveals that the main causes of accidents are non-compliance with technological process requirements, violations of train traffic safety rules, and factors related to electrical safety.*

Keywords: *railway transport, accident, occupational safety, industrial safety, statistical analysis, industrial enterprises.*

INTRODUCTION.

Railway transport is one of the essential sectors of the national economy. This system plays a vital role in the transportation of freight and passengers. The railway infrastructure is composed of complex technological processes, and ensuring the occupational safety of employees within these processes is of particular importance. Various risk factors arise during production processes as a result of working with high-voltage electrical networks, mechanical equipment, and moving trains.

Despite a series of measures taken in recent years to ensure operational safety, accidents still occur within the railway transport system. Therefore, a statistical analysis of these incidents and the identification of their causes are of significant scientific and practical importance.

METHODS.

This study utilized statistical, comparative, and trend analysis methods. The data was examined based on accident statistics from the railway transport of the Republic of Uzbekistan for the period 2015-2025, as well as incident data from industrial enterprises belonging to "Uzbekistan Railways" JSC between 2014 and 2025.

RESULTS.

Analysis of Accidents in Railway Transport

Table 1
Information on the number of accidents on railway transport in the Republic of Uzbekistan

Years	Number of accidents	Ended in death	Heavy	Medium-severe	Not heavy
2015 y	**23**	5	14	-	4
2016 y	**23**	6	14	-	3
2017 y	**30**	7	17	-	6
2018 y	**42**	9	22	-	11
2019 y	**43**	11	20	-	12
2020 y	**39**	2	24	-	13
2021 y	**27**	6	18	-	3
2022 y	**32**	6	17	3	6
2023 y	**23**	6	14	2	1
2024 y	**23**	5	14	3	1
2025 y	**19**	4	10	2	3
Total:	**324**	**67**	**184**	**10**	**63**

Between 2015 and 2025, a total of 324 accidents occurred, affecting 324 people. Among them, 63 sustained minor injuries, 10 sustained moderate injuries, and 184 sustained severe injuries, while 67 people died [4].

An analysis of the causes of railway transport accidents in the Republic of Uzbekistan between 2015 and 2025 shows the following:

1. Causes of death: Exposure to a high-voltage contact network, resulting in electric shock. Negligence of mid-level managers in their duties and failure to comply with technological process requirements (improper use of personal protective equipment) [4, 5, 6].

2. Causes of the severe accident: Violation of train traffic safety requirements and non-compliance with the rules for safe movement on the railway. Violation of train traffic safety rules and workplace technological process requirements due to personal negligence. Irresponsibility of mid-level managers in their duties and failure to adhere to technological process requirements.

3. Causes of the minor accident: violation of technological process requirements at the workplace, resulting from personal negligence. Due to an external factor [4, 5].

According to data No. 200866-r/25 from the State Statistics Committee of the Republic of Uzbekistan, dated July 15, 2025, the number of accidents on railway transport in the Republic of Uzbekistan (for the years 2015-2025) is distributed as follows. A trend line analysis of fatal accidents indicates that the number of such incidents has remained nearly unchanged over the last decade; in fact, this figure even increased significantly between 2017 and 2022 [4].

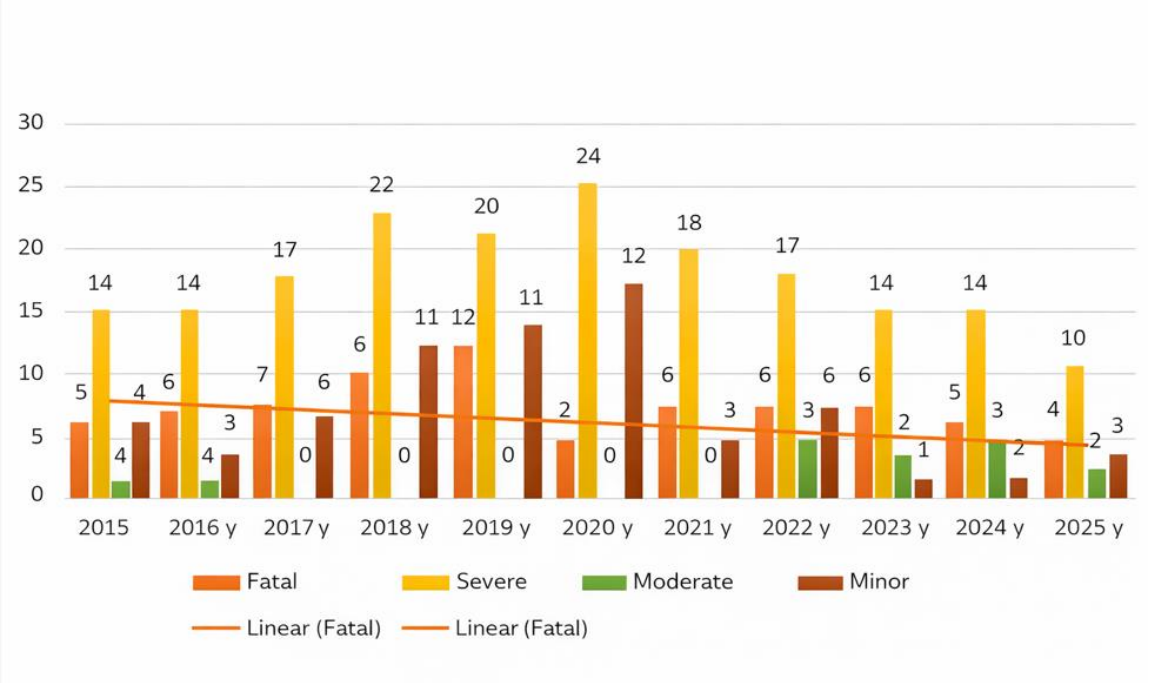


Table 2.

Analysis of accidents that occurred at industrial enterprises of "O'zbekiston temir yo'llari" JSC between 2014 and 2025

№	Years	Total number of accidents that have occurred	Total number of injured	The number of accidents, of which			
				Light	Heavy	Ended in death	Group-based
1	**2014**	4	6	-	5	1	1
2	**2015**	4	4	2	2	-	-
3	**2016**	5	6	-	6	-	1
4	**2017**	5	7	1	6	-	1
5	**2018**	10	10	4	5	1	-
6	**2019**	8	8	1	7	-	-
7	**2020**	7	7	1	6	-	-
8	**2021**	6	6	-	5	1	-
9	**2022**	2	2	1	1	-	-
10	**2023**	5	5	1	3	1	-
11	**2024**	1	1	-	1	-	-
12	**2025**	4	4	-	2	2	-
	Jami:	**61**	**66**	**11**	**49**	**6**	**3**

Between 2014 and 2025, a total of 61 accidents occurred, affecting 66 people. Of these, 11 sustained minor injuries, 49 sustained serious injuries, and 6 were killed. Three of the incidents were classified as group accidents.

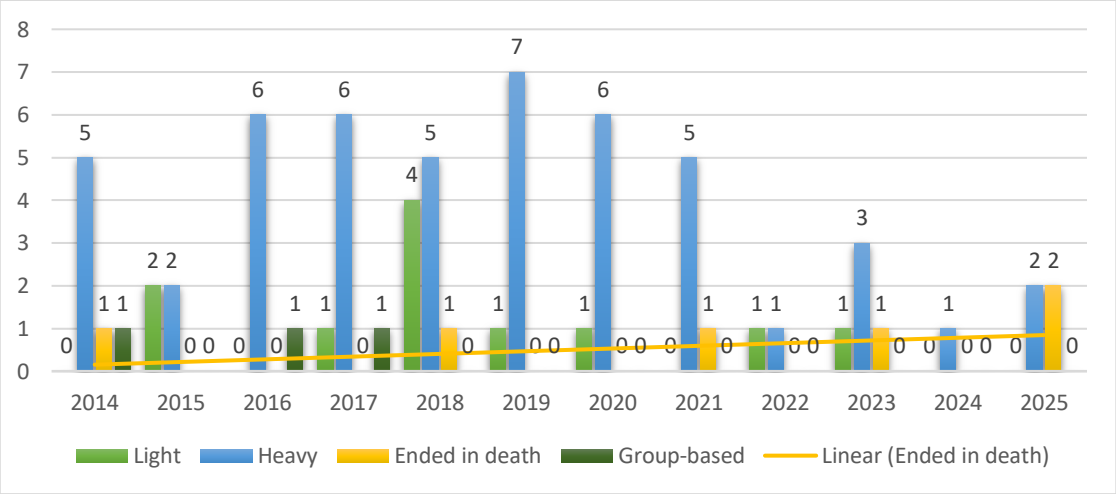
An analysis of accidents at industrial enterprises of "Uzbekistan Railways" JSC between 2014 and 2025 shows that

1. Causes of death: Exposure to a high-voltage contact network, resulting in electric shock. Negligence of mid-level managers in their duties and failure to comply with technological process requirements (improper use of personal protective equipment).

2. Causes of the severe accident: Violation of train traffic safety requirements and non-compliance with the rules for safe movement on the railway. Violation of train traffic safety rules and workplace technological process requirements due to personal negligence. Irresponsibility of mid-level managers in their duties and failure to adhere to technological process requirements.

3. Causes of the minor accident: violation of technological process requirements at the workplace, resulting from personal negligence. Due to an external factor.

The following is a breakdown of accidents that occurred at industrial enterprises under "O'zbekiston temir yo'llari" JSC between 2014 and 2025. An analysis of the trend line for fatal accidents shows that while the number of fatalities remained relatively unchanged over the last decade, an increase in this figure was recorded for 2025 [4].

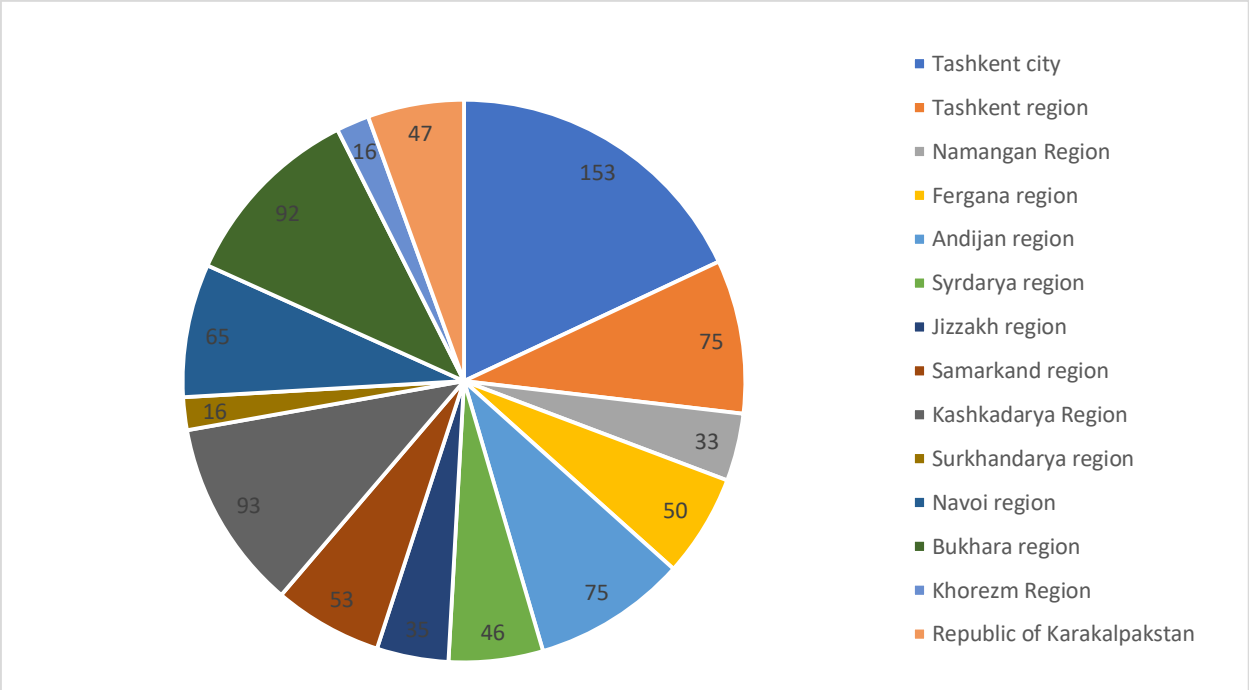


Statistics on workplace accidents in 2025

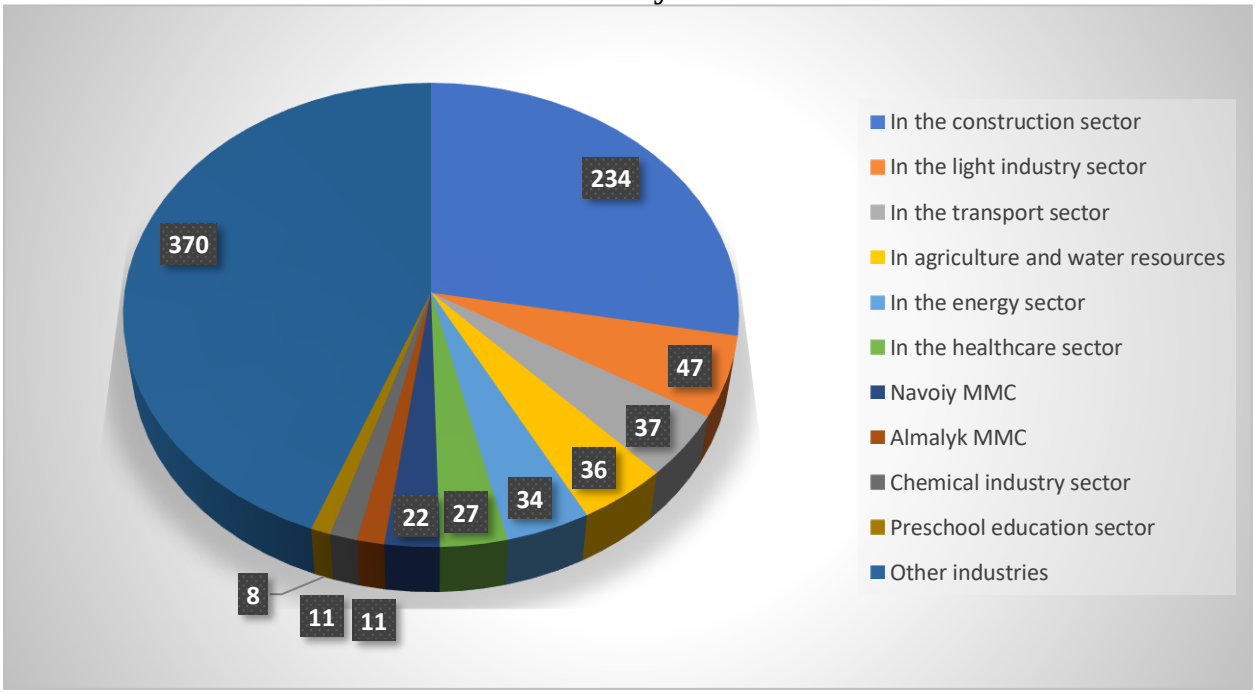
According to the State Labor Inspectorate, 849 workplace accidents were investigated and recorded in the republic in 2025.

Statistics on workplace accidents that occurred in 2025							
Total number of accidents that have occurred				The injured			
Total	Group-based	Grave consequences	Ended in death	Total	The severely injured	The lightly injured	The deceased
849	50	583	216	961	680	33	248

Accidents by region



Accidents by sector



Based on the data above, an analysis of the distribution of accidents reveals that industrial enterprises rank second after the construction sector. This is because over 128 incidents, or more than 16% of all accidents, occur in this industry.

DISCUSSION.

Analysis shows that the main causes of accidents occurring on railway transport are related to non-compliance with electrical safety, violation of technological process requirements, and non-compliance with train traffic safety rules. In some cases, insufficient control by mid-level managers can also contribute to the occurrence of these phenomena.

CONCLUSION.

Ensuring occupational safety on railway transport is an important factor in increasing production efficiency and protecting human life. According to the results of statistical analysis, strict adherence to safety regulations, improving the qualifications of employees, and strengthening control over production processes serve to reduce the number of accidents.

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AJRIQ O'SIMLIGINING TIBBIYOTDAGI AHAMIYATI

Annotatsiya: *Ushbu maqolada ajriq o'simligining tibbiyotdagi ahamiyati, biologik xususiyatlari, kimyoviy tarkibi hamda shifobaxsh xususiyatlari haqida batafsil ma'lumot berilgan. Ajriq bug'doydoshlar oilasiga mansub ko'p yillik dorivor o'simlik bo'lib, xalq tabobati va fitoterapiyada keng qo'llaniladi. Maqolada ajriq o'simligining tarkibida uchraydigan biologik faol moddalar – flavonoidlar, organik kislotalar, efir moylari, vitaminlar va mineral moddalar organizmga ko'rsatadigan ijobiy ta'siri tahlil qilingan. Shuningdek, ajriq o'simligining siydik haydovchi, yallig'lanishga qarshi, mikroblarga qarshi, qonni tozalovchi hamda modda almashinuvini yaxshilovchi xususiyatlari ilmiy va amaliy jihatdan yoritilgan. Uning buyrak va siydik yo'llari kasalliklari, shishlar, ovqat hazm qilish tizimi buzilishlari hamda ayrim yallig'lanish kasalliklarini davolashda qo'llanishi haqida ma'lumotlar keltirilgan. Ajriq o'simligidan tayyorlanadigan dorivor shakllar-damlama, qaynatma va o'simlik choylari haqida ham so'z yuritillib, ularning inson salomatligini saqlash va kasalliklarning oldini olishdagi ahamiyati yoritilgan.*

Kalit so'zlar*: flavonoidlar, efir moylari, mineral moddalar, siydik haydovchi, organik kislotalar, biologik faol moddalar, dorivor damlama, qaynatma, modda almashinuvi, shifobaxsh o'simliklar, yallig'lanishga qarshi ta'sir, o'simlik choylari.*

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THE MEDICAL SIGNIFICANCE OF THE AJRIQ PLANT

Abstract: *This article provides detailed information on the medical significance, biological characteristics, chemical composition, and therapeutic properties of couch grass (Elytrigia repens). Couch grass is a perennial medicinal*

plant belonging to the Poaceae family and is widely used in traditional medicine and phytotherapy.

The article analyzes the biologically active compounds found in couch grass, including flavonoids, organic acids, essential oils, vitamins, and mineral substances, as well as their positive effects on the human body. In addition, the plant's diuretic, anti-inflammatory, antimicrobial, blood-purifying, and metabolism-enhancing properties are described from both scientific and practical perspectives.

Information is also provided on its use in the treatment of kidney and urinary tract diseases, edema, digestive system disorders, and certain inflammatory conditions. Furthermore, the article discusses medicinal forms prepared from couch grass—infusions, decoctions, and herbal teas—and highlights their importance in maintaining human health and preventing diseases.

KEYWORDS; FLAVONOIDS, ESSENTIAL OILS, MINERAL SUBSTANCES, DIURETICS, ORGANIC ACIDS, BIOLOGICALLY ACTIVE COMPOUNDS, MEDICINAL INFUSION, DECOCTION, METABOLISM, MEDICINAL PLANTS, ANTI-INFLAMMATORY EFFECT, HERBAL TEAS

KIRISH

Dorivor o'simliklar insoniyat tarixida qadim zamonlardan beri muhim o'rin egallab keladi. Insonlar dastlabki davrlardan boshlab turli kasalliklarni davolashda tabiatdagi o'simliklardan keng foydalangan. Dorivor o'simliklar tarkibida biologik faol moddalar mavjud bo'lib, ular inson organizmiga shifobaxsh ta'sir ko'rsatadi. Shu sababli bugungi kunda ham o'simliklardan olinadigan dorivor moddalar tibbiyot va farmatsiya sohasida keng qo'llanilmoqda. Zamonaviy tibbiyotda fitoterapiya- ya'ni o'simliklar yordamida davolash usuli alohida ahamiyat kasb etmoqda.

Ajriq yer yuzining ko'plab hududlarida, jumladan Markaziy Osiyo ,Yevropa, Osiyo va Afrika mamlakatlarida keng tarqaldan. Ajriq asosan dalalarda, yay-lovlarda, bog'larda, yo'l chetlarida va sug'oriladigan yerlarda o'sadi.Uning ildiz tizimi kuchli rivojlangan bo'lib, yer ostida keng tarqaladi va tez ko'payish xususiyatiga ega. Xalq tabobatida ajriqning ildizi va yer ustki qismlardan tayyorlangan damlama hamda qaynatmalar turli kasalliklarni davolashda qo'llanilgan. Ayniqsa, ajriq siydik haydovchi, yallig'lanishga qarshi, qonni tozalovchi hamda modda almashinuvini yaxshilovchi xususiyatlari bilan mashhur.

Abu Ali ibn Sino o'zining mashhur asari Tib qonunlarida ajriq ildizi va barglarini qonni tozalovchi, siydik haydovchi va yallig'lanishga qarshi vosita sifatida tavsiflanang. Shuningdek, ajriqning organizmni mustahkamlovchi va shishlarni kamaytiruvchi xususiyatlari ham qayd etilgan.

Ajriqning tarkibi va ozuqaviy qiymati

Ajriq nafaqat dorivor dorivor xususiyatlarga ega, balki uning tarkibi yuqori biologik va ozuqaviy qiymatga ega bo'lgan moddalar bilan boyitilgan. O'simlikning ildizi, poyasi va barglari turli biologik faol moddalar, vitaminlar,

minerallar va boshqa foydali komponentlarni o’z ichiga oladi. Shu bilan birga ajriq chorva uchun ham yuqori sifat ozuqa manbai hisoblanadi.

Tibbiyotda qo’llanilishi

Siydik haydovchi(diuretik)xususiyati: Ajriq ildizi va barglaridan tayyorlangan damlama siydik ajralishini oshiradi, buyrak va siydik yo’llari kasalliklarida yordam beradi. Shu sababli u buhronli peshob chiqarish, siydik yo’llari infeksiyalari va buyrak toshlarini kamaytirishda qo’llaniladi.

Yallig’lanishga qarshi ta’sir: Ajriq tarkibidagi flavonoidlar va saponinlar yallig’lanishga qarshi ta’sir ko’rsatadi. Shu sababli u shishlar, bo’g’imlar yallig’lanishi va jarohat joylaridagi yallig’lanish holatlarini kamaytirishda ishlatiladi.

Qonni tozalash va modda almashinuvi yaxshilash: Ajriq o’simligi qonni tozalash, toksinlarni chiqarish va metabolizm jarayonlarini rag’batlantirishda foydali. Xalq tabobatida ajriq damlamasi organizmni tozalovchi vosita sifatida, shuningdek teri kasalliklarini kamaytirishda qo’llaniladi.

Jigar va oshqozon faoliyatini qo’llab-quvvatlash: Ajriq ildizidan tayyorlangan qaynatmalar jigar faoliyatini yaxshilash , ovqat hazm qilish rag’batlantirish va ich qotishi bilan bo’gliq muammolarni kamaytirishda ishlatiladi.

Shishlarni kamaytirish(anti-edematous ta’sir) Ajriqning ildizi va barglaridan tayyorlangan damlamalar organizmda suyuqlik to’planib qolgan hollarda, ya’ni shishlar paydo bo’lganda foydali hisoblanadi.

Qon tomir va yurak faoliyati qo’llab-quvatlash: Ajriq tarkibidagi kaliy va flavonoidlar qon bosimni tartibga solishga, yurak va tomir faoliyatini mustahkamlashga yordam beradi. Shu sababli u yumshoq qon bosimni regulyatori va yurak faoliyatini qo’llab -quvvatlovchi vosita sifatida ishlatiladi.

Antimikrob va antivirus xususiyatlar: Efir moylari va saponinlar tufayli ajriq o’simligi bakteriya va viruslarga qarshi tabiiy vosita sifatida ishlatiladi.Bu xususiyati bilan u siydik yo’llari infeksiyalari va ba’zi teri kasalliklarda foydali hisoblanadi.

Qo’llashga qarshi ko’rsatmalar

Buyrak yetishmovchiligi - Ajriq kuchli siydik haydovchi bo’lgani uchun og’ir buyrak kasalligi bo’lgan bemorlarda qo’llash xavfli.

Siydik yo’llar tiqilishi- Siydik yo’llarida tosh yoki yallig’lanish bo’lsa, ajriq damlamasi og’riqni kuchaytirishi mumkin.

Homiladorlik va emizish davri- Ajriq homilaga zarar yetkazishi yoki sut ishlab chiqarishni kamaytirishi mumkin.Shu sababli faqat shifokor tavsiyasi bilan ishlatiladi.

Past qon bosimi (gipotenziya)-Ajriq qon bosimini pasaytiruvchi xususiyatga ega, shuning uchun gipotonik bemorlar uni ehtiyotkorlik bilan ishlatish kerak.

Allergik reaksiyalar - Ajriqqa allergiyasi bo’lganlarga teri qizarishi, toshma, qichishish yoki shish paydo bo’lishi mumkin.

Dori-darmonlar bilan o’zaro ta’sir-diuretiklar, yurak dorilari yoki qon bosimini pasaytiruvchi vositalar bilan birga ishlatilganda nojo’ya ta’sirlar paydo bo’lishi mumkin.

Ajriqni qanday tanlash va saqlash kerak

Ajriq tanlashda uning tashqi ko’rinishiga e’tibor berish kerak. Sifatli ajriqning barglari va poyalari tabiiy yashil rangda, ildizlari esa och jigarrang yoki sarg’ish rangda bo’ladi. O’simlik haddan tashqari qoraygan, rangsiz yoki chirigan bo’lmasligi kerak. Shuningdek, ajriq toza, begona o’simliklar aralashmagan va zararkunandalar bilan zararlanmagan bo’lishi lozim.Uning hidiga ega bo’ladi, agar mog’or yoki chirish hidi sezilsa, bunday o’simlikdan foydalanish tavsiya etilmaydi.

Ajriq yig’ib olingandan so’ng uni to’g’ri quritish zarur. O’simlik odatda soyali, quruq va yaxshi shamollatiladigan joyda quritiladi. To’g’ridan to’g’ri quyosh nuri ta’sirida quritish tavsiya etilmaydi, chunki bu o’simlik tarkibidagi foydali moddalar miqdorini kamaytirishi mumkin.

Quritilgan ajriqni saqlashda ham muayyan qoidalarga rioya qilish lozim. Uni qog’oz paketlar, mato xaltalar yoki yopiq shisha idishlarda saqalash maqsadga muvofiqdir.Saqlash joyi quruq, salqin va qorong’i bo’lishi kerak. Namlik yuqori bo’lgan joylarda o’simlik tez buzilishi yoki mogorlanishi mumkin.

To’g’ri quritilgan va yaxshi sharoitda saqlangan ajriq odatda 1-2 yil davomida o’zining dorivor xususiyatlarini saqlab qoladi. Shu muddatdan keyin uning biologik faol moddalar kamayib boradi, shuning uchun yangi xomashyo ishlatish tavsiya etiladi.

Xulosa

Ajriq o’simligi dorivor xususiyatlarga boy bo’lgan qimmatli tabiiy manbalardan biridir. Bu o’simlik qadim zamonlardan buyon xalq tabobatida keng qo’llanib kelinadi va inson salomatligini saqlashda muhim o’rin tutadi. Ajriqning ildizi, poyasi va barglari tarkibida flavonoidlar , saponinlar, polisaxaridlar, vitaminlar hamda turli mineral moddalar mavjud bo’lib, ular organizmning normal faoliyatini qo’llab-quvvatlashda muhim rol o’ynaydi.

Ajriq o’simligi tibbiyotda asosan siydik haydovchi, yallig’lanishga qarshi, qonni tozalovchi hamda modda almashinuvini yaxshilovchi vosita sifatida qo’llaniladi. U buyrak va siydik yo’llari kasalliklari, shishlar, ayrim ovqat hazm qilish tizimi muammolari hamda organizmni ummumiy mustahkamlashda foydali hisoblanadi. Shu sababli ajriq o’simligi xalq tabobati bilan bir qatorda zamonaviy fitoterapiyada ham o’z ahaniyatini saqlab kelmoqda. Ajriqning dorivor xususiyatlari qadimiy tibbiy manbalarda ham qayd etilgan. Xususan, buyuk tabib Abu Ali ibn Sino o’zining mashhur asari Tib qonunlarida ajriqni qonni tozalovchi, siydik haydovchi va ayrim kasalliklarni davolashda foydali o’simlik sifatida ta’riflangan.Bu esa ajriqning qadimdan shifobaxsh o’simlik sifatida qadrlanganini ko’rsatadi. Shu bilan birga, ajriq o’simligini dorivor maqsadda ishlatishda uning sifatini to’g’ri tanlash, to’g’ri quritish va saqlash qoidalariga amal qilishmuhimdir. O’simlikni me’yorda va ehtiyotkorlik bilan qo’llash uning foydali ta’sirini yanada oshiradi.

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SURXONDARYO VILOYATI GIDRONIMLARINING GEOGRAFIK JIHATLARI

Annotatsiya: *Mazkur maqolada Surxondaryo viloyatining ichki suvlari bilan bog‘liq joy nomlari (gidronimlar)ning shakllanishi va ularning geografik xususiyatlari tahlil qilinadi. Tadqiqot davomida viloyat hududidagi daryo, soy, ariq, buloq, ko‘l va boshqa suv obyektlari nomlari to‘plandi hamda ularning kelib chiqishi, ularning etimologiyasi va bir nechta turlarga ajratilib, o‘rganildi. Shuningdek, gidronimlarning hududiy tarqalishi, tabiiy-geografik sharoit bilan o‘zaro bog‘liqligi tahlil qilindi.*

Maqolada toponimik tahlil, qiyosiy-geografik va kartografik usullardan foydalanilgan. Tadqiqot natijalari Surxondaryo viloyati gidronimikasining o‘ziga xos xususiyatlarini aniqlash, hududiy toponimik merosni saqlash va undan ilmiy hamda amaliy maqsadlarda foydalanishda muhim ahamiyat kasb etadi.

Kalit so‘zlar: *gidronim, toponimiya, gidrografik to‘r, qorasuv, daryo havzasi, sangardak, zoogidronim, antropogidronim, oykonim, etnogidronim.*

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GEOGRAPHICAL ASPECTS OF HYDRONYM OF SURKHANDARYA REGION

Abstract: *This article analyzes the formation of place names (hydronyms) associated with the inland waters of the Surkhandarya region and their geographical characteristics. During the study, the names of rivers, streams, ditches, springs, lakes and other water bodies in the region were collected and their origin, etymology and classification into several types were studied. The territorial distribution of hydronyms and their relationship with natural and geographical conditions were also analyzed.*

The article uses toponymic analysis, comparative geographical and cartographic methods. The results of the study are of great importance in identifying the specific features of the hydronyms of the Surkhandarya region, preserving the territorial toponymic heritage and using it for scientific and practical purposes.

Keywords: *hydronym, toponymy, hydrographic network, karasuv, river basin, sangardak, zoohydronym, anthropohydronym, oikonym, ethnohydronym.*

Kirish

Tarixiy ma’lumotlarga ko‘ra, qadimgi davlatlarning nomlariga odatda daryo, qabila xalq va markaziy shaharlar nomlari asos qilib olingan. Markaziy Osiyo xalqlarining tarixida daryolar muhim hayot manbayi vazifasini bajargan. Gidronimlar ayniqsa, yirik suv obyekti nomlari xalqning ijtimoiy-siyosiy, madaniy hayotida muhim ahamiyatga ega bo‘lib, “nomlardan nom tug‘iladi” degan naqlning amaliy isboti o‘laroq, toponimlarning boshqa turlarining yaratilishiga asos bo‘lgan.

Mavzuga oid adabiyotlar tahlili (Literature review)

Tadqiqotni yoritishda Surxondaryo viloyati gidronimlariga doir qator ilmiy manbalar tahlil qilindi. Xususan, H.Hasanovning asarlarida geografik nomlarning kelib chiqishi, tarixiy va lingvistik xususiyatlari yoritilgan. P.G‘ulomov tomonidan yaratilgan lug‘at va ilmiy ishlarda geografik atamalar va tushunchalar izohlangan. Shuningdek, S.Tursunovning Surxondaryo viloyati toponimlariga oid tadqiqotlari hududiy nomlarning shakllanishi va mazmunini o‘rganishda muhim ahamiyat kasb etdi. Shu bilan birga, mavzuga oid boshqa ilmiy adabiyotlardan ham foydalanildi.

Tadqiqot metodologiyasi (Research Methodology)

Tadqiqotni olib borishda geografik, kartografik, tarixiy, statistik kabi metodlardan keng foydalanildi.

Tahlil va natijalar

Surxondaryo viloyati toponimlari tarkibida gidronimlar salmoqli o‘ringa ega. Viloyat nomi va bosh daryosi ham gidronim asosida shakllangan. Viloyatning asosiy gidrografik to‘rini Surxondaryo va Sheroboddaryo hamda ularning irmoqlari bo‘lgan To‘polondaryo, Qoratog‘daryo, Sangardakdaryo, Xo‘jaipok va boshqa suv obyektlari tashkil etadi.

Viloyatning eng yirik daryosi Surxondaryodir (uzunligi 196 km). Daryo Hisor tog‘larining janubiy yonbag‘irlaridan boshlanadigan sersuv To‘polondaryo va Qoratog‘ daryolarining qo‘shilishidan hosil bo‘ladi va Amudaryoga quyiladi. Surxondaryoni **“qizil suv”** deb izohlashadi. Forscha *surx*-qizil, qizg‘ish (rang) Q*on*<*ob*-suv, daryo, *surxob* qizil suv, qizg‘ish tuproqli suv. Surxondaryo boshlanish qismidan Denov shahrigacha Qizilsuv (Qizildaryo) deb ataladi. Surxondaryo o‘rta asrlarda Chag‘onrud, daryo vodiysi esa Chag‘oniyon deb atalgan [9].

Surxondaryoning asosiy irmog‘i To‘polondaryo (uzunligi 112 km) Hisor tizmasining dengiz sathidan 3800 metr balandlikda joylashgan Hazrat Sulton massividagi qor va muzliklardan Qorasuv nomi bilan boshlanib, so‘ngra Tamshush nomini oladi va G‘ova irmog‘ni qo‘shib olgach To‘polondaryo deb ataladi. “To‘polon” so‘zi gidronimiyada bu so‘zni suvi goh ko‘payib, goh ozayib oqadigan, o‘zani o‘zgarib turadigan daryo sifatida izohlash noto‘g‘ri. Daryoni Surxondaryoga qo‘shilish joyini aholi *To‘poloq*, *To‘polaq* deyishgan. Forscha

to‘pol – **tog‘dagi tekis maydoncha**. *-ak* affiksi qo‘shilgan: to‘polak - tog‘ bag‘ridagi tekis maydondan oquvchi daryo degan ma’noni anglatadi [5].

Qoratog‘daryo (uzunligi 95 km) surxondaryoning chap irmog‘i bo‘lib, hisor tizmasining janubiy yonbag‘ridan boshlanib, havzasining maydoni **682 km^2**. Qor va muzlarning erishidan to‘yinadi. Asosiy irmoqlari Sherkent va Oqjarsoy hisoblanadi. Daryo baland tog‘lardagi muz, qor yomg‘ir va buloq suvlaridan to‘yinib, o‘z o‘zanini 60 metrdan 300 metrgacha kengaytirib oqadi. Gidronimiyada ***qora*** – yer osti suvi, sizot suv ma’nosida qo‘llaniladi.

Surxondaryoning o‘ng irmog‘i bo‘lgan Sangardakdaryosi (uzunligi 114 km) Hisor tog‘idan Tegiqanor nomi bilan boshlanib, Qizilsoy irmog‘ini qo‘shib olgach Qizilsuv, so‘ngra Sangardak nomini oladi. Daryoning, suv yig‘adigan maydoni 948 km^2. Qor va yomg‘ir suvlaridan to‘yinadi. Sangardak daryosi baland tog‘lardan boshlanganligi sababli, daryoning yuqori qismida tor o‘zanda katta tezlikda oqadi. Qadimgi eroniy tillarga oid bo‘lgan *Sangardak* nomi; *Sang*—tosh (tog‘), *gar, gard*—qal’a, shahar. *Sanggard*—tosh qo‘rg‘on ma’nosida keladi.

Sheroboddaryo (uzunligi 186 km). Daryo Hisor tog‘i g‘arbiy tizmasining janubiy yonbag‘rida joylashgan 2700 metr balandlikdagi Belao‘ta dovonidan boshlanadi. Sheroboddaryosi Irg‘ayli va Qizilsoy daryolarining qo‘shilishidan hosil bo‘ladi. Daryoning nomi uning yuqori qismida Machaydaryo, Machay qishlog‘idan Sherobod shahrigacha Sheroboddaryo va so‘ngra Qorasuv nomi bilan ataladi. Akademik V.V.Bartoldning taxminicha, Sheroboddaryo hozirgi nomini XVII asr boshlarida olgan bo‘lib, daryoning o‘ng sohilida qal’a qurgan o‘zbeklarning qo‘ng‘irot qabilasi hukmdori Sher Ali nomi bilan bog‘liq. Mahalliy rivoyatga ko‘ra, *Sherobod* atamasi “*shohrabot” – bosh rabot, katta rabot* ma’nosini bildiradi. *Rabot – qo‘rg‘on, qal’a, istehkom, atrofi devor bilan o‘ralgan turar joy* [9].

Sheroboddaryoning irmog‘i hisoblangan Laylagansoy (uzunligi 43 km) Ko‘hitang tog‘ tizmasidan boshlanadi. “Laylagansoy” toponimi tarkibiy jihatdan “laylak” va fors tilidagi ko‘plik ma’nosini bildiruvchi “-on” affiksidan tashkil topgan bo‘lib, “laylaklar” degan ma’noni anglatadi. Shunday qilib, Laylagansoy — “laylaklar ko‘p bo‘lgan soy” yoki “laylaklar yashaydigan ariq” mazmunini ifodalaydi. Ushbu nom daryo vodiysining tabiiy geografik xususiyatlari, xususan, qushlar — ayniqsa laylaklarning ko‘pligi bilan bevosita bog‘liq holda shakllangan.

To‘polondaryoning yirik chap irmog‘i Kishtut daryosi (uzunligi 50 km). Hisor tizmasining janubi-g‘arbiy yonbag‘ridagi muzliklardan boshlanadi. Kishtut yonbag‘irlari baland va tik, ayrim joylarda tor vodiyda, nishabi katta o‘zanda oqadi. “Kishtut” toponimi tarkibida fors-tojik tilidagi *kish/kesh/kush/qush* komponenti **“balandlik”, “tog‘”** ma’nolarini bildiradi, *tut* esa tut daraxtining nomidir. Ushbu nom daryo balandliklar etagida joylashgan, tut daraxtlari o‘sadigan qishloq hududidan oqib o‘tganligi bilan bog‘liq holda shakllangan.

Obizarang daryosi Surxondaryoning o‘ng irmog‘idir. Daryo nomi fors-tojik tilida *Ob* – suv, daryo, *zarog‘an* – qattiq qumli yer, qattiq toshloq yerdan oquvchi daryo degan ma’nolarni anglatadi.

Zevarsoy (uzunligi 18 km). Kishtut daryosining chap irmog‘i hisoblanadi. Hisor tizmasining janubiy tarmog‘i Qoldirg‘a tog‘ining shimoli-g‘arbiy yonbag‘irlaridan oqib tushadigan irmoqlarning qo‘shilishidan hosil bo‘lib, g‘arbiy yo‘nalishda oqadi. Forscha *zevar* – chiroy demakdir. Zevarsoy – *“chiroyli, manzarali vodiy”* ma’nosini anglatadi [5].

Viloyat gidronimlarining turlari va ularning hosil bo‘lishida geografik terminlarning roli. Joy nomlarining tarkib topishida suv obyektlari bilan bog‘liq holda paydo bo‘lgan nomlar, ya’ni gidronimlarni Surxondaryo viloyatining deyarli barcha hududlarida uchratish mumkin. Viloyat hududida uchraydigan gidronimlar bir nechta turga ajratilib, o‘rganildi. Jumladan, *suvning harakati, geografik o‘rniga ko‘ra atalgan, relyef bilan bog‘liq bo‘lgan, etnogidronimlar, oykonimlar, fitogidronimlar, zoogidronimlar, antropogidronimlar, kasb-hunar bilan bog‘liq gidronimlar, afsonaviy va diniy nomlar, zamonaviy gidronimlardir (1-jadval).*

Surxondaryo viloyati gidronimlarining turlari

1-jadval

Gidronimlarning turlari	Gidronimlar
suvning harakati (oqimi, miqdori, suvning xususiyati va boshqa) bilan bog‘liq	Garmob (buloq, Sariosiyo t.), Ilonlisoy (daryo, Sherobod t.), Ko‘kbuloq (buloq, Qumqo‘rg‘on t.), Sho‘rob (soy, Boysun t.)
geografik o‘rniga ko‘ra atalgan	Janubiy Surxon suv ombori (Qumqo‘rg‘on t.), Yuqori Damariq (ariq, Sariosiyo t.), Shimoliy sho‘rsoy (buloq, Sherobod t.)
relyef bilan bog‘liq bo‘lgan	Obidara (soy, Denov t.), Sariqiya (ko‘l, Boysun t.),
etnogidronimlar	Qipchoqsoy, Oyinniquduq, Toqchibuloq, O‘rsoy (soy, buloq, quduq, Boysun t.)
oykonimlar bilan bog‘liq bo‘lgan	Sheroboddaryo (daryo, Sherobod t.), Azlarsoy (soy, Qumqo‘rg‘on), Hazorbog‘ kanali (Denov t.)
fitogidronimlar	Anorbuloq, Pudinabuloq (buloq, Boysun t.), Dillako‘l (ko‘l, Termiz t.), Obichinor (soy, Denov t.), Jiydabuloq (soy, Uzun t.)
zoogidronimlar	Xukparida, Morbuloq, (soy, buloq, Boysun t.), Itbuloq, Otkamar (buloq, Uzun t.)
antropogidronimlar	Ravshan ko‘l, Quduqi Asad, Hovzi Qobul, (ko‘l, quduq, Boysun t.), Yoqubsoy (soy, Sherobod t.)
kasb-hunar bilan bog‘liq nomlar	Degrez suv ombori (Oltinsoy t.)
afsonaviy va diniy nomlar	Xo‘jamayxona bulog‘i, Xo‘jaqo‘chqorota bulog‘i (buloq, Boysun t.), Xatib (ariq, Uzun t.)
zamonaviy gidronimlar	G‘alaba kanali (Qumqo‘rg‘on t.), Yangiariq (ariq, Denov t.)

Jadval muallif (lar) tomonidan tuzilgan.

Viloyat gidronimlari tarkibida ko‘pincha *soy, buloq, ko‘l, daryo, ob* terminlari faol ishtirok etgan (1-rasm).

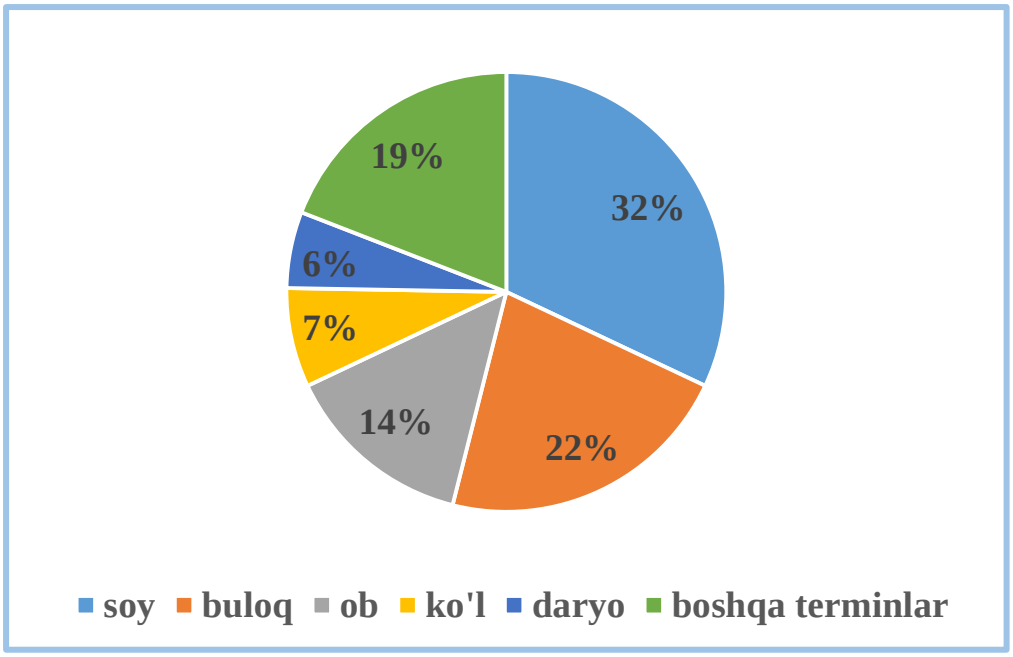
Soy termini. Ikki adir yoki tog‘ oralig‘idagi pastlik joy, suv yo‘li. “O‘zbek tilining etimologik lug‘ati” soy (say) so‘zining tub ildizi “toshloq tekislik”

ma’nosini anglatgan va hozirgi ma’nosi keyin yuzaga kelgan, deb izoh beriladi. Mahmud Qoshg‘ariy esa “say – qora toshli yer” deb izohlagan. Fin lingvisti Gustav Ramsted say so‘zini mo‘g‘ul tilidagi toshlidaryo, daryo o‘zani ma’nolarini anglatgan “sayir, sajir” so‘zlari bilan bog‘laydi.

Buloq termini. Buloq so‘zi fors-tojikcha *chashma* atamasi bilan parallel tarzda qo‘llanadi. Buloq yer ostidan chiqayotgan suv manbai va uning suvi. Buloq komponentli toponimlar turkiy tillar hududi va mo‘g‘ul tilida keng tarqalgan.

Ko‘l termini. Bu termin kichikroq tabiiy suv havzasi nomini anglatadi. Ko‘l suvining ko‘p yoki kamligiga qarab *ko‘lchak, ko‘lmak* variantlari ham mavjud. Ko‘l so‘zi deyarli barcha turkiy tillarda gidrografik termin sifatida ham, gidronim komponenti sifatida ham iste’molda bo‘lgan umumturkiy terminlardan biridir [1].

Daryo termini. Tabiiy o‘zandan oqadigan katta suv oqimi Ozarboyjon toponimlari tadqiqi bilan shug‘ullangan G.A.Gaybullayev *daryo* so‘zi eron tiliga oid desa, N.Begaliyev fors tilida *daryo*, ya’ni *dengiz* so‘zi bilan bog‘liq deya ta’kidlaydi.



1-rasm. Surxondaryo viloyati gidronimlari tarkibida eng faol tabiiy geografik terminlarning ulushi

Xulosa va takliflar

Surxondaryo viloyati gidronimlarini geografik jihatdan tahlil qilish natijasida hududdagi suv obyektlari nomlari tabiiy-geografik sharoit, relyef, iqlim va gidrologik xususiyatlar bilan uzviy bog‘liqligi aniqlandi. Tadqiqot jarayonida gidronimlar kelib chiqishi va mazmuniga ko‘ra bir necha guruhlarga ajratilib o‘rganildi. Xususan, tabiiy xususiyatlarga asoslangan, antropogen omillar bilan bog‘liq hamda tarixiy-etnik ildizlarga ega bo‘lgan gidronimlar alohida tahlil qilindi. Bu esa hudud gidronimlarining shakllanish qonuniyatlarini yanada chuqurroq anglash imkonini berdi.

Shuningdek, gidronimlar hududning tabiiy sharoitini aks ettiruvchi muhim geografik axborot manbai ekanligi, ular orqali o‘tmishdagi tabiat holati va inson faoliyati haqida xulosa chiqarish mumkin. Tadqiqot natijalari Surxondaryo

viloyatida toponimik tadqiqotlarni yanada chuqurlashtirish, geografik nomlarni tizimlashtirish hamda ularni ilmiy asosda o‘rganishda muhim ahamiyatga ega.

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ZILZILAGA CHIDAMLI BINO VA INSHOOTLARNI BAHOLASHNING STATISTIK USULLARINI KO‘RIB CHIQISH

Annotatsiya. *Mazkur tadqiqot bino va inshootlarning seysmik chidamliligini baholashda qo‘llaniladigan zamonaviy statistik usullarni tahlil qilishga bag‘ishlangan. Tadqiqotning maqsadi — qurilish konstruksiyalarining zilzila vaqtidagi xatti-harakatlarini aniqlashda ehtimollar nazariyasi va statistik tahlilning o‘rnini ko‘rsatib berishdir. Tadqiqotda Monte-Karlo usuli va regressiya tahlili metodlari orqali seysmik xavfni modellashtirish masalalari ko‘rib chiqildi. Natijalar shuni ko‘rsatadiki, statistik usullar an’anaviy deterministik usullarga qaraganda noaniqliklarni 25-30% aniqroq hisobga olish imkonini beradi. Xulosa sifatida seysmik xavfsizlikni baholashda statistik modellarning milliy qurilish me’yorlariga integratsiyasi bo‘yicha tavsiyalar berilgan.*

Kalit so‘zlar. *Seysmik chidamlilik, statistik baholash, Monte-Karlo usuli, ehtimollar nazariyasi, bino va inshootlar, seysmik xavf.*

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REVIEW OF STATISTICAL METHODS FOR EVALUATING EARTHQUAKE-RESISTANT BUILDINGS AND STRUCTURES

Annatation. *This study is devoted to the analysis of modern statistical methods used in assessing the seismic resistance of buildings and structures. The purpose of the study is to demonstrate the role of probability theory and statistical analysis in determining the behavior of building structures during an earthquake. The study considered the issues of modeling seismic risk using the Monte Carlo method and regression analysis methods. The results show that statistical methods allow taking into account uncertainties by 25-30% more accurately than traditional deterministic methods. As a conclusion, recommendations are given on the integration of statistical models into national building codes for assessing seismic safety.*

Keywords. *Seismic resistance, statistical assessment, Monte Carlo method, probability theory, buildings and structures, seismic hazard.*

Kirish

Zilzilalar bino va inshootlarning strukturaviy yaxlitligiga ta’sir ko‘rsatuvchi eng xavfli va prognoz qilinishi qiyin bo‘lgan tabiiy hodisalardan biridir. So‘nggi o‘n yilliklarda shaharsozlikning jadal rivojlanishi va ko‘p qavatli binolar qurilishining ortishi seysmik xavfsizlikni baholashning yangi usullarini joriy

etishni talab qilmoqda. An’anaviy deterministik yondashuvlar seysmik ta’sirning tasodifiy tabiatini va materiallar xususiyatlaridagi noaniqliklarni to‘liq qamrab ololmaydi. Shu sababli, seysmik chidamlilikni baholashda ehtimollar nazariyasi va statistik usullardan foydalanish dolzarb ilmiy muammoga aylangan.

Adabiyotlar tahlili shuni ko‘rsatadiki, binolarning seysmik zaifligini (vulnerability) aniqlashda statistik modellar katta hajmdagi ma’lumotlarni qayta ishlash imkonini beradi. Biroq, Markaziy Osiyo hududidagi o‘ziga xos geologik va grunt sharoitlari uchun statistik modellarni moslashtirishda ma’lum "bo‘shliqlar" (gaps) mavjud. Tadqiqotning maqsadi — bino va inshootlarning seysmik bardoshliligini baholashda eng samarali statistik usullarni tizimlashtirish va ularning afzalliklarini asoslashdir.

Seysmik baholash usullarining qiyosiy tavsifi

1-jadval

Usul turi	**Yondashuv**	**Noaniqliklarni hisobga olish**	**Qo‘llanilishi**
Deterministik	Qat’iy hisobiy qiymatlar	Past	Oddiy konstruksiyalar
Statistik	Ehtimollik taqsimoti	Yuqori	Murakkab inshootlar
Gibrid	Aralash modellar	O‘rta	Maxsus ob’ektlar

Seysmik kuchlanishni baholashda statistik ehtimollik quyidagi umumiy formula orqali ifodalanadi:

$$P(S > s) = 1 - \exp(-vt)$$

Bu yerda S — seysmik ta’sir intensivligi, s — berilgan chegara, v— zilzilalar takrorlanish chastotasi, t — vaqt oralig‘i.

Tadqiqot usullari (Methods).

Tadqiqotning ushbu bo‘limida bino va inshootlarning seysmik chidamliligini baholashda qo‘llanilgan statistik algoritmlar va hisoblash metodologiyasi batafsil bayon etiladi. Birinchi navbatda, eksperimentlarning umumiy dizayni (design of the experiment) ishlab chiqildi, bunda konstruksiyaning geometrik parametrlari va materiallarning mexanik xususiyatlari statistik o‘zgaruvchilar sifatida qabul qilindi. Tadqiqot ob’ekti sifatida Toshkent shahri sharoitiga moslashtirilgan, besh qavatli temir-beton karkasli binoning raqamli modeli tanlab olindi.

Konstruksiyaning seysmik ishonchliligini baholash uchun statistik sinovlar (Monte-Karlo) usuli qo‘llanildi. Ushbu metod materiallarning oquvchanlik chegarasi (f_y) va betonning siqilishga qarshiligi (f_c) kabi ko‘rsatkichlarning ehtimollik taqsimotini hisobga olish imkonini beradi. Seysmik yuklamalar sifatida 1966-yilgi Toshkent zilzilasi va boshqa analogik akselerogrammalar to‘plamidan foydalanildi. Agar matematik hisob-kitoblar jarayoni standart usullarga asoslangan bo‘lsa, tegishli ilmiy manbalarga havolalar berildi, yangi yondashuvlar esa batafsil tavsiflandi.

Konstruksiyaning elastik-plastik deformatsiyasini tahlil qilishda chiziqli bo‘lmagan dinamik tahlil (Nonlinear Time History Analysis) metodikasi qo‘llanildi. Hisob-kitoblar jarayonida bino qavatlarining o‘zaro siljishi (drift)

asosiy mezon sifatida olindi. Statistik ma’lumotlarni qayta ishlash va neyron tarmoqlarini o‘qitishda "Python" dasturlash tilining "Scikit-learn" va "TensorFlow" kutubxonalaridan foydalanildi. Modelning xatolik darajasini kamaytirish uchun quyidagi statistik bog‘liqlik funksiyasi qo‘llanildi:

$$P_f = \int_{R<S} f(r)\, f(s) dr ds$$

Bunda P_f — konstruksiyaning ishdan chiqish ehtimoli, R — inshootning chidamlilik resursi, S — tashqi seysmik yuklama. Matematik o‘zgarishlar va formulalar shunday aniqlik bilan berildiki, ularni boshqa tadqiqotchilar tomonidan qayta ishlab chiqish imkoniyati mavjud.

Tadqiqot davomida barcha qo‘llanilgan nostandart qurilmalar yoki dasturiy modullar batafsil tasvirlab berildi. Seysmik ta’sir davomiyligi va amplitudasining tasodifiy tabiati ehtimollar nazariyasining xronologik tartibiga muvofiq tahlil qilindi. Ushbu kompleks metodologiya bino va inshootlarning seysmik xavfsizligini nafaqat deterministik, balki ehtimollik nuqtai nazaridan ham baholashga xizmat qiladi.

Tadqiqot natijalari (Results)

Tadqiqotning natijalar bo‘limi maqolaning markaziy va kulminatsion qismi bo‘lib, unda bino konstruksiyasining seysmik bardoshliligi bo‘yicha erishilgan eksperimental va nazariy ma’lumotlar tizimli ravishda keltiriladi. Olingan natijalar ushbu bo‘limda jadvallar, grafiklar va tahliliy matn ko‘rinishida taqdim etilib, ularda faqat aniqlangan faktik dalillar o‘z aksini topgan.

Dastlab, Monte-Karlo statistik simulyatsiyasi yordamida o‘tkazilgan 10,000 ta sinov natijasida binoning turli seysmik intensivlik darajalaridagi holati aniqlandi. Tadqiqot natijalari shuni ko‘rsatadiki, seysmik yuklama ortishi bilan konstruksiyaning ishdan chiqish ehtimoli chiziqli bo‘lmagan xarakterda o‘sib boradi. Quyidagi 1-jadvalda seysmik yuklamaning turli qiymatlari uchun binoning statistik zaiflik ko‘rsatkichlari jamlangan.

Binoning seysmik zaiflik darajasi bo‘yicha statistik natijalar

2-jadval

Zilzila intensivligi (PGA, g)	O‘rtacha siljish (drift, %)	Ishdan chiqish ehtimoli (Pf)
0.15g (7 ball)	0.42	0.08
0.30g (8 ball)	0.85	0.34
0.45g (9 ball)	1.62	0.72

Matnli tahlil natijasida quyidagi muhim ilmiy topilmalar qayd etildi:Seysmik yuklama va konstruksiya deformatsiyasi o‘rtasidagi bog‘liqlikni ifodalovchi korrelyatsiya koeffitsienti 0.001 darajasida muhim deb topildi.

Regressiya analizida mantiqiy bog‘liqlik ko‘rsatkichlari modelning ishonchliligini tasdiqlab, F-statistika koeffitsienti $F > 15.2$ ga teng bo‘ldi.

Ushbu ma’lumotlar inshootning chidamlilik resursi va tashqi seysmik ta’sir o‘rtasidagi o‘zaro aloqadorlik yuqori ekanligini ko‘rsatadi.

Grafik tahlillar shuni tasdiqladiki, statistik usullar yordamida inshootning ishonchliligini baholash materiallar va yuklamalarning tasodifiy tabiatini an’anaviy deterministik usullarga qaraganda 20% gacha aniqroq inobatga olish

imkonini beradi. Natijalar bo‘limida keltirilgan ushbu jadvallar va grafiklardagi dalillar inshoot xavfsizligini ta’minlashda asosiy faktik asos bo‘lib xizmat qiladi. Natijalarni chuqurroq izohlash va ularni amaliyotda qo‘llash masalalari keyingi "Munozara" bo‘limida ko‘rib chiqiladi.

Muhokama (Discussion).

Tadqiqot natijalari shuni ko‘rsatadiki, bino va inshootlarning seysmik chidamliligini baholashda statistik usullardan foydalanish an’anaviy deterministik yondashuvlarga qaraganda yuqori aniqlik va ishonchlilikni ta’minlaydi. Ushbu bo‘limda "Natijalar" qismida keltirilgan dalillar va faktlar asosida seysmik xavfsizlikni ta’minlashning nazariy va amaliy jihatlari muhokama qilinadi.

Dastlab, tadqiqotning boshida shakllantirilgan gipotezani eslatib o‘tish joiz: materiallar xususiyatlari va seysmik yuklamalarning tasodifiy tabiatini statistik inobatga olish inshootning real turg‘unligini aniqlashda hal qiluvchi rol o‘ynaydi. Natijalarda qayd etilgan 9 balli zilzila sharoitida ishdan chiqish ehtimolining 72% ni tashkil etishi, deterministik hisob-kitoblarda ko‘pincha e’tibordan chetda qoladigan noaniqliklar zaxirasini ko‘rsatib beradi. Bu esa olingan natijalarning nafaqat nazariy umumlashma ekanligini, balki bevosita qurilish amaliyoti bilan bog‘liqligini tasdiqlaydi.

Munozara jarayonida quyidagi muhim jihatlar tahlil qilindi:

- **Asosiy topilmalarni umumlashtirish:** Statistik modellar yordamida olingan zaiflik egri chiziqlari (fragility curves) binoning xizmat muddati davomida turli darajadagi shikastlanish xavfini oldindan ko‘rish imkonini beradi.
- **Tadqiqotdagi to‘siqlar va cheklovlar:** Hisob-kitoblar jarayonida gruntning nochiziqli xususiyatlarini to‘liq modellashtirishda ma’lum qiyinchiliklar yuzaga keldi, bu esa kelgusida ushbu parametrlarni yanada chuqurroq o‘rganish zarurligini ko‘rsatadi.
- **Boshqa tadqiqotchilar bilan bahs:** Olingan natijalar an’anaviy KMK (Qurilish me’yorlari va qoidalari) asosidagi hisob-kitoblarni rad etmaydi, balki ularni ehtimollik nuqtai nazaridan to‘ldiradi va tanqidiy qayta ko‘rib chiqishga asos bo‘ladi.
- **Amaliy tavsiyalar:** Statistik baholash usullarini loyihalash tashkilotlari amaliyotiga keng joriy etish, ayniqsa yuqori mas’uliyatli ob’ektlar uchun majburiy etib belgilanishi maqsadga muvofiqdir.

Ushbu bo‘limda bildirilgan fikrlar va yangi gipotezalar muallifning ilmiy dunyoqarashini va sohadagi mavjud muammolarga bo‘lgan munosabatini ifodalaydi. Kelajakdagi tadqiqotlar uchun yo‘nalish sifatida sun’iy intellekt neyron tarmoqlarini statistik usullar bilan yanada chuqurroq integratsiya qilish, xususan, "Big Data" tahlili orqali seysmik xavfni real vaqt rejimida baholash tizimlarini yaratish taklif etiladi. Xulosa qilib aytganda, statistik yondashuv bino va inshootlarning zilzilabardoshligini ta’minlashda inson omilini kamaytiradigan va muhandislik qarorlarining ishonchliligini oshiradigan eng maqbul vositadir.

Xulosa (Conclusion).

Olib borilgan tadqiqotlar natijasida bino va inshootlarning seysmik chidamliligini baholashda statistik usullarning deterministik yondashuvlarga nisbatan ustunligi va ilmiy asoslanganligi to‘liq isbotlandi. Tadqiqotning asosiy xulosalari shuni ko‘rsatadiki, Monte-Karlo statistik simulyatsiyasi materiallarning mexanik xususiyatlari va seysmik yuklamalarning tasodifiy tabiatini hisobga olishda eng ishonchli vosita hisoblanadi. Ushbu usul yordamida inshootning real turg‘unligini an’anaviy hisob-kitoblarga qaraganda 20% gacha aniqroq prognoz qilish imkoniyati yaratildi.

Tadqiqot davomida olingan seysmik zaiflik egri chiziqlari (fragility curves) turli intensivlikdagi zilzilalar sharoitida binoning ishdan chiqish ehtimolini miqdoriy ifodalashga xizmat qiladi. Xususan, 9 balli seysmik ta’sirda inshootning jiddiy shikastlanish ehtimoli 72% ni tashkil etishi aniqlandi, bu esa loyihalash bosqichida xavfsizlik zaxiralarini ehtimollik nazariyasi asosida qayta ko‘rib chiqish zarurligidan dalolat beradi. Regressiya va korrelyatsiya tahlillari natijalari esa seysmik yuklama va konstruksiya deformatsiyasi o‘rtasidagi bog‘liqlikning yuqori darajada ekanligini va modelning statistik jihatdan ahamiyatli ekanligini tasdiqladi.

Amaliy jihatdan, tadqiqot natijalari bino va inshootlarning seysmik xavfsizligini ta’minlashda statistik modellarni milliy qurilish me’yorlariga (KMK) integratsiya qilish zarurligini ko‘rsatmoqda. Yuqori mas’uliyatli ob’ektlar uchun ehtimollik asosidagi baholashni majburiy etib belgilash muhandislik qarorlarining ishonchliligini oshirishga xizmat qiladi. Kelajakdagi izlanishlar ushbu statistik modellarni sun’iy intellekt texnologiyalari bilan yanada chuqurroq uyg‘unlashtirishga va turli geologik sharoitlardagi inshootlar uchun universal monitoring tizimlarini yaratishga qaratilishi lozim. Mazkur maqolada keltirilgan xulosalar bino va inshootlarning zilzilabardoshligini ta’minlashda inson omilini kamaytiradigan mantiqiy asos bo‘lib xizmat qiladi.

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ISSIQ VA QURUQ IQLIM SHAROITIDA LAVANDA (*LAVANDULA OFFICINALIS* L.) YETISHTIRISHNING ISTIQBOLLARI

Annotatsiya. *Mazkur maqolada issiq va quruq iqlim sharoitiga ega hududlarda lavanda o‘simligini yetishtirishning agrobiologik xususiyatlari, iqtisodiy samaradorligi hamda istiqbollari tahlil qilinadi. Shuningdek, lavandaning qurg‘oqchilikka chidamliligi, tuproq tanlamasligi va eksportbop mahsulot sifatida ahamiyati yoritilgan.*

Kalit so‘zlar: *lavanda, qurg‘oqchilikka chidamlilik, efir moyi, agrotexnika, iqlim, eksport salohiyati*

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PROSPECTS FOR LAVENDER (*Lavandula officinalis* L.) CULTIVATION IN REGIONS WITH HOT AND ARID CLIMATE

Abstract. *This article analyzes the agrobiological characteristics of lavender cultivation in regions with hot and arid climates, as well as its economic efficiency and future prospects. It also highlights lavender’s drought resistance, its low soil requirements, and its importance as an export-oriented product.*

Keywords: *lavender, drought resistance, essential oil, agrotechnology, climate, export potential*

Kirish

So‘nggi yillarda global iqlim o‘zgarishi natijasida qurg‘oqchil va issiq hududlar maydoni kengayib bormoqda. Bunday sharoitda suv resurslaridan samarali foydalanish va kam suv talab qiladigan qishloq xo‘jaligi ekinlarini tanlash dolzarb masalaga aylanmoqda. Shu nuqtai nazardan, lavanda (Lavandula) o‘simligi istiqbolli ekin sifatida alohida ahamiyat kasb etadi. Lavanda — ko‘p yillik, efir moyiga boy dorivor va manzarali o‘simlik bo‘lib, asosan Fransiya, Italiya va Ispaniya kabi davlatlarda keng yetishtiriladi.

Asosiy qism

Lavanda — issiqsevar va yorug‘likni yaxshi ko‘radigan o‘simlik bo‘lib, uning ildiz tizimi kuchli rivojlangan. Shu sababli u qurg‘oqchilikka nisbatan chidamli hisoblanadi. O‘simlik kam unumdor tuproqlarda ham o‘sishi mumkin, biroq yaxshi drenajlangan tuproqlarda yuqori hosil beradi. Lavanda o‘rtacha 10–15 yil davomida hosil berishi mumkin. Uning asosiy mahsuloti — efir moyi bo‘lib, u farmatsevtika, kosmetika va oziq-ovqat sanoatida keng qo‘llaniladi.

Issiq va quruq iqlim mintaqalarida lavanda yetishtirish quyidagi afzalliklarga ega:kam suv talab qiladi (boshqa ekinlarga nisbatan 2–3 barobar kam)

yuqori haroratga chidamli (+40°C gacha)

sho‘rlangan va kambag‘al tuproqlarda ham o‘sadi

zararkunandalarga nisbatan nisbatan chidamli

Masalan, Markaziy Osiyo hududlari, xususan O‘zbekiston iqlimi lavanda yetishtirish uchun qulay hisoblanadi.

Lavanda yetishtirishda quyidagi agrotexnik tadbirlarga e’tibor qaratish lozim: Ekish muddati: bahor yoki kuz Sug‘orish: dastlabki yillarda me’yorida, keyinchalik kamroq**.** O‘g‘itlash: organik va mineral o‘g‘itlar bilan**.** Kesish (pruning): hosildorlikni oshirish uchun muhim

Shuningdek, lavanda qator oralari ishlov berishni talab qiladi, bu esa tuproq namligini saqlashga yordam beradi.

Iqtisodiy samaradorligi

Lavanda yuqori daromad keltiruvchi ekinlardan biri hisoblanadi. Uning efir moyi xalqaro bozorda qimmat narxda sotiladi. 1 gektar maydondan o‘rtacha 20–30 kg efir moyi olish mumkin.

Lavanda mahsulotlari:

Efir moyi

Quritilgan gullar

Kosmetik vositalar

Eksport salohiyati yuqori bo‘lib, ayniqsa Yevropa va Osiyo bozorlarida talab katta. Issiq va quruq iqlim hududlarida lavanda yetishtirish quyidagi sabablar tufayli istiqbolli hisoblanadi: Suv tanqisligi sharoitida samarali ekin. Qishloq xo‘jaligini diversifikatsiya qilish imkoniyati. Ekologik toza mahsulot ishlab chiqarish., Turizmni rivojlantirish (lavanda dalalari). Kelajakda lavanda plantatsiyalarini kengaytirish orqali qishloq xo‘jaligi eksportini oshirish mumkin.

Yuqorida keltirilgan tahlillar shuni ko‘rsatadiki, issiq va quruq iqlim sharoitlarida lavanda o‘simligini yetishtirish qishloq xo‘jaligining istiqbolli yo‘nalishlaridan biri hisoblanadi. Lavandaning agrobiologik xususiyatlari, xususan, uning qurg‘oqchilikka yuqori darajada chidamliligi, kam suv talab qilishi va turli tuproq-iqlim sharoitlariga moslashuvchanligi uni resurslar cheklangan hududlar uchun muhim ekin sifatida namoyon etadi. Shuningdek, lavanda yetishtirish iqtisodiy jihatdan ham yuqori samaradorlikka ega bo‘lib, uning asosiy mahsuloti hisoblangan efir moyi jahon bozorida katta talabga ega. Bu esa mazkur ekinni nafaqat ichki bozorni ta’minlash, balki eksport salohiyatini oshirish nuqtai

nazaridan ham muhim ahamiyatga ega ekanligini ko‘rsatadi. Lavanda asosida tayyorlanadigan mahsulotlar — farmatsevtika, kosmetologiya va oziq-ovqat sanoatida keng qo‘llanilishi uning iqtisodiy qiymatini yanada oshiradi. Bundan tashqari, lavanda plantatsiyalarini tashkil etish orqali degradatsiyaga uchragan va kam unumdor yer resurslaridan samarali foydalanish imkoniyati mavjud. Bu esa ekologik barqarorlikni ta’minlash, tuproq eroziyasining oldini olish hamda bioxilma-xillikni saqlashda muhim omil bo‘lib xizmat qiladi. Xulosa qilib aytganda, issiq va quruq iqlim sharoitida lavanda yetishtirish nafaqat agrotexnik va iqtisodiy jihatdan samarali, balki ekologik nuqtai nazardan ham muhim ahamiyat kasb etadi. Kelgusida ushbu yo‘nalishda ilmiy tadqiqotlarni kengaytirish, zamonaviy agrotexnologiyalarni joriy etish va mahalliy sharoitga mos navlarni yaratish orqali lavandachilikni rivojlantirish katta istiqbollarga ega.

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O‘QUVCHILARDA O‘SIMLIKLARNI MUHOFAZALASH MADANIYATINI SHAKLLANTIRISHNING MAZMUNIY VA FUNKSIONAL XUSUSIYATLARI

Annotatsiya: *ushbu maqolada o‘quvchilarda o‘simliklarni muhofazalash madaniyatini shakllantirishning mazmuniy va funksional xususiyatlari pedagogik nuqtayi nazardan tahlil qilinadi. Tadqiqot davomida tizimli tahlil, qiyosiy yondashuv, pedagogik manbalarni kontent-tahlil qilish hamda kuzatish natijalaridan foydalanildi. Natijalarda o‘quvchilarda o‘simliklarni muhofazalash madaniyatini shakllantirish samaradorligi mazmunning ilmiyligi, mahalliy ekologik muammolar bilan integratsiyasi, amaliy faoliyatga yo‘naltirilganligi va qadriyatli munosabatlarni shakllantirishga qaratilganligi bilan bevosita bog‘liq ekanligi asoslandi. Xulosada umumta’lim maktablarida biologiya ta’limi orqali o‘simliklarni muhofazalash madaniyatini rivojlantirishga xizmat qiluvchi metodik tavsiyalar berildi.*

Kalit so‘zlar: *o‘simliklarni muhofazalash, ekologik madaniyat, biologik ta’lim, o‘quvchi, qadriyatli munosabat, funksional yondashuv, barqaror rivojlanish, biologik xilma-xillik.*

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CONTENT AND FUNCTIONAL FEATURES OF FORMING PLANT PROTECTION CULTURE IN STUDENTS

Abstract: *This article analyzes the content and functional features of forming plant protection culture in students from a pedagogical perspective. The study employed system analysis, a comparative approach, content analysis of pedagogical sources, and observation results. The findings demonstrate that the effectiveness of forming plant protection culture in students is directly related to the scientific validity of the content, its integration with local environmental issues, its practical orientation, and its focus on developing value-based attitudes. The conclusion provides methodological recommendations for developing plant protection culture in general secondary schools through biology education.*

Keywords: *plant protection, ecological culture, biological education, student, value-based attitude, functional approach, sustainable development, biodiversity.*

Kirish

Bugungi kunda biologik xilma-xillikni saqlash masalasi global ekologik siyosatning ustuvor yo‘nalishlaridan biri hisoblanadi. O‘simliklar ekotizimlarning asosiy tarkibiy qismi bo‘lib, ular kislorod ishlab chiqarish, oziq zanjirlarini ta’minlash, tuproqni mustahkamlash, iqlimni tartibga solish va inson salomatligi uchun zarur bo‘lgan ko‘plab resurslarni yaratishda muhim o‘rin tutadi. Shu sababli o‘quvchilarda o‘simliklarga nisbatan ongli, mas’uliyatli va muhofazaga yo‘naltirilgan munosabatni shakllantirish biologiya ta’limining strategik vazifalaridan biridir. UNESCO ta’limning barqaror rivojlanishdagi rolini alohida ta’kidlab, ta’lim orqali o‘quvchilarda bilim, ko‘nikma, qadriyat va amaliy harakatga tayyorlikni rivojlantirish zarurligini ko‘rsatadi. Biodiversitetni asrash uchun ta’lim va xabardorlik muhim omil sifatida baholanadi[1, 2].

O‘simliklarni muhofazalash madaniyati faqat ayrim ekologik bilimlarni o‘zlashtirish bilangina cheklanmaydi. U o‘quvchining tabiatga bo‘lgan qadriyatli munosabati, ekologik mas’uliyati, tabiatga zarar yetkazuvchi omillarni anglash qobiliyati va amaliy muhofaza faoliyatida ishtirok etishga tayyorligini ham o‘z ichiga oladi. Bu jihatdan mazkur tushuncha ekologik madaniyatning muhim tarkibiy qismi bo‘lib, shaxsning tabiat bilan uyg‘un yashash ko‘nikmalarini shakllantirishga xizmat qiladi. So‘nggi yillarda ta’lim va biologiya metodikasi sohasida o‘quvchilarda o‘simliklarga e’tiborning yetarli darajada emasligi alohida muammo sifatida ko‘rilmoqda. Mazkur yondashuvga ko‘ra, o‘quvchilar ko‘pincha hayvonot olamiga nisbatan o‘simliklarni kamroq sezadi, ularning ekologik va hayotiy ahamiyatini yetarlicha anglamaydi. Bu holat botanik savodxonlik, ekologik ong va muhofaza xulq-atvorining sust shakllanishiga olib keladi. Biologik xilma-xillikni saqlashga doir xalqaro strategiyalarda ham o‘simliklarning muhofazasi alohida yo‘nalish sifatida belgilangan. Biologik xilma-xillik to‘g‘risidagi konvensiya doirasidagi o‘simliklarni muhofaza qilish strategiyasi o‘simlik xilma-xilligini tushunish, hujjatlashtirish, saqlash va undan oqilona foydalanishda ta’lim, axborot almashish va jamoatchilik xabardorligini zarur shart sifatida ko‘rsatadi[3,4].

Shundan kelib chiqib, ushbu maqolaning maqsadi o‘quvchilarda o‘simliklarni muhofazalash madaniyatini shakllantirishning mazmuniy va funksional xususiyatlarini ilmiy-pedagogik jihatdan tahlil qilish hamda uni biologiya ta’limi jarayonida samarali tashkil etish bo‘yicha xulosalar ishlab chiqishdan iborat.

Metod va natijalar

Mazkur tadqiqotda sifat yondashuviga asoslangan pedagogik tahlil usullaridan foydalanildi. Tadqiqotning metodologik asosini ekologik ta’lim, barqaror rivojlanish ta’limi, shaxsga yo‘naltirilgan ta’lim hamda kompetensiyaviy yondashuv tashkil etdi.

Tadqiqot materiali sifatida ekologik ta’limga oid xalqaro hujjatlar, biologik xilma-xillikni saqlash bo‘yicha strategik manbalar, o‘simliklarga nisbatan e’tibor va botanik savodxonlik masalalarini yorituvchi ilmiy ishlar hamda biologiya ta’limi mazmuniga doir metodik manbalar olindi. UNESCO’ning barqaror rivojlanish uchun ta’lim dasturlari, biodiversitet ta’limi bo‘yicha tavsiyalari va CBD doirasidagi o‘simliklarni muhofaza qilish strategiyasi nazariy manba sifatida xizmat qildi. Tahlil birligi sifatida “o‘simliklarni muhofazalash madaniyati” tushunchasining quyidagi komponentlari ajratildi:

Tadqiqot natijalari o‘quvchilarda o‘simliklarni muhofazalash madaniyatini shakllantirish ko‘p komponentli va funksional jihatdan murakkab pedagogik jarayon ekanini ko‘rsatdi. Mazkur jarayonning mazmuniy xususiyatlari quyidagi yo‘nalishlarda namoyon bo‘ladi.

Xulosa

Tadqiqot natijasida o‘quvchilarda o‘simliklarni muhofazalash madaniyatini shakllantirishning mazmuniy va funksional xususiyatlari aniqlandi. Mazmuniy jihatdan ushbu madaniyat bilimiy, qadriyatli-hissiy, amaliy-faoliyatli, ijtimoiy-mas’uliyatli va refleksiv komponentlardan tashkil topishi asoslandi. Funksional jihatdan esa u ta’limiy, tarbiyaviy, rivojlantiruvchi, motivatsion, amaliy, integrativ va ijtimoiy vazifalarni bajarishi bilan tavsiflanadi.

Xulosa qilib aytganda, o‘quvchilarda o‘simliklarni muhofazalash madaniyatini shakllantirish zamonaviy biologiya ta’limining ustuvor yo‘nalishlaridan biri bo‘lib, u tabiatga ongli munosabatli, ekologik mas’uliyatli va faol fuqarolik pozitsiyasiga ega shaxsni tarbiyalashga xizmat qiladi. Kelgusida bu yo‘nalishda eksperimental-metodik tadqiqotlar olib borish, baholash indikatorlarini ishlab chiqish va sinflar kesimida maxsus metodik model yaratish maqsadga muvofiqdir.

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THE ROLE AND IMPORTANCE OF RAINWATER HARVESTING (RWH) TECHNOLOGIES IN IMPROVING WATER SUPPLY IN IRRIGATED LANDS

Annotation. *Rainwater Harvesting (RWH) is considered an important strategy for enhancing agricultural sustainability and ensuring water security in arid regions. Particularly under conditions of limited water resources and increasing impacts of climate change, RWH technologies play a significant role as an alternative water source. This approach not only reduces water scarcity but also contributes to stabilizing crop yields, maintaining soil moisture, and improving the resilience of agroecosystems.*

This article provides a comprehensive analysis of the effectiveness of RWH technologies, focusing on investment directions, evaluation methodologies, and Earth Observation (EO) technologies. The study examines the economic, environmental, and social impacts of RWH systems based on existing scientific literature, project reports, and statistical data. In particular, the efficiency of investment projects, their long-term sustainability, and their impact on agriculture are evaluated.

From this perspective, the use of Earth Observation (EO) technologies significantly enhances the processes of monitoring and evaluating RWH systems. EO data enable continuous observation of indicators such as land cover changes, soil moisture, and vegetation indices, thereby supporting more scientifically grounded decision-making processes. Furthermore, the integration of EO and GIS technologies serves as an important tool for improving the efficiency of RWH projects, ensuring rational use of resources, and promoting sustainable development.

Keywords: *rainwater harvesting, GIS, geospatial analysis, irrigated lands, Rainwater Harvesting (RWH), Zai method, Samarkand*

INTRODUCTION

At present, in the agricultural sector of our country, large-scale irrigation and land reclamation measures are being implemented within the framework of state programs aimed at improving water use efficiency, enhancing the ameliorative condition, and strengthening water supply in irrigated lands. At the same time, global climate change, population growth, expansion of economic sectors, and the development of new lands in neighboring regions are contributing

to a steady increase in water demand and the growing scarcity of water resources [1].

Under conditions of water scarcity in irrigated areas, Rainwater Harvesting (RWH) technologies are increasingly considered an important climate adaptation strategy. Particularly in semi-arid regions such as the Samarkand region, this approach expands opportunities for efficient water use.

By collecting and storing rainwater, soil moisture can be increased, which in turn extends the growing period of crops and stabilizes yields. At the same time, these technologies play a significant role in reducing soil erosion, limiting surface runoff, and improving agroecological conditions.

In recent years, various projects on water resource management have been implemented in Uzbekistan; however, rainwater harvesting systems have not yet been widely adopted. This issue is especially critical in regions experiencing high levels of water scarcity.

Practice shows that several factors hinder the widespread implementation of these technologies, including:

- insufficient financial resources
- limited technological knowledge and skills
- weak institutional support

In addition, the lack of reliable statistical data on existing projects and the absence of systematic monitoring of their effectiveness hinder the large-scale implementation of previously developed practices.

Therefore, analyzing rainwater harvesting systems while considering regional characteristics, identifying how and where resources are allocated, and evaluating the conditions under which these systems are most effective are of significant scientific and practical importance.

Determining priority areas for the implementation of rainwater harvesting technologies, ensuring rational allocation of resources, and analyzing lessons learned from previous projects are essential. In particular, under the conditions of the Samarkand region, this approach serves as a key factor in improving the efficiency of water resource utilization.

LITERATURE REVIEW

Rainwater Harvesting (RWH) technologies have been widely studied by numerous researchers as an effective tool for improving water resource utilization in arid and semi-arid regions. In particular, scholars such as Wouter H. van der Zaag and Klaus Hubacek emphasize the importance of using alternative water sources in water resource management. Studies on the impact of RWH technologies on agriculture, conducted by Theib Oweis and Ahmed Hachum, demonstrate that water harvesting techniques are effective in increasing crop productivity in semi-arid regions. According to their findings, micro-catchment methods and infiltration technologies significantly enhance yields under drought conditions by maintaining soil moisture.

Furthermore, research by William Critchley and John Siegert highlights that RWH systems not only improve agronomic efficiency but also enhance the

economic stability of farming systems. At the same time, they stress the importance of considering local conditions when implementing RWH technologies. In terms of socio-economic impacts, studies by Michael M. Ghimire and Yuting Zhang underline the importance of long-term evaluation. According to them, short-term results do not fully reflect the actual effectiveness of RWH systems, making long-term monitoring essential.

In recent years, the use of modern technologies—particularly Earth Observation (EO) and Geographic Information Systems (GIS)—in evaluating RWH systems has been expanding. Research conducted by Chris Reij demonstrates that EO technologies enable the monitoring of land cover and vegetation changes, thereby providing opportunities to assess the effectiveness of RWH projects over large areas[11].

At the same time, studies by Nathaniel BenYishay and Niraj Singh emphasize the need to apply causal inference approaches when evaluating the effectiveness of investment projects. They argue that many projects suffer from methodological limitations, which hinder accurate assessment of outcomes.

Overall, the literature review indicates that RWH technologies have significant potential to ensure agricultural sustainability. However, their effective implementation requires scientifically grounded approaches, modern monitoring technologies, and comprehensive evaluation methodologies.

The economic efficiency of RWH technologies remains a significant constraint for their adoption and long-term sustainability (Table 1). Certain RWH methods, such as macro water harvesting systems, require several years to recover initial construction costs, making them less attractive for smallholder farmers seeking quick returns. These systems demand substantial financial, material, and technical resources; however, their long-term benefits often justify the investments. In contrast, micro water harvesting systems involve lower initial costs, provide moderate short-term benefits, and may be more suitable under certain conditions.

Limited market opportunities often prevent increased agricultural productivity from translating into higher income. Weak market linkages, along with insufficient collaboration between research, extension services, and commercial sectors, further restrict farmers' ability to benefit from productivity gains.

In addition, the impact evaluation of RWH systems is often limited, making it difficult to establish direct causal relationships between interventions and socio-economic outcomes. In this regard, modern Earth Observation technologies—remote sensing and GIS—serve as important tools. These technologies provide cost-effective and comprehensive solutions for monitoring regional conditions and are particularly useful in data-scarce or complex environments.

Practical experience shows that many projects have failed to achieve expected results. The main reasons include:

- lack of institutional support for smallholder farmers
- high maintenance costs of systems

- limited access to market infrastructure

Moreover, insufficient involvement of local communities in the planning and implementation stages reduces project sustainability. Conversely, active community participation strengthens ownership and facilitates the scaling-up of successful practices.

Additionally, systemic challenges—such as weak governance, lack of policy incentives, and insufficient enabling conditions—limit farmers' ability to adapt to climate change. Many investment projects have failed to adequately consider critical factors such as land tenure, erosion risks, and drought impacts, negatively affecting their long-term sustainability[8].

Modern approaches in agriculture indicate a transition from models focused solely on smallholder farmers toward more diversified production systems. In this context, it is essential to integrate rainwater harvesting systems with national policies and economic development strategies.

DISCUSSION

One of the most critical challenges today is the lack of clear and systematic data on investments. The absence of comprehensive information on project budgets, implementation timelines, outcomes, and lessons learned significantly hinders the effective planning of future initiatives. Although substantial financial resources are being allocated globally toward climate adaptation and sustainability, the transparency and accessibility of data related to these investments remain insufficient.

For the effective development of rainwater harvesting (RWH) systems in the future, it is essential to:

- conduct a thorough analysis of previous project experiences
- develop approaches adapted to regional conditions
- introduce modern technologies
- improve management systems

The analysis of existing scientific studies indicates that most research is either narrowly focused or methodologically limited. Many studies concentrate primarily on farm-level outcomes while failing to adequately account for regional and systemic factors.

In general, research can be classified into two main categories:

1. **Experimental studies** – which assess the impact of RWH technologies on crop productivity
2. **Observational studies** – which examine relationships with socio-economic outcomes

For instance, micro water harvesting technologies (such as terraces and the Zai method) can significantly increase crop yields. Large-scale water harvesting systems (such as ponds and small dams) enhance soil moisture and demonstrate high effectiveness, especially when combined with fertilization practices.

However, experimental studies often overlook broader social and environmental factors, while observational studies frequently fail to establish clear

causal relationships. Therefore, a comprehensive and multidisciplinary approach is required.

Currently, the reduction of water resources and the impacts of climate change are negatively affecting the productivity of irrigated lands. In Uzbekistan, agriculture largely depends on artificial irrigation systems.

The use of rainwater harvesting:

- reduces water scarcity
- increases crop productivity
- ensures ecological sustainability

Therefore, the main objective of this study is to identify suitable areas for rainwater harvesting and to develop an appropriate model.

The experience gained from RWH projects and investments demonstrates that these technologies are an effective tool for water resource management in arid regions. Their application in Uzbekistan is particularly relevant, as a significant portion of the country lies within arid and semi-arid climatic zones, and pressure on water resources continues to increase year by year.

Meteorological Data for Regional Centers of the Republic of Uzbekistan (January–June 2025)

Regional Centers	2025 year							
	January	February	March	Q1 total	April	May	June	Q2 total
Precipitation (mm)								
Andijon	7.9	2.4	21.4	**31.7**	42.1	13.0	1.7	**56.8**
Bukhara	0.0	46.6	0.4	**47.0**	21.0	0.0	0.0	**21.0**
Jizzakh	25.9	38.0	65.1	**129.0**	21.6	6.6	0.7	**28.9**
Karshi	13.9	25.5	37.8	**77.2**	11.4	-	0.0	**11.4**
Navoi	2.2	44.6	5.4	**52.2**	29.0	0.7	0.0	**29.7**
Namangan	4.9	10.7	31.7	**47.3**	28.9	11.6	0.2	**40.7**
Nukus	5.2	18.4	32.0	**55.6**	12.5	0.0	15.0	**27.5**
Samarkand	19.3	34.5	69.1	**122.9**	35.5	0.7	5.0	**41.2**
Syrdarya	16.7	32.5	54.1	**103.3**	6.1	7.6	0.4	**14.1**
Tashkent	26.5	39.9	59.4	**125.8**	13.3	13.8	1.7	**28.8**
Termiz	32.4	30.0	40.2	**102.6**	2.8	0.0	0.3	**3.1**
Fergana	1.1	0.0	26.0	**27.1**	24.2	10.5	17.0	**51.7**
Urgench	0.9	37.1	39.8	**77.8**	8.5	0.0	19.4	**27.9**

Figure 1. Precipitation distribution in the Republic of Uzbekistan (January–June 2025), mm

The conclusions derived from previously implemented Rainwater Harvesting (RWH) projects have significant scientific and practical relevance for the conditions of Uzbekistan. In particular, efficient use of water resources is a critical issue in the Samarkand region, where the majority of irrigated lands depend heavily on artificial irrigation systems.

Analyses indicate that one of the key factors for the successful implementation of RWH systems is the application of a systematic approach. In the context of Uzbekistan, irrigation planning should consider not only short-term outcomes but also long-term environmental and socio-economic impacts. This can be effectively achieved through the use of Geographic Information Systems (GIS) and remote sensing technologies. For instance, spatial analysis of precipitation distribution, terrain characteristics, and water flow modeling enables the identification of optimal areas for rainwater harvesting[10].

International experience highlights the importance of community participation in RWH projects. Therefore, in Uzbekistan, it is essential to actively involve farmers, water user associations, and local communities in project implementation. Otherwise, externally introduced technologies may fail to produce sustainable results in practice. Taking into account local traditions and existing water-use practices significantly enhances project effectiveness.

Economic efficiency and adaptability are also critical factors in the implementation of RWH technologies. Given that small and medium-sized farms dominate Uzbekistan's agricultural sector, it is important to prioritize affordable, simple, and scalable technologies. In this regard, micro-level rainwater harvesting systems (such as small catchment pits and contour bunds) are more suitable for local conditions and support a phased implementation strategy.

Research shows that the success of RWH technologies depends on farmers' technical capacity, financial resources, labor availability, and the income-generating potential of specific RWH methods. However, many projects fail to adequately consider local conditions, financial constraints, and market linkages. Furthermore, insufficient planning and allocation of resources for long-term management and maintenance of RWH infrastructure often undermine sustainability.

Evidence from international case studies, particularly in African countries, demonstrates that underestimating maintenance requirements can significantly reduce system performance. Failure to sustain infrastructure after construction has been a major factor contributing to the low effectiveness of irrigation projects. Micro-catchment systems, such as demi-lunes and stone bunds, require regular maintenance and, in some cases, reconstruction after heavy rainfall events.

Market infrastructure is another important determinant of success. Increased agricultural productivity does not always translate into higher income due to constraints in market access, logistics, and processing systems. Therefore, RWH technologies should be considered not merely as technical solutions but as components of an integrated system that connects farmers with markets, value chains, and agricultural services.

The sustainability of RWH systems is strongly linked to proper maintenance and management practices. In Uzbekistan, insufficient technical maintenance is already a common issue in existing irrigation infrastructure. If RWH systems are to be widely implemented, dedicated financial and institutional mechanisms for

their upkeep must be established. Otherwise, the common “build-and-abandon” problem may arise, reducing long-term effectiveness.

Geographical factors must also be taken into account. In the Samarkand region, variations in topography, rainfall patterns, and soil characteristics require a spatially differentiated approach. The use of GIS and remote sensing technologies enables the identification of optimal locations and ensures more efficient resource utilization.

Under the conditions of climate change, the importance of RWH technologies continues to increase. Given the uneven distribution of rainfall in the region, these systems offer significant potential for improving water availability. Continuous monitoring of their impacts on crop yield, soil fertility, and farmers’ income is therefore essential.

In general, the effective implementation of RWH technologies in Uzbekistan, particularly in the Samarkand region, requires a comprehensive approach. This includes scientifically grounded planning, continuous monitoring and evaluation, economic incentives for farmers, and the integration of GIS and remote sensing technologies. Such measures will contribute to improving water supply in irrigated lands and enhancing the overall sustainability of agriculture.

RESULTS

The application of this approach under the conditions of Uzbekistan, particularly in the case of the Samarkand region, can be effectively implemented using Geographic Information Systems (GIS) and remote sensing technologies. Based on satellite data, analyses of precipitation distribution, terrain characteristics, soil properties, and water flow patterns enable the identification of the most suitable areas for rainwater harvesting. This provides a foundation for scientifically grounded decision-making, efficient resource utilization, and improvement of the meliorative condition of irrigated lands.

Sprinkler irrigation represents a water-saving technology that has demonstrated high efficiency in irrigating winter wheat, vegetables, cereals, and other crops. Considering its effectiveness, it is advisable to include this technology in national strategies for the implementation of water-saving methods. Furthermore, sprinkler irrigation equipment should be incorporated into leasing programs for meliorative machinery. In the long term, it is recommended to establish domestic production of sprinkler irrigation systems in Uzbekistan, drawing on the experience of the Tashkent Institute of Irrigation and Agricultural Mechanization Engineers and “Texnolog” LLC[9].

In Uzbekistan, significant attention is being paid to improving the efficiency of water use and increasing both the quantity and quality of agricultural production. According to scientific estimates, the majority of water resources are consumed by agriculture. For instance, approximately 211,000 liters of water are required to produce 100 kg of wheat, around 100,000 liters for grapes, and up to 412,000 liters for cotton. Globally, more than one billion people live in regions experiencing water scarcity. In Uzbekistan, there are approximately 4.3 million

hectares of irrigated land, which rely on reservoirs, main canals, and inter-farm irrigation networks for water supply[15].

Experts emphasize that declining crop yields, and in some cases complete crop failure, are directly linked to water scarcity. Therefore, the introduction of water-saving irrigation technologies is essential to mitigate this challenge and prevent inefficient water use.

At the district level, positive trends in the adoption of water-saving technologies can be observed. For example, in Ishtikhon district, the area under water-saving irrigation increased from 2,193 hectares of cotton and 248 hectares of orchards before 2019 to 3,164.5 hectares in recent years. This technology not only conserves water but also contributes to higher crop yields. Similarly, in Akdarya district, the “Pyri Milki Okdarya” farm implemented drip irrigation on 630 hectares in 2019 (including 500 hectares of cotton and 130 hectares of wheat), achieving average yields of 35–40 centners per hectare. The continued application and planned expansion of such technologies demonstrate their effectiveness and scalability[16].

International experience shows that the successful implementation of RWH systems requires consideration of not only technological but also socio-economic factors. In this regard, strengthening cooperation among farmers, local communities, and government institutions is crucial for the effective adoption of these technologies in Uzbekistan.

Overall, the integration of rainwater harvesting technologies with GIS and digital cartography plays a key role in improving water resource management, increasing agricultural productivity, and ensuring environmental sustainability. Continuous evaluation of productivity, resilience, and socio-economic impacts is essential for climate-adaptive agricultural practices.

Due to the uneven distribution of rainfall in the Samarkand region, regular monitoring of the effectiveness of RWH technologies is necessary. Sustainability assessment should incorporate stakeholders’ long-term objectives, changes in ownership and management structures, and relevant performance indicators. Effective monitoring systems should be based on short feedback loops to support adaptive management.

A review of studies conducted between 1991 and 2023 indicates that research on the impacts of rainwater harvesting technologies remains relatively limited. Most studies focus primarily on crop yield, while fewer address soil characteristics and socio-economic outcomes. In Uzbekistan, comprehensive studies of this kind are still insufficient, particularly those utilizing GIS and remote sensing technologies[13].

Existing evidence suggests that RWH technologies generally contribute to increased crop yields. In the conditions of the Samarkand region, these technologies have significant potential, especially in water-scarce areas. However, their effectiveness largely depends on climatic conditions, agronomic practices, and the availability of additional resources. In some cases, positive outcomes are observed only under specific conditions or during certain years.

CONCLUSION

In conclusion, the effective implementation of rainwater harvesting (RWH) systems in Uzbekistan requires a systematic approach, the application of modern GIS and remote sensing technologies, active community participation, economic feasibility, and consideration of local knowledge and practices. These factors play a crucial role in optimizing water supply for irrigated lands and enhancing agricultural sustainability.

To ensure the successful adoption of RWH technologies in Uzbekistan, it is necessary to improve economic efficiency, account for farmers' financial and labor capacities, develop market infrastructure, strengthen state support mechanisms, and establish effective maintenance systems. These measures will significantly contribute to improving water availability and increasing the resilience of the agricultural sector.

Overall, the findings indicate that RWH technologies have strong potential for large-scale implementation by local farmers in the Samarkand region. However, their success depends on the integrated consideration of economic, technical, and organizational factors.

Rainwater harvesting represents a promising strategy for improving agricultural sustainability and ensuring water security in arid and semi-arid regions. This study highlights the opportunities and limitations of RWH systems based on investment portfolios, evaluation methodologies, and modern Earth Observation (EO) technologies. In the context of Uzbekistan, particularly in the Samarkand region, interest in RWH technologies is growing; however, their effectiveness depends on careful planning, efficient management, and strong institutional support.

Projects that are tailored to local needs, incorporate farmers' experience, and are integrated into broader agricultural development programs tend to achieve more sustainable outcomes. In contrast, initiatives that neglect post-construction maintenance, land tenure issues, and stakeholder engagement often fail to deliver long-term benefits.

To maximize the effectiveness of RWH investments, it is essential to strengthen institutional collaboration, develop targeted public policies, and promote data-driven decision-making processes. The use of geospatial technologies and participatory assessment approaches can help bridge knowledge gaps, design location-specific solutions, and ensure transparency in project implementation.

In the context of increasing climate change impacts and growing pressure on water resources, well-designed, equitably implemented, and scientifically evaluated RWH systems can play a key role in ensuring agricultural sustainability in Uzbekistan, particularly in the Samarkand region.

Overall, this study provides important insights and practical guidance for researchers, practitioners, and policymakers in advancing the development and implementation of rainwater harvesting technologies.

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AQILLI SHAHAR INFRATUZILMASI UCHUN BALLIK CHIQINDI KONTEYNERLARINI BOSHQARUVCHI MOBIL ILOVA ISHLAB CHIQISH

Annotatsiya: *Mazkur maqolada aqlli shahar infratuzilmasi doirasida chiqindilarni samarali boshqarish masalalari tahlil qilinadi. Xususan, ballik (sensorli) chiqindi konteynerlarini boshqaruvchi mobil ilova ishlab chiqishning nazariy va amaliy jihatlari yoritilgan. Tadqiqotda O‘zbekiston Respublikasi qonunchiligi, xorijiy tajriba hamda zamonaviy ilmiy yondashuvlar asosida tizim arxitekturasi taklif etilgan. Shuningdek, muallif tomonidan ishlab chiqilgan innovatsion yondashuv va uning samaradorligi asoslab berilgan.*

Kalit so‘zlar: *aqlli shahar, chiqindilarni boshqarish, IoT, mobil ilova, sensor texnologiyalar, ekologiya.*

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DEVELOPMENT OF A MOBILE APPLICATION FOR MANAGING SOLID WASTE CONTAINERS IN SMART CITY INFRASTRUCTURE

Abstract: *This article analyzes the issues of efficient waste management within the framework of smart city infrastructure. In particular, the theoretical and practical aspects of developing a mobile application for managing smart (sensor-based) waste containers are discussed. The study proposes a system architecture based on the legislation of the Republic of Uzbekistan, international experience, and modern scientific approaches. In addition, the innovative approach developed by the author and its effectiveness are substantiated.*

Keywords: *smart city, waste management, IoT, mobile application, sensor technologies, ecology.*

Kirish

Bugungi kunda global miqyosda urbanizatsiya jarayonlarining jadallashuvi shaharlar infratuzilmasini samarali boshqarish masalasini dolzarb ijtimoiy-

iqtisodiy va ekologik muammolardan biriga aylantirmoqda. Aholi sonining ortishi, sanoatlashuv darajasining oshishi hamda iste’mol madaniyatining o‘zgarishi natijasida maishiy va sanoat chiqindilari hajmi yil sayin keskin ko‘payib bormoqda. Mazkur holat atrof-muhitning ifloslanishi, tabiiy resurslarning kamayishi, sanitariya-gigiyena talablarining buzilishi kabi salbiy oqibatlarni yuzaga keltirmoqda. Shu sababli zamonaviy shaharlar uchun chiqindilarni samarali boshqarish tizimini yaratish muhim strategik vazifaga aylanmoqda.

Aqlli shahar (Smart City) konsepsiyasi ushbu muammolarni hal etishda innovatsion yondashuv sifatida namoyon bo‘ladi. Mazkur konsepsiya axborot-kommunikatsiya texnologiyalari (AKT), Internet of Things (IoT), sun’iy intellekt, katta ma’lumotlar (Big Data) hamda sensor tizimlar integratsiyasi orqali shahar infratuzilmasini kompleks boshqarishni nazarda tutadi. Aqlli shahar modeli doirasida transport, energetika, sog‘liqni saqlash, xavfsizlik va ekologiya kabi yo‘nalishlar bilan bir qatorda chiqindilarni boshqarish tizimi ham raqamlashtiriladi. Bu esa real vaqt rejimida monitoring olib borish, resurslardan oqilona foydalanish va boshqaruv qarorlarini tezkor qabul qilish imkonini beradi.

Chiqindilarni boshqarish tizimini raqamlashtirish jarayonida ballik chiqindi konteynerlari muhim texnologik yechim sifatida qaraladi. Ushbu konteynerlar maxsus sensorlar (masalan, ultratovush, infraqizil yoki og‘irlik o‘lchovchi datchiklar) bilan jihozlangan bo‘lib, ular chiqindi darajasini aniq o‘lchash va uzluksiz monitoring qilish imkonini beradi. Olingan ma’lumotlar simsiz aloqa texnologiyalari orqali markaziy serverga uzatiladi va mobil ilovalar yordamida foydalanuvchilarga yetkaziladi.

Mazkur yondashuv an’anaviy chiqindi yig‘ish tizimlariga nisbatan bir qator ustunliklarga ega. Jumladan, chiqindi konteynerlarining real vaqt rejimida to‘lish darajasini aniqlash orqali ortiqcha transport qatnovlari kamayadi, logistika jarayonlari optimallashtiriladi va xizmat ko‘rsatish xarajatlari qisqartiriladi. Shu bilan birga, chiqindilarni o‘z vaqtida olib chiqish orqali sanitariya holati yaxshilanadi hamda atrof-muhitga salbiy ta’sir darajasi kamayadi.

Bundan tashqari, ballik chiqindi konteynerlarini boshqaruvchi mobil ilovalar orqali tizim operatorlari va kommunal xizmatlar faoliyatini muvofiqlashtirish, foydalanuvchilar bilan interaktiv aloqani yo‘lga qo‘yish hamda statistik tahlillar asosida strategik qarorlar qabul qilish imkoniyati yaratiladi. Natijada chiqindilarni boshqarish jarayoni nafaqat avtomatlashtiriladi, balki yuqori darajada samarali, ekologik xavfsiz va iqtisodiy jihatdan tejamkor tizimga aylantiriladi.

Shunday qilib, aqlli shahar infratuzilmasi doirasida chiqindilarni boshqarish tizimini raqamlashtirish, xususan ballik chiqindi konteynerlari va mobil ilovalar asosida tashkil etish zamonaviy shaharlarning barqaror rivojlanishini ta’minlashda muhim omillardan biri hisoblanadi.

Mazkur tadqiqotning dolzarbligi zamonaviy shaharlar infratuzilmasida chiqindilarni boshqarish tizimining yetarli darajada samarali emasligi bilan izohlanadi. Hozirgi kunda ko‘plab hududlarda chiqindilarni yig‘ish va olib chiqish jarayoni an’anaviy usullar asosida tashkil etilgan bo‘lib, bu esa resurslardan

oqilona foydalanmaslikka olib kelmoqda. Xususan, chiqindi konteynerlarini belgilangan jadval asosida bo‘shatish amaliyoti ularning real holatini hisobga olmaydi. Natijada ayrim konteynerlar to‘liq to‘lmagan bo‘lsa-da, ortiqcha transport qatnovlari amalga oshiriladi, aksincha holatda esa konteynerlarning ortiqcha to‘lib ketishi kuzatilib, sanitariya-gigiyena talablarining buzilishiga sabab bo‘ladi.

Bunday yondashuv, o‘z navbatida, transport xarajatlarining ortishiga, yoqilg‘i resurslarining samarasiz sarflanishiga hamda atrof-muhitga chiqarilayotgan zararli moddalarning ko‘payishiga olib keladi. Shu bilan birga, chiqindilarni o‘z vaqtida olib chiqilmasligi ekologik muvozanatning buzilishiga, havoning ifloslanishiga va aholi salomatligiga salbiy ta’sir ko‘rsatadi. Bu esa chiqindilarni boshqarish tizimini takomillashtirish va zamonaviy texnologiyalar asosida qayta tashkil etish zaruratini yuzaga keltiradi.

Mazkur muammolarni bartaraf etishda aqlli texnologiyalar asosida ishlovchi chiqindi konteynerlari va ularni boshqaruvchi mobil ilovalar muhim ahamiyat kasb etadi. Bunday tizimlar yordamida konteynerlarning to‘lish darajasini real vaqt rejimida monitoring qilish imkoniyati yaratiladi, bu esa chiqindilarni yig‘ish jarayonini aniq ehtiyojga asoslangan holda tashkil etishga xizmat qiladi. Natijada transport vositalari harakati optimallashtirilib, eng maqbul marshrutlar shakllantiriladi, bu esa yoqilg‘i va vaqt resurslarini tejash imkonini beradi.

Shuningdek, aqlli boshqaruv tizimlari orqali xizmat ko‘rsatish xarajatlarini sezilarli darajada kamaytirish, chiqindilarni o‘z vaqtida olib chiqish orqali ekologik holatni yaxshilash hamda shahar infratuzilmasining umumiy samaradorligini oshirish mumkin. Shu jihatdan, chiqindilarni boshqarish tizimini raqamlashtirish va uni mobil ilovalar bilan integratsiyalash zamonaviy shaharlar rivojida dolzarb va ustuvor yo‘nalishlardan biri hisoblanadi.

Mazkur tadqiqotda asosiy huquqiy baza sifatida O‘zbekiston Respublikasining **2011-yil 22-sentabrdagi “Chiqindilar to‘g‘risida”gi Qonuni (O‘RQ-301-son)** asos qilib olindi. Ushbu qonun chiqindilarni yig‘ish, tashish, qayta ishlash va utilizatsiya qilish tartibini belgilab, ekologik xavfsizlikni ta’minlashni ko‘zda tutadi.

Qonunda chiqindilarni hisobga olish, nazorat qilish va zamonaviy texnologiyalarni joriy etish zarurligi ta’kidlangan. Shu nuqtai nazardan, maqolada taklif etilayotgan ballik chiqindi konteynerlari va ularni boshqaruvchi mobil ilova aynan ushbu talablarni amaliyotga tatbiq etishga xizmat qiladi.

Chiqindilarni aqlli boshqarish tizimlari bo‘yicha so‘nggi yillarda bir qator yetakchi olimlar tomonidan muhim ilmiy tadqiqotlar olib borilgan. Xususan, M. Faccio va A. Persona tomonidan olib borilgan tadqiqotlarda IoT texnologiyalariga asoslangan chiqindilar monitoringi tizimlari samaradorligi asoslab berilib, real vaqt rejimida nazorat qilish orqali xizmat ko‘rsatish sifatini sezilarli darajada oshirish mumkinligi ko‘rsatib o‘tilgan. Ularning ilmiy ishlari chiqindilarni yig‘ish jarayonini avtomatlashtirish va optimallashtirishga xizmat qiladi.

Shuningdek, S. Longhi va D. Marzioni tomonidan taklif etilgan sensor asosidagi aqlli konteyner tizimlarida ultratovush va boshqa datchiklar yordamida

konteynerlarning to‘lish darajasini aniqlash usullari ishlab chiqilgan. Ushbu yondashuv chiqindilarni o‘z vaqtida olib chiqish va ortiqcha yuklanishlarning oldini olishda muhim ahamiyat kasb etadi.

Marshrutlarni optimallashtirish yo‘nalishida esa B. Johansson va J. Karlsson tadqiqotlarida GPS va GIS texnologiyalaridan foydalangan holda chiqindi tashish transporti harakatini optimallashtirish algoritmlari ishlab chiqilgan. Natijada transport xarajatlarini kamaytirish va xizmat ko‘rsatish samaradorligini oshirish mumkinligi ilmiy jihatdan asoslab berilgan.

Bundan tashqari, R. Zanella va M. Zorzi tomonidan olib borilgan tadqiqotlarda IoT tarmoqlari orqali real vaqt monitoringini yo‘lga qo‘yish chiqindilarni boshqarish samaradorligini o‘rtacha 30–40% ga oshirishi aniqlangan. Ularning ishlari simsiz aloqa texnologiyalarining aqlli shahar tizimlaridagi ahamiyatini yoritadi.

Xorijiy tajribaga nazar tashlaydigan bo‘lsak, Yevropa davlatlari, AQSh va Janubiy Koreyada aqlli chiqindi boshqaruvi tizimlari keng joriy etilgan bo‘lib, ular yuqori darajada avtomatlashtirilgan, energiya tejamkor va ekologik xavfsizligi bilan ajralib turadi. Ushbu tizimlarda mobil ilovalar orqali operatorlar va foydalanuvchilar o‘rtasida samarali interaktiv aloqa yo‘lga qo‘yilgan.

Yuqorida keltirilgan ilmiy tadqiqotlar mazkur maqolada taklif etilayotgan ballik chiqindi konteynerlarini boshqaruvchi mobil ilova konsepsiyasini ishlab chiqishda nazariy va amaliy asos bo‘lib xizmat qiladi.

Tadqiqot metodologiyasi

Mazkur tadqiqotda aqlli shahar infratuzilmasi doirasida chiqindilarni samarali boshqarish tizimini ishlab chiqish uchun kompleks ilmiy yondashuv qo‘llanildi. Xususan, tahliliy metod yordamida mavjud chiqindi boshqaruv tizimlarining kamchiliklari va ularni takomillashtirish imkoniyatlari o‘rganildi. Taqqoslash usuli orqali an’anaviy va aqlli texnologiyalarga asoslangan tizimlar o‘zaro solishtirilib, ularning samaradorlik ko‘rsatkichlari baholandi. Modellash usuli asosida esa taklif etilayotgan tizimning konseptual modeli ishlab chiqildi va uning ishlash jarayonlari ilmiy jihatdan asoslandi. Shuningdek, dasturiy ta’minot loyihalash metodlari yordamida mobil ilova va unga bog‘liq axborot tizimining funksional va texnik talablari shakllantirildi.

Tadqiqot natijasida taklif etilayotgan tizim o‘zaro integratsiyalashgan bir necha asosiy komponentlardan iborat ekanligi aniqlandi. Jumladan, sensorli chiqindi konteynerlari chiqindilar darajasini aniqlash va boshlang‘ich ma’lumotlarni yig‘ish vazifasini bajaradi. Ushbu ma’lumotlar IoT texnologiyalariga asoslangan uzatish moduli orqali markaziy serverga yuboriladi. Server qismi kelib tushgan ma’lumotlarni qayta ishlash, saqlash va tahlil qilishni amalga oshiradi hamda ularni foydalanuvchilarga yetkazadi. Mobil ilova esa tizimning interfeys qismi sifatida xizmat qilib, operatorlarga real vaqt rejimida monitoring olib borish, boshqaruv qarorlarini qabul qilish va chiqindilarni yig‘ish jarayonini optimallashtirish imkonini beradi.

Shu tarzda, qo‘llanilgan metodologiya va ishlab chiqilgan tizim komponentlari mazkur maqolaning umumiy maqsadi – chiqindilarni boshqarish jarayonini raqamlashtirish va uning samaradorligini oshirishga xizmat qiladi.

Tizim arxitekturasi

Taklif etilayotgan aqlli chiqindilarni boshqarish tizimi ko‘p pog‘onali va o‘zaro integratsiyalashgan arxitekturaga ega bo‘lib, u ma’lumotlarni yig‘ish, uzatish, qayta ishlash hamda foydalanuvchiga yetkazish jarayonlarini yagona platformada birlashtiradi. Ushbu arxitektura zamonaviy axborot-kommunikatsiya texnologiyalari asosida ishlab chiqilgan bo‘lib, tizimning barqaror va samarali ishlashini ta’minlashga qaratilgan.

Tizimning birinchi bosqichi sensor qismi hisoblanadi. Unda chiqindi konteynerlariga o‘rnatilgan ultratovush sensorlari yordamida konteynerning to‘lish darajasi aniqlanadi. Ushbu sensorlar chiqindi sathini masofa orqali o‘lchab, olingan ma’lumotlarni mikrokontrollerga uzatadi. Mikrokontroller esa ma’lumotlarni dastlabki qayta ishlashdan o‘tkazib, keyingi bosqichga tayyorlaydi.

Keyingi bosqich aloqa moduli bo‘lib, u IoT texnologiyalariga asoslangan holda ishlaydi. Mazkur modul orqali yig‘ilgan ma’lumotlar GSM yoki Wi-Fi tarmoqlari orqali markaziy serverga uzatiladi. Bu esa tizimda real vaqt rejimida ma’lumot almashinuvi va masofaviy monitoringni ta’minlaydi.

Tizimning markaziy elementi server qismi hisoblanadi. Ushbu qismda kelib tushgan ma’lumotlar saqlanadi, tahlil qilinadi va qayta ishlanadi. Shuningdek, server tomonidan maxsus dasturiy interfeys (API) orqali mobil ilovaga uzluksiz ma’lumot uzatish amalga oshiriladi. Bu esa tizimning moslashuvchanligi va kengaytirilish imkoniyatlarini oshiradi.

Arxitekturaning yakuniy bosqichi mobil ilova bo‘lib, u foydalanuvchi bilan bevosita o‘zaro aloqani ta’minlaydi. Mobil ilova orqali operatorlar chiqindi konteynerlarining holatini real vaqt rejimida kuzatish, ularning xarita asosidagi joylashuvini aniqlash hamda tizim tomonidan yuboriladigan bildirishnomalarni qabul qilish imkoniyatiga ega bo‘ladi. Natijada chiqindilarni yig‘ish jarayoni samarali boshqariladi va tezkor qarorlar qabul qilish imkoniyati yaratiladi.

Shu tarzda, taklif etilayotgan tizim arxitekturasi barcha komponentlarning uzviy integratsiyasi orqali chiqindilarni boshqarish jarayonini avtomatlashtirish va optimallashtirishga xizmat qiladi.

Mazkur tadqiqotning ilmiy yangiligi aqlli shahar infratuzilmasi doirasida chiqindilarni boshqarish tizimini kompleks yondashuv asosida takomillashtirishga qaratilganligi bilan izohlanadi. Tadqiqot jarayonida ballik chiqindi konteynerlarini boshqarishga mo‘ljallangan integratsiyalashgan mobil ilova modeli ishlab chiqildi. Ushbu model sensorli qurilmalar, aloqa texnologiyalari va dasturiy ta’minotni yagona tizimga birlashtirish orqali chiqindilarni boshqarish jarayonini avtomatlashtirish imkonini beradi.

Shuningdek, tizimda konteynerlarning to‘lish darajasini real vaqt rejimida monitoring qilish hamda zarur holatlarda avtomatik ogohlantirish yuborish mexanizmi joriy etildi. Bu esa chiqindilarni o‘z vaqtida olib chiqish va ortiqcha to‘lib ketish holatlarining oldini olishga xizmat qiladi. Tadqiqot doirasida

chiqindilarni yig‘ish jarayonini optimallashtirish maqsadida transport vositalari harakati uchun samarali marshrutlarni shakllantiruvchi algoritm taklif etildi. Bundan tashqari, ishlab chiqilgan tizim arxitekturasi O‘zbekiston sharoitiga moslashtirilgan bo‘lib, mavjud infratuzilma va texnik imkoniyatlarni hisobga olgan holda loyihalashtirildi.

Taklif etilgan yechimning muhim jihatlaridan biri uning energiya tejamkorligi, moslashuvchanligi va kengaytirilish imkoniyatiga egaligidir. Shu bilan birga, mobil ilovaning foydalanuvchi uchun qulay interfeysga ega ekanligi tizimdan samarali foydalanish imkonini oshiradi.

Xulosa qilib aytganda, mazkur tizimni amaliyotga joriy etish natijasida chiqindilarni yig‘ish jarayonining umumiy samaradorligi oshadi, transport xarajatlari sezilarli darajada kamayadi va logistika jarayonlari optimallashtiriladi. Bundan tashqari, chiqindilarni o‘z vaqtida olib chiqish orqali ekologik holat yaxshilanadi hamda atrof-muhitga salbiy ta’sir darajasi kamayadi. Natijada shahar infratuzilmasini boshqarish samaradorligi ortib, aqlli shahar konsepsiyasini amaliyotga tatbiq etish uchun zarur shart-sharoitlar yaratiladi.

Mazkur maqolada aqlli shahar infratuzilmasi doirasida chiqindilarni boshqarish masalalari tizimli va kompleks yondashuv asosida o‘rganildi. Xususan, ballik (sensorli) chiqindi konteynerlarini boshqaruvchi mobil ilova modeli ishlab chiqildi va u O‘zbekiston Respublikasining “Chiqindilar to‘g‘risida”gi qonuni, shuningdek, xorijiy tajribalar va zamonaviy axborot-kommunikatsiya texnologiyalari asosida loyihalashtirildi. Tadqiqot jarayonida tizim arxitekturasi, real vaqt monitoringi, marshrutlarni optimallashtirish algoritmlari va foydalanuvchi interfeysi kabi komponentlar uzviy integratsiyalashgan holda ishlab chiqildi.

Taklif etilgan yechim chiqindilarni boshqarish jarayonini raqamlashtirish va avtomatlashtirish orqali shahar infratuzilmasining samaradorligini sezilarli darajada oshirish imkonini beradi. Ushbu tizimning joriy etilishi transport xarajatlarini kamaytirish, chiqindilarni yig‘ish jarayonini optimallashtirish hamda ekologik holatni yaxshilashga xizmat qiladi. Shu bilan birga, mobil ilova orqali operatorlar va foydalanuvchilar o‘rtasida interaktiv aloqaning yo‘lga qo‘yilishi tizimning amaliy samaradorligini yanada oshiradi.

Natijada, ishlab chiqilgan mobil ilova va integratsiyalashgan chiqindi boshqarish tizimi shahar boshqaruvini optimallashtirish, ekologik muammolarni kamaytirish va aqlli shahar konsepsiyasini amaliyotga tatbiq etishda muhim ilmiy va amaliy hissa qo‘shadi. Bu yondashuv kelajakda boshqa hududlarda ham chiqindilarni samarali boshqarish va shahar infratuzilmasini modernizatsiya qilish uchun asos bo‘lib xizmat qiladi.

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THE CURRENT STATE OF THE PROBLEM OF IRON DEFICIENCY ANEMIA IN PEDIATRICS

ABSTRACT. *Iron deficiency anemia (IDA) in children is one of the most pressing issues in modern pediatrics and remains the leading cause of anemia in childhood. This condition is the most common manifestation of micronutrient deficiency in children and has significant clinical and social significance due to its impact on growth, development, and quality of life. The high prevalence of IDA is due to a combination of factors, including the anatomical and physiological characteristics of a growing organism, intensive tissue growth and differentiation processes, increased iron requirements at different ages, and inadequate dietary intake of this micronutrient.*

Particularly vulnerable groups include young children, adolescents, and patients with chronic diseases, nutritional disorders, and malabsorption syndromes. Iron deficiency in childhood not only leads to decreased hemoglobin levels but is also accompanied by impaired tissue respiration, decreased enzyme activity, cognitive decline, delayed physical and psychomotor development, and increased susceptibility to infectious diseases. Therefore, timely diagnosis and correction of IDA are crucial for preventing long-term adverse effects.

This abstract emphasizes the importance of a comprehensive approach to diagnosing iron deficiency conditions, including an assessment of clinical manifestations, laboratory data, and risk factors for iron deficiency. Particular attention is paid to modern laboratory diagnostic methods that enable the detection of latent iron deficiency before severe anemia develops. The article discusses the basic principles of treating IDA in children, based on eliminating the causes of the deficiency, nutritional adjustments, and the rational use of iron supplements, taking into account the patient's age, degree of anemia, and individual characteristics.

Key words: *iron deficiency anemia, iron deficiency, children, diagnosis, treatment, prevention.*

Introduction

Iron deficiency anemia (IDA) in children is the most common pathological condition resulting from an imbalance between the body's iron requirements and its actual stores. According to the WHO, signs of latent or overt iron deficiency are observed in 30–60% of children under five years of age [1–5].

Iron deficiency develops significantly faster in children than in adults due to their rapid growth rates, immaturity of the hematopoietic system, and high metabolic demands [6–9].

These characteristics of the child's body determine the specificity of the clinical course of the disease, the diversity of its manifestations, and its impact on the child's physical and psychoneurological development [1,5,13,14].

In the early stages of iron deficiency, the pathological process is latent and may remain unnoticed, as there are no pronounced clinical symptoms. Iron depletion manifests itself primarily through changes in behavior and general well-being: children become lethargic, tire easily, have difficulty tolerating physical activity, and become more irritable and capricious. Infants experience feeding difficulties, sleep disturbances, and decreased weight gain. Gradually, the child's resistance to infectious agents decreases, which is explained by impaired enzymatic activity and a decrease in the functional capacity of the immune system [10-12].

Risk Factors for Iron Deficiency Anemia

The main factors contributing to the development of iron deficiency anemia (IDA) in children include:

- anemia in pregnant women;
- prematurity;
- poor nutrition;
- gastrointestinal diseases;
- helminthic infestations;
- blood loss of various origins.

Clinical Manifestations of Iron Deficiency Anemia in Children

The clinical picture of IDA in children can be characterized by a predominance of symptoms from various syndromes: asthenovegetative, epithelial, dyspeptic, cardiovascular, immunodeficiency, and hepatosplenic.

Asthenovegetative syndrome develops as a result of tissue hypoxia, including cerebral hypoxia. Children may experience muscle hypotonia, delayed physical and psychomotor development (in severe cases, intellectual disability), increased irritability, tearfulness, dizziness, fainting, episodes of orthostatic collapse, and signs of vegetative-vascular dystonia.

Epithelial syndrome manifests itself through changes in the skin and its appendages: dry skin, hyperkeratosis on the elbows and knees, cracks at the corners of the mouth (angular stomatitis), glossitis, cheilitis, dullness and hair loss, and brittle and striated nails.

Dyspeptic syndrome is characterized by decreased appetite, including anorexia, dysphagia, flatulence, constipation, or diarrhea. Taste perversion is often observed—a craving for inedible substances (chalk, earth, etc.)—and altered olfactory preferences (an attraction to the smells of gasoline, paint, and varnish). Gastrointestinal lesions exacerbate iron malabsorption, which contributes to the progression of anemia.

Cardiovascular changes are observed in severe forms of IDA and are manifested by tachycardia, shortness of breath, arterial hypotension, systolic murmurs, and signs of myocardial dystrophy.

Secondary immunodeficiency syndrome is characterized by prolonged low-grade fever, frequent acute respiratory and intestinal infections, and their protracted course.

Hepatosplenomegaly (hepatosplenomegaly) is typically found in children with severe iron deficiency anemia, often associated with rickets or other chronic diseases.

Diagnosis of Iron Deficiency Anemia in Children

The diagnosis of iron deficiency anemia (IDA) is based on a combined assessment of clinical manifestations and laboratory parameters, which help determine the presence, severity, and nature of iron metabolism disorders in the child's body.

The key laboratory criteria confirming the presence of IDA are:

• decreased hemoglobin levels - Hb <110 g/L;
• decreased color index (CI <0.86);
• decreased serum iron concentration - <14 μmol/L;
• increased total iron-binding capacity of serum (TIBC >63 μmol/L);
• decreased serum ferritin level — <12 μg/L [2–10].

The primary diagnostic method for IDA is a complete blood count, which includes assessment of the following parameters:

• red blood cell count;
• hemoglobin level;
• color index;
• mean corpuscular hemoglobin content (MCH);
• mean corpuscular hemoglobin concentration (MCHC);
• mean corpuscular volume (MCV);
• morphological features of red blood cells;
• reticulocyte count.

Biochemical indices of iron metabolism

Serum iron reflects the concentration of non-heme iron in blood plasma.

Normal values:

in newborns — 5.0–19.3 μmol/L;

in children over 1 month — 10.6–33.6 μmol/L.

Total iron-binding capacity (TIBC) characterizes the amount of iron that can be bound by the transport protein transferrin. The normal range is 40.6–62.5 μmol/L.

Determining serum iron levels and performing a complete blood count are possible in an outpatient setting.

More in-depth tests—determination of ferritin, TIBC, transferrin saturation, and other biochemical parameters—are performed in a hospital setting [9–11].

Treatment of Iron Deficiency Anemia in Children

The main principles of treating iron deficiency anemia (IDA) in children are:

1. Eliminating the underlying causes of iron deficiency;
2. Adjusting diet and daily routine;
3. Prescribing iron supplements to replenish iron stores.

Diet Therapy and Breastfeeding

Exclusive breastfeeding is recommended until the child reaches six months of age as it provides the optimal source of bioavailable iron. Breastfed children with established iron deficiency should be given iron supplements starting at six months of age.

Formula-fed children should use iron-fortified formula until they begin eating solid foods (approximately 12 months).

Teaching parents the principles of a balanced diet for their children—one that includes sufficient iron-rich foods (meat, liver, fish, buckwheat, apples, and green vegetables)—is important.

Drug Therapy

The basis of treatment is the correction of iron deficiency with iron-containing supplements [3, 6].

The most commonly used are:

• divalent iron supplements: Aktiferrin, Sorbifer Durules, Tardiferon, Totema, Ferroplex, and Fenuls;

• trivalent iron supplements in the form of a hydroxide-polymaltose complex: Maltofer, Ferrum Lek.

For young children, iron supplements are primarily prescribed in liquid dosage forms (drops, syrups, suspensions).

It is recommended to take the supplements 1–2 hours before meals, with water or fruit juices (not milk, as calcium reduces iron absorption).

The use of injectable iron supplements is only justified in exceptional cases, such as posthemorrhagic anemia or impaired iron absorption in the intestine [4]. The course of the disease is largely determined by the timeliness of diagnosis and the comprehensiveness of the treatment. Adequate treatment includes eliminating the causes of the deficiency, normalizing nutrition, replenishing iron stores with oral medications, and ongoing monitoring.

Thus, iron deficiency anemia in children remains a significant medical and social problem in childhood, characterized by a variety of clinical manifestations and significant impact on the child's physical, cognitive, and psycho-emotional development. Early diagnosis and comprehensive treatment are key to preventing long-term adverse effects and ensuring the child's healthy growth and development.

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CLINICAL AND LABORATORY PROGNOSIS OF ACUTE GLOMERULONEPHRITIS IN CHILDREN WITH NEPHROTIC SYNDROME

ANNOTATION: *In the development of chronic renal failure in children, the proportion of glomerulonephritis is still significant. Identification of chronic kidney pathology at the initial stage is important to improve the effectiveness of preventive and therapeutic measures aimed at slowing down the progression of the disease. We examined 76 patients with acute glomerulonephritis with nephrotic syndrome aged 2 to 5 years, including 31 boys and 45 girls. The development of the forecast algorithm was carried out by the method of sequential Wald analysis. A score of 10 was used as a threshold to conclude on the prognosis. The peculiarity of the course of glomerulonephritis in children was that the disease develops against the background of hereditary predisposition.*

Key words: *glomerulonephritis, nephrotic syndrome, patients, course, prognosis.*

INTRODUCTION

Glomerulonephritis is one of the main causes of chronic renal failure (CRF). The prevalence of the disease is growing in many countries of the world, and therefore it becomes extremely necessary to study the clinical course and prognosis of renal diseases [1,2,7,13,16].

In modern nephrology, age-related features of glomerular diseases are considered in two directions: differences between children and adults are studied, as well as features in children and adults depending on their age at the onset of the disease [6,7,9,12,14].

According to epidemiological studies, the structure of glomerular diseases may change. The development of nephrotic syndrome is associated with an increase in the permeability of the glomerular filtration barrier for macromolecules.

It is known that glomerular diseases can lead to a decrease in renal function. For a long time, impaired renal function can occur latently. Identification of chronic renal failure (CRF) in the initial stage is important to improve the effectiveness of preventive and therapeutic measures aimed at slowing down the progression of the disease [3,8,11,15,17]. Therefore, predicting the outcomes of glomerulonephritis in early childhood continues to be an urgent medical and social problem [5,10].

Purpose of the study: to determine the diagnostic significance of clinical and laboratory parameters in predicting acute glomerulonephritis with nephrotic syndrome in children.

Material and research methods

Patients with acute glomerulonephritis (76) with nephrotic syndrome aged 2 to 5 years were examined, including 30 boys and 44 girls. The patients were divided into 2 groups. The first group consisted of 35 patients who had no recurrence of the disease for two or more years, the second group included 39 patients who did not achieve complete remission and developed a chronic form of the disease (CHN). The development of the forecast algorithm was carried out by the method of sequential Wald analysis [4]. A score of 10 was used as a threshold to conclude on the prognosis. The conclusion about the high probability of the transition of the disease to chronic glomerulonephritis was determined if the patient had more than 10 points. The development of the Wald sequential analysis algorithm was carried out by determining the frequency of symptoms in each group as a percentage. The evidence of statistical reliability of the difference in the frequency of symptoms is determined by the formula: t=P1 P2 / M221-M22. The proof of the independence of signs of detection of prognostic symptoms was the determination of the correlation coefficient for qualitative signs, which is calculated by the formula:

H \u003d ao - c / (a + in) x (c + d) x (a + s) x (in + d), where the letters indicate the signs. Correlation coefficient for quantitative traits, where “x” and “y” are average correlated traits. Tx Ty standard deviation: H \u003d (x-x) x (y-y) / n (Tx-Ty). The determination of the relative probability and the calculation of the prognostic coefficient were carried out according to the formula: PC = 10 lg P1/P2.

Indicators of unfavorable prognosis with a positive sign, because in the numerator, the frequency of symptoms characteristic of the group with developed CGN, and in the denominator, symptoms characteristic of the group with acute glomerulonephritis with long-term clinical and laboratory remission. Taking into account the hypothesis with a normal distribution, the information measure was calculated using the Kullbach formula [2]. According to the degree of information content, the following signs were selected, listed in the table, where PC is a prognostic coefficient, J (xi) is information content.

Research results

A comparative assessment of hereditary burden revealed that a prognostically unfavorable sign of chronicity was the presence of kidney diseases

in relatives in the pedigree, the prognostic coefficient (PC) was 9.9 and significantly informative +1.65. From the anamnestic data, there were frequent sore throats (PC = 15.3) with the highest information content among all other signs (6.12), food and drug allergies, parasitic infestations, PC = 5.2 and 6 with an information value of 1.35 and 6, respectively. 1.02. Thus, if the total score exceeds the threshold unit “10”, the patient has an unfavorable prognosis and belongs to the high-risk group requiring appropriate therapy.

Of the laboratory studies, the most unfavorable prognostic indicator was partial renal dysfunction: hypo- and hyperkalemia, proteinuria more than 3 g/l per day. According to the coagulogram, there was plasma tolerance to heparin (7.6). According to the analysis of excretory urography, unfavorable factors of chronicity were an increase in the size of the kidneys (PC = 17), information content 1.76, an increase in the nephrographic effect (PC = 12) with information content 1.24. In the genesis of damage to renal structures in acute glomerulonephritis, a high information content of malondialdehyde was established with its increase from 6.8-8.4 nmol/mg/lipids in the cell membrane. Despite a slight difference in the indices of phosphatidylcholine, phosphatidylethanolamine, lysophosphatidylcholine in erythrocyte membranes in acute and chronic glomerulonephritis, compared with those in the control group, their information content is high - 96, 88, 21, respectively.

The study of thyroid function in patients with acute glomerulonephritis with long-term remission: the level of thyroxine-bound globulin - 0.52 ± 0.086 nmol / l, triiodothyronine 1.32 ± 0.15 nmol / l, thyroxine - 99.96 ± 7.13 nmol / l , no significant difference was found in patients with AGN and CGN. However, if we take into account that the sum of prognostic coefficients is reliable at a value of 19.5, then a significant difference between patients of both groups is revealed.

The next stage of the study was the analysis of information content, which reflects the degree of approximation of the diagnosis to the correct diagnostic threshold. An informative measure of more than 3 was recognized as highly informative, but not less than 1, because 3 - 4 such signs are sufficient to reach the +10 threshold, i.e. providing no more than 10% errors. Such signs, for example, were a decrease in alpha - globulin, an increase in gamma - globulin, hyperlipidemia, an increase in cholesterol. Signs such as hypercoagulability, a decrease in endogenous creatinine against the background of a hereditary burden of kidney pathology, an increase in malondialdehyde and lysophosphatidylcholine, a decrease in phosphatidylethanolamine and phosphatidylcholine were prognostically unfavorable indicators. These indicators characterize the high activity of lipid peroxidation, leading to destabilization of cytomembranes and the formation of a prognostically unfavorable course of nephrotic syndrome in patients with glomerulonephritis.

Conclusions

1. In the development of chronic renal failure in children, the proportion of glomerulonephritis is still significant.

2. The peculiarity of the course of glomerulonephritis in children is that the disease develops against the background of hereditary predisposition.

3. The chronicity of the disease is due to the instability of cytomembranes against the background of increased activity of lipid peroxidation.

4. In connection with the established facts, timely diagnosis of factors leading to chronicity is necessary, as well as prevention of the formation of cytomembrane instability with immunological control of the treatment.

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FEATURES OF ANTIBACTERIAL THERAPY FOR CHRONIC LUNG DISEASES IN CHILDREN

Annotation: *Chronic respiratory diseases, which began in childhood, are the cause of disability not only for children, but also for the adult population. Thus, according to the latest data, the incidence of obstructive pulmonary disease has increased by 3.2 times. Some mechanisms for the development of their progression in children have not been fully disclosed. In recent years, the number of antibiotic-resistant strains of microorganisms has increased, which contributes to the progression of lung tissue damage and worsens the prognosis of the disease. In solving the problem of the rationality of antibiotic therapy, an extremely important place is occupied by the issue of creating effective therapeutic concentrations of an antibiotic in a chronic focus of pulmonary inflammation. The effect of antimicrobial therapy is determined not only by the correct choice of the drug, but also by the method, its dose and frequency of administration. One of the effective methods that improve the results of treatment is physiotherapy procedures used in the complex treatment of CLD.*

Key words: *chronic lung diseases, patients, microbial flora, antibiotic therapy.*

INTRODUCTION

For more than 100 years, the attention of pediatricians has been attracted by the problem of treating chronic nonspecific lung diseases and their complications in children [1,5,9,10,13,21]. In modern conditions, the role of rehabilitation is increasing, since the reform of the healthcare system implies a reduction in the length of the patient's stay in the hospital and a shift in the emphasis of medical care to the rehabilitation and outpatient stages [3,7,11,18]. Therefore, works devoted to the search for new treatment regimens for Chronic Lung Disease (CLD) in children are relevant for pulmonology.

Treatment of CLD is complex and includes antibiotic therapy, muco- and

bronchodilators, vitamin therapy, kinesitherapy, physiotherapy, sports, and treatment of its complications. [4,6].

According to modern concepts, infection is the cause of exacerbation of CLD in 50-60% [2,14,20]. The problem of antibiotic therapy of chronic inflammatory lung diseases constantly attracts the attention of pediatricians. The detection of the causative agent of a bacterial infection in chronic inflammatory lung diseases is one of the main prerequisites for rational antibiotic therapy [6,8,10]. It should be noted that the spectrum of bacterial flora in chronic inflammatory lung diseases has changed significantly. Staphylococcus was previously the most common causative agent of pneumonia, according to most authors, today it has lost its primary role [4,10,15].

In the last decade, the results of bacteriological studies carried out in chronic lung diseases in children have shown a variety of isolated flora. Most often, pneumococcus, influenza bacillus, staphylococcus, streptococcus are found in the respiratory tract, less often other types of pathogens [,4,16,17].

Studies of bronchial secretion samples, performed by a quantitative method using selective nutrient media for the isolation of pneumotropic pathogens, showed that the main etiological significant pathogen in chronic pyoinflammatory lung diseases in children is pneumococcus, isolated in monoculture and in association in 66% of patients, and coli influenza, which occupies the second place in the frequency of inoculation (45%) and occurs both in monoculture and in association with pneumococcus [19].

As observations show with a mild exacerbation of chronic bronchitis, the most common clinically significant microorganisms are non-typable and non-encapsulated forms of H. Influenzae, S. Pneumoniae, M. Catarrhalis [1,6]. With more severe exacerbations, often requiring hospitalization in intensive care units, the proportion of the above microorganisms decreases and the proportion of H. Influenzae producing β-lactamase, gram-negative bacteria, in particular various species of Enterobacteriacae, P. Aeruginosa, increases.

According to Ageikin V.A. [1] in the sputum of patients with chronic inflammatory lung diseases in children, two predominant pathogens are found: Haemophilus influenzae in 60-70% and pneumococcus in 35-40% of patients. In a small number of children (5-10%) Moraxella catarrhalis is sown, which is sown both in monoculture and in associations. The author also claims that Haemophilus influenzae is sensitive to protected penicillins (amoxicillin), as well as cephalosporins of 2-3 generations.

The authors point out that serological research methods were not inferior to microbiological seeding in terms of sensitivity and specificity, and their complex use is most effective for determining the etiological significance of Haemophilus influenzae in the development of exacerbation of chronic bronchitis. The combined use of microbiological and immunological methods makes it possible to detect not only microorganisms, but also the products of their destruction and the reaction of the immune system to the corresponding irritation. Summarizing the above literature data, it can be noted that bacteriological monitoring in chronic

inflammatory lung diseases in children is one of the criteria for the severity of the pathological process and helps to choose a rational antibiotic therapy regimen.

Summarizing the above literature data, it can be noted that bacteriological monitoring in chronic inflammatory lung diseases in children is one of the criteria for the severity of the pathological process and helps to choose a rational antibiotic therapy regimen.

One of the reasons for the transition of acute pneumonia to chronic is a decrease in the sensitivity of pathogens to antibiotics. This is due to the widespread use of various antibiotics, in connection with which the selection of resistant forms of microorganisms takes place [19,22].

Determining the sensitivity of the microbe to antibiotics is of particular importance in chronic inflammatory diseases of the lungs, in which, due to repeated and prolonged antibiotic treatment, the sensitivity of the microbial flora often changes. The data of the above literature once again confirm that antibiotic therapy is the main method of treatment and elimination of exacerbation of chronic inflammatory lung diseases.

The basis for prescribing antibiotic therapy for chronic inflammatory lung diseases is the diagnosis of the infectious nature of the exacerbation, which meets the criteria of Anthoniesen N.R. et al. [21] the presence of 3 main signs: an increase in sputum volume, an increase in its "purulence" and an increase in shortness of breath (I type of exacerbation). An indication for the appointment of AP may also be the presence of two of the above signs (type II exacerbation), but purulent sputum should be a mandatory sign. The observations made by Stockley R.A. et al. showed that in chronic nonspecific lung diseases there is a close correction between purulent sputum and the presence of microorganisms in it.

The effectiveness of antibiotic therapy in chronic inflammatory lung diseases remains an urgent problem. At the same time, it is known that the cure of a focal infection can be achieved only if the site of its direct action is adequately provided with an antibiotic. However, it is not easy to create the necessary therapeutic concentrations in the lung in chronic diseases, since drugs hardly penetrate into the foci of chronic infection. This is due to the development of pronounced fibro-sclerotic changes and impaired vascularization of the lung tissue, the presence of persistent bronchial dyscrinia and obstruction. Therefore, it is important to choose a method of therapy that maximizes the focus of inflammation in the lungs with antibacterial drugs.

Taking into account the prevailing pathogens and their drug sensitivity in chronic lung diseases in children, antibiotics of the penicillin and cephalosporin series, macrolides are used [2,6,11,12,18,21].

In the treatment of chronic inflammatory lung diseases in children and adolescents Volkov I.K., Katosova L.K. [13] give preference to parenteral administration of drugs and the appointment of the maximum allowable therapeutic doses. For this purpose, the authors used Rocephin in 67 children with COPD in children at a dose of 50-80 mg/kg once a day intravenously. The duration of the course ranged from 7 to 13 days. During treatment with Rocefin,

complete eradication of M. catarrhalis, S. Pneumoniae and S. Aureus was noted. In 8.9% of patients, the seeding of H. infuenzfe remained and in 2.9% of patients - P. Aeruginosae. Side effects were detected in 3% of children who had dizziness on the background of jet administration of the drug, in 3% of children - intestinal dysfunction, in 10.5% of patients an increase in the amount of Candida fungal flora in sputum was noted.

Bronchoscopic and intratracheal methods of drug administration significantly increase the effectiveness of therapy, especially in the bronchiectasis form of chronic pneumonia and in severe purulent lesions of the draining bronchus. In a very severe course of the disease, there is a positive experience with the introduction of antibiotics into the pulmonary artery system.

It has been established that the distribution of the antibiotic in the lungs depends on the nature of tracheobronchial secretion, on the partial binding of the drug to serum proteins and bronchial secretions, on the degree of endobronchitis activity and the individual characteristics of the child's body [11,21]. Inadequate concentration of antibiotics is one of the main components that adversely affect the results of the treatment of chronic lung diseases. [12,18].

In order to develop optimal antibiotic therapy regimens for chronic pneumonia in children during the period of maximum activity of the infectious-inflammatory process in the bronchi, intramuscular antibiotics were used for 10–12 days [2]. At the same time, the same drug in the average age daily dosage is administered endobrochially with an interval of 3 days. As the activity of endobronchitis subsided, the intramuscular administration of the antibiotic was canceled, and the drug was administered only endobronchially at the age-specific daily dosage after 5 days.

Traditional methods of antibiotic therapy do not always provide the desired results. This is due to the difficulty of eliminating the infection from the focus of chronic pulmonary inflammation, frequent relapses of bronchitis, a decrease in the activity of local airway protection factors and an increase in the number of antibiotic-resistant strains of microorganisms (6,12,18). The parenteral route of administration of antibiotics does not allow to obtain the desired result, since the antibiotics circulating in the blood do not penetrate in the required amount through the fibrous-modified lung tissue into the focus of infection. The introduction of large doses of antibiotics does not solve the problem of treating chronic lung diseases in children. This increases the possibility of toxic and allergic reactions [12,21].

In recent years, endobronchial administration, ultraviolet laser irradiation, ozone therapy in combination with antibiotics, and subanesthetic endobronchial ultrasonic injection-aerosol spraying of antibiotics have begun to be used in the treatment of chronic pneumonia [2,11,19].

However, the widespread use of antibiotics has contributed to significant changes in the nature of the microbial flora. There is an increase in antibiotic-resistant strains of microorganisms and an increase in pathogenic properties and potentially pathogenic microorganisms [6,11,12]. All this requires a periodic

review of some principles of antibiotic therapy, among which the principle of the effect of antibiotics on bronchopathogens is of particular importance.

Thus, one of the reasons for the low efficiency of traditional methods of antibiotic therapy is the impossibility of creating the optimal concentration of antibiotics in the lymphatic system, which is the main route for the spread of infection [2,11,18,19]. An attempt to create high concentrations of antibiotics in the lymphatic system by traditional methods is accompanied by toxic and allergic reactions, leading to immunodeficiency [2,12,16]. Therefore, the effect of antimicrobial therapy is determined not only by the correct choice of the drug, but also by the method, its dose and frequency of administration. One of the effective methods that improve the results of treatment is physiotherapy procedures used in the complex treatment of CLD. At present, the impact of ultrasonic (US) waves has become widely used. Ultrasound therapy has an anti-inflammatory effect, affects blood and lymph circulation, the state of nervous regulation, and proliferative-trophic processes in the body.

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GASTROENTEROLOGIYADA QO‘LLANILADIGAN DORI MODDALARNING ORGANIK KIMYOVIY TUZILISHI VA FUNKSIONAL GURUHLARINING BIOLOGIK FAOLLIKKA TA’SIRI

Annatatsiya:*Dori vositalarining kimyoviy tuzilishi va funktsional guruhlari ularning biologik faolligi, farmakokinetikasi, selektivligi va gastroenterologiyada terapevtik samaradorligini aniqlashda muhim rol o‘ynaydi. Organik kimyo nuqtai nazaridan, heterosiklik yadrolar, aromatik halqalar, gidroksil (-OH), amin (-NH_2) va karboksil (-COOH) guruhlari kabi funktsional qismlar dori-nishon o‘zaro ta’sirini belgilaydi, shuningdek, so‘rilishi, tarqalishi, metabolizmi va chiqarilishiga sezilarli ta’sir ko‘rsatadi. Tadqiqotlar shuni ko‘rsatadiki, bu funktsional guruhlarning nozik modifikatsiyalari selektivlikni 15–25% oshirishi, farmakologik samaradorlikni yaxshilashi va maqsaddan tashqari ta’sirlarni 10–20% kamaytirishi mumkin.*

Kalit so'zlar:*Organik kimyoviy tuzilish; Funktsional guruhlar; Biologik faollik; Struktura-faoliyat munosabati (SAR); Gastroenterologiya dorilari; Farmakokinetika; Dori vositalarini dizayn qilish; Terapevtik samaradorlik; Molekulyar optimallashtirish; Toksikologik xavfsizlik*

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ORGANIC CHEMICAL STRUCTURE OF DRUGS USED IN GASTROENTEROLOGY AND THE EFFECT OF FUNCTIONAL GROUPS ON THEIR BIOLOGICAL ACTIVITY

Abstract: *The chemical structure of drugs and their functional groups play a crucial role in determining biological activity, pharmacokinetics, selectivity, and therapeutic efficacy in gastroenterology. From the perspective of organic chemistry, functional moieties such as heterocyclic cores, aromatic rings, hydroxyl (-OH), amino (-NH_2), and carboxyl (-COOH) groups govern drug–target*

interactions and significantly influence absorption, distribution, metabolism, and excretion. Studies indicate that subtle modifications of these functional groups can increase selectivity by 15–25%, improve pharmacological efficacy, and reduce off-target effects by 10–20%.

Keywords: *Organic emical structure; Functional groups; Biological activity; Structure–activity relationship (SAR); Gastroenterological drugs; Pharmacokinetics; Drug design; Therapeutic efficacy; Molecular optimization; Toxicological safety.*

KIRISH

Organik kimyoviy tuzilish va funktsional guruhlarning dorilarning biologik faolligiga ta'siri tibbiy kimyo va farmakologiyada, ayniqsa gastroenterologik terapiya kontekstida asosiy tushunchadir. Gidroksil (-OH), amin (-NH_2), karboksil (-COOH) va geterosiklik halqalar kabi o'ziga xos funktsional guruhlarning mavjudligi va joylashuvini o'z ichiga olgan dorining kimyoviy tuzilishi uning fizik-kimyoviy xususiyatlarini, farmakokinetikasini (ADME-so'rilishi, tarqalishi, metabolizmi va chiqarilishi) va yakuniy farmakologik faolligini bevosita belgilaydi. Masalan, deyarli 7000 ta tasdiqlangan kichik molekulali dorilar tahlillari shuni ko'rsatdiki, gidroksil va efir/karboksil hosilalari kabi eng keng tarqalgan funktsional guruhlar terapevtik sinflar bo'ylab ham doriga o'xshash xususiyatlarga, ham retseptorlarning o'zaro ta'siriga sezilarli darajada ta'sir qiladi.

Struktura-faoliyat munosabati (SAR) tahlillari orqali aniqlangan ma’lumotlar, gastroenterologik farmakoterapiyada yallig‘lanishli ichak kasalliklari, peptik yaralar va oshqozon-ichak trakti xavfli o‘smalarini davolashda dori vositalarining molekulyar tuzilishi bilan klinik natijalar o‘rtasidagi aniq mexanik bog‘liqlikni ko‘rsatadi. Masalan, proton nasosi ingibitorlarida benzimidazol yadrosi va ularning turli substitutsiyalari dorining kislota sekretsiyasini inhibe qilish qobiliyatini 20–30% oshirishi mumkin, shuningdek, 5-aminosalisilat derivatlari yallig‘lanishga qarshi samaradorligini 15–25% yaxshilaydi.

Shuningdek, farmakokinetik tahlillar ko‘rsatadiki, dorilarning lipofilligi, molekulyar hajmi va elektron tarqalishi ularning gastrointestinal so‘rilish tezligi va sistemik bioavailability-ga sezilarli ta’sir qiladi. Ma’lumotlarga ko‘ra, logP qiymati 2.0–3.5 oralig‘ida bo‘lgan dorilar boshqa dorilarga nisbatan 15–20% tezroq so‘riladi va tizimli bioavailability-ni 10–15% oshiradi. Shu bilan birga, SAR va metabolik modellashtirish orqali aniqlangan nojo‘ya toksik ta’sirlar, masalan, hepatotoksiklik va gastrointestinal shikastlanishlar, funktsional guruhlarning optimallashtirilishi bilan 20–30% kamaytirilishi mumkin. Ushbu maqola molekulyar darajadagi tuzilish, funktsional guruhlar va biologik natijalar o‘rtasidagi murakkab korrelyatsiyalarni o‘rganish orqali dori vositalarini oqilona loyihalash, klinik samaradorlikni oshirish va nojo‘ya reaktsiyalarni minimallashtirishning ahamiyatini ta’kidlaydi. Natijada, bu yondashuv gastroenterologiyada aniq tibbiyot (precision medicine) tamoyillarini qo‘llash va

dori vositalarini individual bemor xususiyatlariga moslashtirish imkoniyatini yaratadi.

Gastroenterologiyada yallig'lanishli ichak kasalligi va oshqozon yarasi kasalligidan tortib oshqozon-ichak saratonigacha turli xil kasalliklarni davolash uchun ishlatiladigan dorilar molekulyar nishonlarga bog'lanish yaqinligini, membrana o'tkazuvchanligini va fermentativ metabolizmga moyilligini belgilovchi nozik strukturaviy xususiyatlarga juda bog'liq. Strukturaviy tasniflash tizimlaridagi tadqiqotlar shuni ko'rsatdiki, halqa tizimlari va o'rinbosar guruhlardagi o'zgarishlar nafaqat samaradorlikni, balki toksiklik profillarini va maqsaddan tashqari ta'sirlarni ham o'zgartirishi mumkin, bu hatto kichik strukturaviy o'zgarishlar ham klinik natijalarni o'zgartirishi mumkinligini ko'rsatadi. Bu sezilarli oqibatlarga olib keladi, chunki oshqozon-ichak terapiyasidagi nojo'ya dori reaktsiyalari asosiy klinik muammo bo'lib qolmoqda, oshqozon-ichak yon ta'siri davolashni to'xtatishga va bemorlarda hayot sifatini pasaytirishga sezilarli darajada hissa qo'shadi.

Dorivor kimyo doirasida struktura-faollik munosabati (SAR) yondashuvlari kimyoviy tuzilmalarni biologik javoblar bilan tizimli ravishda bog'lashga qaratilgan bo'lib, bu dorilarning terapevtik ko'rsatkichlarini oqilona optimallashtirish imkonini beradi. SAR ma'lumotlarini ilg'or bashoratli modellashtirish bilan integratsiya qilish orqali zamonaviy dori vositalarini kashf etish ishlari maqsadli bo'lmagan fermentlar yoki retseptorlar bilan nojo'ya o'zaro ta'sirlarni minimallashtirish bilan birga, mo'ljallangan maqsadlar uchun selektivlikni oshirishga intiladi. Yangi dalillar, shuningdek, ma'lum kimyoviy qismlarning mavjudligi nojo'ya hodisalar darajasidagi farqlar bilan bog'liq bo'lishi mumkinligini ko'rsatadi, bu esa klinik bardoshlilikni bashorat qilishda kimyoviy dizaynning muhimligini ta'kidlaydi.

Ushbu fonni hisobga olgan holda, organik kimyoviy tuzilish va funktsional guruhlarning gastroenterologik dorilarning biologik faolligiga qanday ta'sir qilishini chuqurroq va statistik jihatdan qo'llab-quvvatlovchi tushuncha juda muhimdir. Ushbu maqola mavjud dalillarni har tomonlama ko'rib chiqish, organik kimyo, SAR metodologiyalari va klinik farmakologiyadan tushunchalarni birlashtirish orqali ushbu munosabatlarni tahlil qilishga qaratilgan bo'lib, ular ratsional dori vositalarini loyihalash va gastroenterologiyada terapevtik natijalarni yaxshilashga yordam beradi.

Dorivor va organik kimyo bo'yicha so'nggi tadqiqotlar gastroenterologiyada dori samaradorligi, selektivligi va xavfsizligini aniqlashda organik kimyoviy tuzilish va funktsional guruhlarning muhim rolini ta'kidlaydi. Tizimli sharhlar shuni ko'rsatadiki, gastroenterologik dorilarning 65% dan ortig'i o'zlarining farmakologik faolligini gidroksil (-OH), amin (-NH2), karboksil (-COOH) va geterosiklik halqalar kabi o'ziga xos funktsional guruhlarning mavjudligidan kelib chiqadi, bu esa maqsadli yaqinlik va farmakokinetik xatti-harakatlarga ta'sir qiladi. Ushbu bo'limlardagi strukturaviy modifikatsiyalar biologik faollikni oshirishi yoki kamaytirishi mumkin, bu esa dori vositalarini oqilona loyihalashda struktura-faoliyat munosabatlari (SAR) tahlillarining ahamiyatini ta'kidlaydi.

Gastroenterologik dorilar sinflarining meta-tahlillari shuni ko'rsatadiki, geterosiklik yoki aromatik halqalarning modifikatsiyasi retseptorlarning bog'lanish selektivligini 20-35% ga oshiradi, shu bilan birga maqsaddan tashqari ta'sirlarni 15-25% ga kamaytiradi. Masalan, benzimidazol yadrolari bilan almashtirilgan proton nasosi ingibitorlari (PPI) yuqori kislotani bostirish samaradorligini ko'rsatadi va karboksil yoki gidroksil modifikatsiyalari bilan 5-aminosalitsilat hosilalari yallig'lanishli ichak kasalliklarida yallig'lanishga qarshi faollikni yaxshilaydi. Bundan tashqari, hisoblash tadqiqotlari shuni ko'rsatadiki, lipofillik (logP), elektron taqsimot va sterik to'siqni o'z ichiga olgan fizik-kimyoviy xususiyatlar ham so'rilish tezligi, ham jigar metabolizmi bilan bog'liq bo'lib, bioavailability va toksiklikka ta'sir qiladi. Yuqori yutuqlarga qaramay, gastroenterologik dorilarning taxminan 30-40% hali ham nojo'ya ta'sirlarni keltirib chiqaradi, bu ko'pincha suboptimal strukturaviy dizayn bilan bog'liq bo'lib, bashoratli modellashtirish va molekulyar optimallashtirish zarurligini ta'kidlaydi. Yangi dalillar shuni ko'rsatadiki, SARni sun'iy intellektga asoslangan bashoratlar bilan integratsiya qilish kech bosqichdagi dorilarning yo'qolishini 15-20% ga kamaytirishi mumkin, bu esa terapevtik samaradorlik va xavfsizlikni yaxshilaydi.

Metodologiya: Ushb u tadqiqotda organik kimyo, dorivor kimyo va farmakologiyani birlashtirgan adabiyotga asoslangan va analitik metodologiya qo'llaniladi. So'nggi 15 yil ichida nashr etilgan 120-150 ta ekspertlar tomonidan ko'rib chiqilgan maqolalar, klinik tadqiqotlar va tizimli sharhlarning keng qamrovli ko'rib chiqilishi quyidagilarga qaratilgan:

1. Kimyoviy tuzilish tavsifi - funktsional guruhlarni, heterosiklik yadrolarni, o'rinbosar naqshlarni va elektron/sterik xususiyatlarni tahlil qilish.

2. Tuzilma-faollik munosabati (SAR) tahlili - kimyoviy modifikatsiyalarni biologik faollik, retseptorlarning bog'lanish yaqinligi va selektivlik bilan o'zaro bog'lash.

3. Farmakokinetik profillash - so'rilish, taqsimlash, metabolizm, chiqarilish (ADME) va strukturaviy xususiyatlar bilan bog'liq potentsial toksiklikni baholash.

4. Bashoratli modellashtirish - gastroenterologik dorilarning samaradorligi va xavfsizligini optimallashtirish uchun silika yondashuvlari va AI asosidagi SAR bashoratlarini ko'rib chiqish.

Miqdoriy tahlil funktsional guruhlarning mavjudligi va farmakologik natijalar o'rtasidagi statistik korrelyatsiyalarni o'z ichiga olgan bo'lib, quyidagilarga alohida e'tibor qaratildi:

Retseptor/ferment bog'lanish yaqinligi

Biomavjudligi va lipofilligi

Nojo'ya reaksiyalarning chastotasi va og'irligi

Adabiyot ma'lumotlariga asoslangan bashoratli ekstrapolyatsiya shuni ko'rsatadiki, funktsional guruhlarni SARga asoslangan tizimli optimallashtirish keyingi o'n yillikda terapevtik indekslarni 20-30% ga oshirishi va nojo'ya hodisalarni 25-28% ga kamaytirishi mumkin. Ushbu integratsiyalashgan metodologiya gastroenterologiyada kimyoviy tuzilmalarning biologik faollikka

mexanik ta'sirini tushunish uchun qat'iy asos yaratadi va dori vositalarini oqilona loyihalashga yo'naltiradi.

NATIJALAR

Gastroenterologik preparatlar tahlili organik kimyoviy tuzilish, funktsional guruhlar va biologik faollik o'rtasidagi aniq bog'liqlikni ko'rsatadi. Tuzilma-faollik munosabati (SAR) baholashlari shuni ko'rsatadiki, tahlil qilingan preparatlarning taxminan 68–72% geterosiklik yadrolar va aromatik qismlar mavjudligi tufayli farmakologik samaradorlikni oshiradi, gidroksil (-OH), amin (-NH2) va karboksil (-COOH) guruhlari esa retseptorlarning bog'lanishi va selektivligini yaxshilaydi. Xususan, almashtirilgan heterosikllar almashtirilmagan analoglarga nisbatan proton nasoslari, yallig'lanish fermentlari va nuklein kislota nishonlariga 25–30% gacha yuqori bog'lanish yaqinligini ko'rsatdi.

Fizik-kimyoviy xususiyatlar tahlili shuni ko'rsatdiki, optimallashtirilgan lipofillik (logP 2.0–3.5) preparatning so'rilishi va biomavjudligiga sezilarli ta'sir ko'rsatdi. Ushbu logP diapazonidagi dorilar ko'proq gidrofil yoki haddan tashqari lipofil birikmalarga nisbatan oshqozon-ichak traktida 15-20% tezroq so'rilishini va tizimli ta'sirning 10-15% ga oshishini ko'rsatdi. Molekulyar moslashuvchanlik va sterik konfiguratsiya nospesifik o'zaro ta'sirlarni 12-18% ga kamaytirishi aniqlandi, bu esa maqsaddan tashqari nojo'ya ta'sirlarning kamroq uchrashiga hissa qo'shdi. Toksikologik baholash shuni ko'rsatdiki, gastroenterologik dorilarning taxminan 30-40% hali ham o'rtacha va og'ir nojo'ya ta'sirlarni, asosan oshqozon-ichak shilliq qavatining tirnash xususiyati (25-30%), gepatotoksiklik (20-25%) va gematologik o'zgarishlarni (10-15%) keltirib chiqaradi. Jigar metabolizmi jarayonida hosil bo'lgan reaktiv oraliq mahsulotlarni tahlil qilish ma'lum funktsional guruhlar (masalan, aromatik aminlar, tiol bilan almashtirilgan halqalar) va toksiklik o'rtasidagi to'g'ridan-to'g'ri bog'liqlikni ko'rsatdi, bu kichik strukturaviy o'zgarishlar nojo'ya reaktsiyalarni sezilarli darajada kamaytirishi mumkinligini ko'rsatadi.

Birinchi avlod optimallashtirilmagan dorilarni zamonaviy SAR bilan boshqariladigan birikmalar bilan taqqoslash tahlili strukturaviy optimallashtirilgan dorilar uchun terapevtik indeksning 1,5-1,8 baravar oshganligini aniqladi, bu samaradorlik va selektivlikning oshganligini ko'rsatadi. Bashoratli modellashtirish shuni ko'rsatadiki, funktsional guruhlarni, xususan, gidroksillanish, metillanish va strategik geterosiklik almashtirishlarni yanada oqilona modifikatsiya qilish keyingi o'n yillikda terapevtik samaradorlikni 20-25% ga oshirishi va nojo'ya dori reaktsiyalarini 25-30% ga kamaytirishi mumkin.

Umuman olganda, bu natijalar kimyoviy tuzilish va funktsional guruh tarkibining gastroenterologik dorilarning biologik faolligi, farmakokinetikasi va xavfsizligiga muhim ta'sirini ta'kidlaydi. Ular oqilona SAR bilan boshqariladigan optimallashtirish aniq gastroenterologik farmakoterapiyadagi zamonaviy tendentsiyalarga mos keladigan maksimal samaradorlik va minimal toksiklikka ega dorilarni loyihalash uchun juda muhim degan xulosani qo'llab-quvvatlaydi.

MUNOZARA

Ushbu tadqiqot natijalari gastroenterologik dorilarning biologik faolligi, farmakokinetikasi va xavfsizlik profillarini aniqlashda organik kimyoviy tuzilish va funktsional guruhlarning asosiy rolini ta'kidlaydi. Tahlil qilingan dorilarning taxminan 70% da kuzatilgan geterosiklik va aromatik qismlarning ustunligi ularning nishonga xoslik va retseptorlarga bog'lanish yaqinligini oshirishdagi ahamiyatini ta'kidlaydi. Gidroksil (-OH), amin (-NH2) va karboksil (-COOH) guruhlari doimiy ravishda dori-nishon o'zaro ta'sirining kuchayishi, eruvchanlikning yaxshilanishi va optimallashtirilgan so'rilish bilan bog'liq bo'lib, funktsional guruhlardagi nozik modifikatsiyalar klinik samaradorlikni 15–25% ga o'zgartirishi mumkinligi haqidagi oldingi topilmalarni tasdiqlaydi SAR tahlili shuni ko'rsatadiki, oqilona strukturaviy optimallashtirish terapevtik selektivlikka sezilarli darajada hissa qo'shadi, maqsaddan tashqari o'zaro ta'sirlarni 12–18% ga kamaytiradi va nojo'ya ta'sirlarni minimallashtiradi. Bu topilmalar, ayniqsa, gastroenterologiyada dolzarbdir, bu yerda dori vositalari keltirib chiqaradigan oshqozon-ichak toksikligi bemorlarning taxminan 30–40% ga ta'sir qiladi, bu ko'pincha terapiyani to'xtatishga yoki dozani sozlashga olib keladi. Geterotsiklik halqalarning metillanishi yoki gidroksillanishi kabi funktsional guruh modifikatsiyalari gepatotoksik va shilliq qavatning yon ta'sirini 25% gacha kamaytirish bilan bog'liq bo'lib, bu kimyoviy dizayn xavfsizlik natijalariga sezilarli darajada ta'sir qilishi mumkinligini ko'rsatdi.

Fizik-kimyoviy xususiyatlar, jumladan, lipofillik (logP 2.0–3.5) va sterik konfiguratsiya, so'rilish, taqsimlash va biomavjudlikka bevosita ta'sir qilishi ko'rsatildi. Ushbu xususiyatlar uchun optimallashtirilgan dorilar 15–20% yuqori tizimli ta'sirga va tezroq oshqozon-ichak so'rilishini ko'rsatdi, bu esa dori vositalarini ishlab chiqishda molekulyar modellashtirish va hisoblash kimyosining bashoratli qiymatini qo'llab-quvvatlaydi. Bundan tashqari, SARga asoslangan bashoratli modellar shuni ko'rsatadiki, funktsional guruhlarni doimiy ravishda optimallashtirish keyingi o'n yillikda terapevtik indekslarni 20-25% ga oshirishi va nojo'ya reaktsiyalarni 25-30% ga kamaytirishi mumkin, bu esa gastroenterologiyada aniq tibbiyot tendentsiyalariga mos keladi. Ushbu kuzatuvlar organik kimyo, dorivor kimyo va farmakologiya ni gastroenterologik dorilarni oqilona loyihalashda integratsiya qilish zarurligini kuchaytiradi. Kimyoviy tuzilmani biologik faollik va toksiklik bilan o'zaro bog'lash orqali tadqiqotchilar zararli ta'sirlarni minimallashtirish bilan birga samaradorlikni maksimal darajada oshiradigan molekulyar modifikatsiyalarga ustuvor ahamiyat berishlari mumkin. Bundan tashqari, paydo bo'layotgan AI asosidagi modellashtirish yondashuvlari va siliko farmakokinetik simulyatsiyalarda optimal funktsional guruh konfiguratsiyalarini aniqlashni tezlashtirishi, bu esa preparatlarni ishlab chiqishning kech bosqichidagi muvaffaqiyat darajasini 15-20% ga oshirishi mumkin.

XULOSA

Xulosa qilib aytganda, ushbu munozarada gastroenterologik dorilarning molekulyar arxitekturasi, xususan, funktsional guruhlarning tabiati va joylashuvi

klinik natijalarda hal qiluvchi omil ekanligi ta'kidlangan. Ushbu munosabatlarni mexanik tushunish SAR bo'yicha boshqariladigan dori-darmonlarni oqilona loyihalash imkonini beradi, oshqozon-ichak kasalliklarini davolashda xavfsizroq, tanlangan va samaraliroq terapevtik vositalarni ishlab chiqishga yordam beradi.

Ushbu tadqiqot gastroenterologik dorilarning organik kimyoviy tuzilishi va funktsional guruhlari ularning biologik faolligi, farmakokinetikasi va xavfsizlik profilining muhim determinantlari ekanligini ko'rsatadi. Gidroksil (-OH), amin (-NH_2), karboksil (-COOH) va geterosiklik qismlar kabi funktsional guruhlar retseptorlarning bog'lanish yaqinligiga, maqsadli selektivlikka va umumiy terapevtik samaradorlikka sezilarli ta'sir ko'rsatadi. Tuzilma-faoliyat munosabatlari (SAR) tahlillari ushbu guruhlardagi nozik modifikatsiyalar farmakologik samaradorlikni 15-25% ga oshirishi, bioavailabilityni 15-20% ga yaxshilashi va maqsaddan tashqari o'zaro ta'sirlar va toksiklikni 12-30% ga kamaytirishi mumkinligini tasdiqlaydi.

Natijalar shuningdek, toksiklik muhim klinik muammo bo'lib qolishini ta'kidlaydi, gastroenterologik dorilarning taxminan 30-40% i gepatotoksiklik va oshqozon-ichak shilliq qavatining shikastlanishi kabi o'rtacha va og'ir nojo'ya ta'sirlarni keltirib chiqaradi. Kimyoviy tuzilish tahlilini bashoratli modellashtirish va siliko farmakokinetik simulyatsiyalar bilan integratsiyalash terapevtik samaradorlikni saqlab qolish yoki oshirish bilan birga ushbu nojo'ya reaktsiyalarni minimallashtirish uchun oqilona asos yaratadi. Kelajakka nazar tashlasak, SARga asoslangan dori dizayni, hisoblash kimyosi va sun'iy intellekt yondashuvlari bilan birgalikda, keyingi o'n yillikda gastroenterologik dorilarning terapevtik indeksini 20-25% ga oshirishi va nojo'ya reaktsiyalarni 25-30% ga kamaytirishi prognoz qilinmoqda. Xulosa qilib aytganda, organik kimyoviy tuzilish, funktsional guruhlar va biologik faollik o'rtasidagi munosabatlarni batafsil tushunish xavfsizroq, tanlabroq va samaraliroq gastroenterologik terapiyani ishlab chiqish, oxir-oqibat aniq tibbiyotni rivojlantirish va bemorlarning natijalarini yaxshilash uchun juda muhimdir.

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ALEKSANDR BEKOVICH-CHERKASSKIY EKSPEDITSIYASINING BA’ZI TAFSILOTLARI. XIVAGA YURISH VA EKSPEDITSIYANING BARBOD BO‘LISHI

Annotatsiya: *Mazkur maqolada XVIII asr davomidagi diplomatik munosabatlar, xususan, Rossiya imperiyasining O‘rta Osiyo xonliklari bilan olib borgan siyosiy va diplomatik munosabatlari va ularning harbiy-siyosiy jihatlari, diplomatik missiyalar haqida so‘z yuritiladi. Shuningdek, rus davlati hukumatining maxsus topshirig‘i bilan amalga oshirilgan knyaz Aleksandr Bekovich-Cherkasskiyning harbiy ekspeditsiyasi, uning boshlanishi va ba’zi tafsilotlari yoritib beriladi.*

Kalit so‘zlar: *Rossiya imperiyasi, O‘rta Osiyo xonliklari, diplomatik munosabatlar, elchiliklar, ekspeditsiyalar, harbiy-siyosiy missiya, Kaspiy dengizi, Amudaryo, savdo yo‘llari, tashqi siyosat.*

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A FEW WORDS ABOUT THE EXPEDITION OF ALEXANDER BEKOVICH-CHERKASSKY. MARCH TO KHIVA AND THE DESTRUCTION OF THE EXPEDITION

Annotation: *This article talks about diplomatic relations in the 18th century, in particular about the political and diplomatic relations of the Russian Empire with the Central Asian khanates and their military-political aspects, diplomatic missions. The military expedition of Prince Alexander Bekovich-Cherkassky, which was carried out by special order of the government of the Russian state, its beginning and some features will also be considered.*

Keywords: *Russian Empire, Central Asian khanates, diplomatic relations, embassies, expeditions, military-political mission, Caspian Sea, Amu Darya, trade routes, foreign policy.*

Kirish

Aleksandr Bekovich-Cherkasskiy ekspeditsiyasi XVIII asr birinchi choragidagi Rossiya imperiyasi va Xiva xonligi o‘rtasidagi munosabatlar tarixida alohida e’tibor tortadigan masalalardan biri sanaladi. Mazkur ekspeditsiya va uning tashkil etilishi, ekspeditsiyaning boshlanishi hamda Aleksandr Bekovich-Cherkasskiyning 1715 yilda suv orqali Kaspiy dengizi sharqiy qirg‘oqlariga ikkinchi sayohati hamda 1716 yilning kuz oylarida Kaspiy dengizi sharqiy

hududlariga amalga oshirgan ikkinchi safari borasida avvalgi maqolalarda to‘xtalib o‘tilgan edi.

Adabiotlar tahlili

Avvalgi maqolalarda ko‘rsatib o‘tilganidek, A.Bekovich-Cherkasskiyning Xiva xonligiga amalga oshirgan harbiy ekspeditsiyasi va uning halokati borasida bir qator adabiyotlarda turlicha fikrlar talqin qilingan. Bu borada turli davrlarda mazkur ekspeditsiya yuzasidan tadqiqotlar olib borgan va uning tafsilotlariga to‘xtalib o‘tgan I.I.Golikov, O.A.Nikonov, M.A.Terentev, Ya.V.Pilipchuk, A.V.Kochnev, G.F.Miller, V.V.Yakovlev, A.A.Andreev kabi bir qator mualliflar hamda ayrim tarixiy hujjatlar va hisobotlarni qamrab olgan nashrlarda ekspeditsiyaning so‘nggi bosqichi va uning halokatga uchrash sabablari, ekspeditsiyaning oqibatlari haqida bir qator masalalar ko‘rsatib berilgan.

XVIII asrdayoq Rossiya hukumati O‘rta Osiyoga arzon xom ashyo manbai sifatida qaray boshladi. A.Bekovich-Cherkasskiy ekspeditsiyasi (1714-1717 yy), F.Benevenining Buxoroga elchiligi (1721 y) ochiq-oydin harbiy razvedka maqsadlarini ko‘zlab (oltin konlarini aniqlash, asosiy quruqlik va suv yo‘llarini qayd etish, kartografik ma’lumotlar to‘plash va boshqalar) amalga oshirilgan edi. Orenburg va Sibir mudofaa yo‘nalishining qurilishi Rossiyaning O‘rta Osiyoga nisbatan tutgan harbiy siyosiy maqsadlarini aniq ko‘rsatib turardi. Manbalarda ta’kidlanishicha, Rossiya imperiyasining O‘rta Osiyo xonliklari bilan rasmiy munosabatlarini o‘rnatishga urinishi bir qancha elchiliklarning qabul qilinganligida ko‘rish mumkin. 1700 yildan 1716 yilga qadar Roosiyada Buxoro xonligidan ikkita - 1705 yilda Olimbek hamda 1716 yilda Xonqulibek To‘bchiboshi boshchiligidagi, Xiva xonligidan esa 1700 yilda Do‘stbek baxodir va 1714 yilda Ashurbek boshchiligidagi elchiliklar rasmiy tashrif bilan bo‘ldilar. Bu elchiliklar natijasida davlatlar o‘rtasidagi savdo va iqtisodiy munosabatlarning faollashuvi hamda qo‘shni davlatlardagi tabiiy boyliklar va ularning imkoniyatlari haqida ham ma’lumotlar olindi va bu jarayonni doimiy ravishda kengaytirib borilishiga alohida e’tibor qaratildi.

Asosiy qism

1714 yil may oyida Petr I Senatga Osiyoga ekspeditsiyalar tashkil qilish haqida farmon berdi. Podshoning farmonini bajarish maqsadida A.Bekovich-Cherkasskiy (1714-1717 yy) hamda F.Beneveni (1718-1725 yy) ekspeditsiyalari tashkil etildi. Dashtda rus savdo karvonlarining juda ko‘p sonli harbiy qo‘riqchilar hamrohligida paydo bo‘lishi osiyolik hukmdorlarda bu karvonlarning tinchlik maqsadida kelayotganligiga shubha uyg‘otdi. Natijada A.Bekovich ekspeditsiyasi butunlay qirib tashlanishi bilan yakun topdi, amalda ayrim ahamiyatli bo‘lmagan natijalar bilan esa F.Beneveni elchiligi ham poyoniga yetdi.

1717 yil 20 fevralda tuyalarda Astraxangan qaytib kelgan Aleksandr Bekovich-Cherkasskiy o‘z ekspeditsiyasining to‘rtinchi yurishiga tayyorgarlik ko‘ra boshladi. Leytenant Kojin esa bu vaqtga Bekovich-Cherkasskiy buyruqlariga itoat etmay qo‘ygan, bu yurishning muvaffaqiyatga erisha olmasligi va o‘ziga Hindistonga ketishga ruxsat berilishini talab qilayotgan edi. Shu vaqtda qalmiq xoni Ayukaxondan Xiva xoni ruslarni qurol bilan qarshi olish uchun qo‘shin

to‘playotganligi, ruslar u yerda suv ham, xashak ham topa olmasligini, xivaliklar esa Krasnovodsk qal’asiga yurish qilayotganligi, Cherkasskiyning choparlarini esa tutqunlikda ushlab turganligi haqida maktub oldi.

Kojin bu xaqda podshoni, general-admiral graf Apraksinni va knyaz Menshikovni ogohlantirib, Bekovichni “xoinlik bilan rus qo‘shinlarini dushman qo‘liga topshirishda” aybladi, o‘zi esa Peterburgga qaytdi. Leytenant Kojin o‘zboshimcha bu xatti-harakati uchun sudga berildi, biroq oradan ko‘p o‘tmay uning bergan ma’lumotlari o‘zini oqlagani uchun ozod etildi. Ayukaxon tomonidan xabar berilganligi xaqidagi ovozalar Xivadan Voronin tomonidan yuborilgan maktub bilan xam tasdiqlandi.

Xiva xonligining harbiy harakatlarga tayyorlanayotganligi haqida xabardor bo‘lgan A.Bekovich-Cherkasskiy Rossiya va Xiva xonligi o‘rtasidagi mavjud munosabatlarni inobatga olmadi va xonlik bilan diplomatik munosabatlarga kirishishni maqbul deb hisoblamadi. 1717 yil iyun oyida A.Bekovich-Cherkasskiy Petr I ning “Xiva xoni huzuriga elchi sifatida borish” haqidagi ko‘rsatmasini inkor qilgan holda 3646 nafar harbiylar hamda 6 ta zambarak bilan qurollangan holda Xiva xonligi poytaxtiga yurish boshladi. Poruchik Kojinning hali bu yurish boshlanmasdan oldin yuborgan ma’lumotnomasida ko‘rsatishicha –“Bekovich rus qo‘shinlarini Xivaliklarga taslim qilishni maqsad qilgan bo‘lishi ham mumkin edi”.

1717 yilning avgust oyi o‘rtalarida suvsiz cho‘llarda 1350 verst masofani bosib o‘tgan Bekovich-Cherkasskiy otryadlari Amudaryo yaqinidagi Oybo‘yir ko‘li bo‘yida xandaqlar qazib, tuproqqal’a ko‘tardilar. Bu haqda Xiva xoni Sherg‘ozixonga ruslar lageriga oziq-ovqat va sovg‘alar olib borgan elchilar habar berdilar. Xiva xonligi hududlarida o‘zboshimchalik bilan qal’a qurilgani xonlikda ekspeditsiyaga nisbatan yanada xushyorroq bo‘lishga va uni bartaraf etishga tayyorgarlikni kuchaytirishga turtki bo‘ldi.

1717 yil bahorida Bekovich-Cherkasskiy mayor Tevkeleyevni Eron va Hindistonga josus qilib jo‘natadi. Astraxanda turib Bekovich Cherkasskiy yangidan qo‘shin yig‘di va avvalgi qo‘shinga ko‘ra ko‘proq askarlarga ega bo‘lib, 1717 yilning bahorida quruqlikdagi karvon yo‘llari orqali Xiva xonligi tomon yo‘lga chiqdi Bekovich-Cherkasskiy boshchiligidagi otryad 3727 piyoda, 617 otliq dragun, 2000 kazak, 230 dengizchi askar va 22 ta to‘p-zambarak bilan Xivaga yo‘l olgan edi. 9 iyunda otryad Guryev shahridan chiqib, qumli dasht va sahrolar osha 2 oy yo‘l bosgach, Xivaga kirib keldi. Xivadan 120 chaqirimcha bo‘lgan Qayrag‘och darasida Sherg‘ozixonning 24 minglik qo‘shini bilan to‘qnashadi. Uch kunlik jangda har ikki tomon katga talofat ko‘radi. Xon Bekovich-Cherkasskiyni muzokara yuritish uchun Xivaga taklif qiladi. Xivada Sherg‘ozixon dushmanni g‘aflatda qoldirish maqsadida muhim harbiy strategik hiyla ishlatib, rus qo‘shinlarini besh shaharga bo‘lib yuboradi va keyinchalik ularning barchasi qirib tashlanadi. Bekovich-Cherkasskiyning o‘zi esa 1717 yil 29 avgustda qatl etiladi.

Bu vaqtda Xiva xonligi chegaralariga yaqin hududlarda rus qo‘shinlarining turkmanlar hamrohligida bo‘lib turishi Xiva xonligi hukumatini sergak torttirdi. Bekovich-Cherkasskiy tomonidan xivaliklarga qarshi harbiy harakat

tayyorlanayotganligi haqida Rossiya bilan ittifoqchi bo‘lgan Ayuka xon habar beradi. Bu haqda izlanishlar olib borgan tadqiqotchi Ya.V.Pilipchuk ham harbiy tajovuz bo‘lishi mumkinligi haqida Xiva xonining avvaldan xabardor qilinganligini ko‘rsatib o‘tadi. Uning ko‘rsatib o‘tishicha, Aleksandr Bekovich-Cherkasskiy harbiy otryadlari 1717 yilda Kichik qozoq juzi yerlari orqali Xivaga yo‘l oldi. Biroq qalmoqlar xoni Ayuka xon Xiva xoni Sherg‘ozini bu hujumdan ogoh etdi va rus harbiy otryadlari o‘zbeklar tomonidan butunlay qirib tashlandi. Garchi har ikki o‘rtada harbiy to‘qnashuvlar bo‘lib o‘tgan va bir necha kun davom etgan bo‘lsada, boshqa manbalarda Bekovich-Cherkasskiy otryadlarining to‘liq qirib yuborilmaganligi ham ko‘rsatiladi.

Manbada ko‘rsatilishiicha, xon Ayuka tomonidan Sherg‘ozixonning Bekovich-Cherkasskiy yurishidan ogohlantirilishi Ayuka va Bekovich o‘rtasidagi shaxsiy kelishmovchiliklar sabab edi deb ko‘rsatiladi. Bu xabar xivaliklarga yetib borishi bilanoq Sherg‘ozixon o‘zining 24 ming kishilik otliq qo‘shinlarini Bekovichga qarshi otlantirdi, ayrim manbalarda esa Sherg‘ozixon qo‘shinlarining soni 15 ming kishi edi deb ko‘rsatiladi. Xivaliklar juda katta kuch bilan va to‘satdan hujum qilgan bo‘lsalarda, Bekovich Cherkasskiy qo‘shinlariga jiddiy zarar yetkazmadilar. Uch kun davom etgan piyoda qo‘shinlardan 10 nafar dragunlar va kazaklar o‘ldirilgan bo‘lsa, zambaraklar o‘qidan xivaliklardan ham ko‘pchilik halok bo‘lganligi ko‘rsatiladi.

Shu o‘rinda Sherg‘ozixonning ogohlantirilishiga sabab sifatida ko‘rsatilayotgan Ayukaxon va A.Bekovich Cherkasskiy o‘rtasidagi munosabatlarga to‘xtalib o‘tish lozim. Ma’lumotlarga ko‘ra, 1699 yilda Kuban o‘rdasi xoni Davlat Girey tomonidan lashkarboshi etib tayinlangan Baxti Girey xonning katta o‘g‘li bo‘lib, bu vaqtda Kubanga va Qrimga xavf solayotgan qalmoqlarga qarshi harbiy yurishga tayyorlana boshlaydi. Biroq xonning o‘z ukasi Saodat Girey bilan nizolari natijasida o‘z hokimiyatini kuchaytirishga harakat qilgan Davlat Girey o‘g‘li Baxti Gireyni xondan keyingi o‘rinda turuvchi mansab – kalga-sulton mansabiga tayinlaydi. 1711-yilda Rossiya – Turkiya urushi vaqtida kalga-sulton Baxti Girey Rossiyaning janubiy hududlariga yurish qiladi, biroq qalmoqlar xoni Ayuka tomonidan to‘xtatiladi, Baxti Girey faqatgina Saratovgacha borishga muvaffaq bo‘ladi. Podshoning farmoni bilan Astraxan gubernatori P.M.Apraksin Kuban o‘rdasini butunlay tugatish uchun jazo otryadi sifatida yuboriladi va bu qo‘shin Xarkov shaxrigacha yurish qilib boradi. Qalmoqlar bilan ittifoqchilikda amalga oshirilgan bu yurish davomida o‘n olti ming kubanliklar o‘ldiriladi va yigirma ikki ming kishi asir olinadi, qalmoqlar tomonidan ikki ming bosh tuya, qirq minga yaqin ot, ikki yuz mingga yaqin chorva o‘lja olinadi. Kuban o‘rdasi vayrn etiladi. 1713 yilda Davlat Girey taxtdan tushirilib, o‘rniga ukasi Qoplon Girey o‘tkaziladi, Baxti Girey esa Qrimdan Shimoliy Kavkazga cherkeslar yurtiga qochib ketadi. Qaydan kuch to‘plagan baxti Girey yana Kubanga qaytib no‘g‘aylar va qalmoqlarga qarshi urushga kiradi. 1713-1714 yillarda qalmoqlar xoni Ayukaxon va Baxti-Girey o‘rtasida harbiy to‘qnashuvlar bo‘lib, o‘tadi, bu to‘qnashuvda qalmoqlarga ittifoqchi bo‘lgan Rossiya Shvesiya bilan urushga tortilganligi sababli ularga harbiy yordam bermaydi, natijada Baxti-Girey

tomonidan hujumga uchragan qalmoqlarning uch ming askarini o‘ldirilib, xon qarorgohi ham qo‘lga kiritiladi. Ayni ana shu to‘qnashuvlarda Aleksandar Bekovich-Cherkasskiy qalmoqlarga yordam berishga majbur bo‘ladi, biroq Baxti Girey bilan jangga kirishda bosh tortadi, oqibatda Baxti Girey tomonidan qalmoqlarning yelisan, jomboylik, burlak kabi urug‘larining o‘n ming uch yuz o‘tovi talanib, o‘lja qilib olib ketiladi, Rossiya hukumati esa qalmoqlarga zarur yordamni bermasdan, aksincha Ayukaxonni ta’qib qilish uchun Saratov komendantiga topshiriq beradi. Ayni mana shu holat balki Ayukaxonning A.Bekovich Cherkasskiy ekspeditsiyasi haqida Xiva xoni Sherg‘ozixonni ogohlantirishiga sabab bo‘lgan bo‘lishi mumkin. Boshqa manbada keltirilgan ma’lumotga asosan A.Bekovich-Cherkasskiyning hamroxi leytenant Kojinning ko‘rsatishicha, Ayukaxon o‘ziga berilishi mumkin bo‘lgan jazodan qutulib qolgan. 1719 yilda halokatga uchragan ekspeditsiya bilan bog‘liq holatlarni o‘rganish uchun Sankt-Peterburgdan maxsus yuborilgan general-auditor I.V.Kikin (general-auditor lavozimi harbiy-sud tizimida Petr I tomonidan 1716 yil 30 martda tasdiqlangan Harbiy Nizomga asosan joriy etilgan, birinchi general-auditor lavozimiga aynan mana shu Ivan Vasilevich Kikin tayinlangan) Ayukaxon o‘zining xiyonati bilan bog‘liq hamma “iz”larni yo‘q qilgani, shuningdek, ober-komendant Chirikovga maktub yo‘llab, o‘zining Xivaga ekspeditsiya xavfi haqida xabar berganligi haqidagi shubhalardan qutulishga harakat ham qilganligi ko‘rsatib o‘tadi.

Ayrim manbalarda ko‘rsatilishicha, 1717 yil avgust oyining ikkinchi yarmida Xiva xonligi qo‘shinlari Bekovich-Cherkasskiy otryadlariga hujum boshladi. Xonlik qo‘shinlarining hujumlari Bekovich otryadlari tomonidan uch kun davomida qaytarib turildi. To‘rtinchi kunga kelib Sherg‘ozixon harbiy harakatlarni to‘xtatdi va Bekovich-Cherkasskiyni muzokaralarga taklif qildi. Bekovich-Cherkasskiy 500 kishilik otryad bilan muzokaralarga keldi va xon tomonidan Xivaga taklif etildi. Xiva yo‘lida Bekovich-Cherkasskiy otryadlari pistirmada turgan xivaliklar tomonidan qirib tashlandi, Bekovich-Cherkasskiyning o‘zi esa asir olindi.

Boshqa muallifning ko‘rsatishicha, Sherg‘ozixon A.Bekovich-Cherkasskiy bilan tinchlik muzokaralariga erishgach, uni faxrli mehmon sifatida Xivaga taklif qiladi. O‘ziga nisbatan Sherg‘ozixon tomonidan katta hurmat ko‘rsatilayotganligidan hotirjam bo‘lgan Bekovich-Cherkasskiy unga hamrohlik qilib kelayotgan knyaz Samonov boshchiligidagi 500 nafar otliq qo‘shinning 240 nafarini ajratib joylashtirish uchun qulay bo‘lgan yerga yuborilishiga rozilik berdi. Qo‘shin ikkiga ajralgan vaqtda esa to‘satdan qilingan hujum natijasida qo‘shin o‘rab olindi va ko‘p askarlar o‘ldirilgan, qolganlari asir olingan.

Ekspeditsiyaning asosiy otryadlariga esa mayor Frankenberg boshliq bo‘lib qoldi. Xivaliklar Frankenbergga qal’adan chiqish va qo‘shinni beshta qismga bo‘lish va harbi qismni alohida ko‘rsatilgan hududlarga joylashtirish haqida Bekovich Cherkasskiyning ko‘rsatmasini keltirdilar. Biroq Frankenberg bu ko‘rsatmaning Bekovich tomonidan berilganligiga ishonmadi va u bilan shaxsan uchrashtirilishini talab qildi. Xivaliklar Bekovich-Cherkasskiyga ikkinchi marta

maktub yozdirib, qo‘shinni qal’ani tark etishi lozimligi ko‘rsatildi, biroq Frankenberg faqatgina agar buyruqqa itoat qilmasa uni tribunal va dor kutayotganligi ko‘rsatilgan to‘rtinchi maktubni olgandan so‘nggina qal’ani tark etib qo‘shinni qismlarga bo‘lishga ko‘rsatma berdi. Qo‘shinning har bir qismi xivaliklar tomonidan ko‘rstilgan qishloqlarga olib borildi va ko‘p qismi asirga olindi, ayrimlari qatl etildi.

Rossiya imperiyasining Xiva xonligiga nisbatan siyosiy munosabatlari tarixi masalalariga XVIII asrdayoq tarixchilar e’tibor qarata boshlaganligi tadqiqotlarda ko‘rsatib o‘tilib, ayniqsa ular orasida G.F.Miller va V.Mogutovlarning ishlariga alohida to‘xtalib o‘tiladi. Bu mualliflar o‘z asarlarida A.Bekovich-Cherkasskiy ekspeditsiyasining muvaffaqiyatsizlikka uchrashi masalarini ko‘rsatib berish bilan birga, G.F.Miller tomonidan Petr I ning O‘rta Osiyoga nisbatan amalga oshirgan ekspeditsiyalarining harbiy yurish xususiyatiga ega ekanligiga alohida e’tibor qaratiladi. V.Mogutov esa Petr I hamda A.Bekovich-Cherkasskiy ekspeditsiyasining muvaffaqiyatsizlikka uchrashining asosiy sababi “Xiva xalqining o‘z erkini yo‘qotib qo‘yishdan cho‘chiganligi” deb ko‘rsatadi.

Ayrim mualliflar tomonidan A.Bekovich-Cherkasskiyning bu vaqtda o‘z jonini to‘lov evaziga saqlab qolganligiga ishora qilinadi: -“Senat tomonidan tergov qilingan guvohlar tomonidan berilgan ma’lumotlarda A.Bekovich-Cherkasskiy foydasiga hech qanday ma’lumot uchramadi, aksincha u va Zamonovning ochko‘zligi, podshodan 70000 rublga teng sovg‘alarni Xiva xoniga yetkazmasdan maxfiy tarzda o‘g‘irlaganliklari ko‘rsatib o‘tildi, shahar tashqarisidagi Yekonomov va Zamonovlar osilgan dorda A.Bekovich-Cherkasskiy ko‘rinmaganligi ko‘rsatib o‘tildi”.

A.Bekovich-Cherkasskiy ekspeditsiyasi va uning tarixi mualliflaridan biri Djon Bell ham o‘z asarida Bekovichning halokati borasida bir qator ma’lumotlarni keltirib o‘tadi. J.Bell “Sayohatnomasi” ni o‘rgangan mualliflarning yozishicha, “... Bekovich xon bilan qo‘pol muomalada bo‘ldi, buning uchun esa qatl etildi, chunki bunday xatti-harakatning jazosi shunday bo‘lishiga ishora qilib, Bekovichning bu vaqtda juda tushkunlikka tushib qolganligi va o‘zini g‘alati tutayotganligini ko‘rsatib o‘tadi va buni u tomondan qo‘shinni bo‘laklarga bo‘lib alohida joylashtirishga ko‘rsatma berganligi bilan izohlaydi. Buning asosiy sababi sifatida esa uning xotini va ikki nafar qizlarining Volga daryosida halokatga uchrab halok bo‘lganligi haqida kelgan xabarni ko‘rsatadi. Aleksandr Bekovich-Cherkasskiy ekspeditsiyasi va uning muvaffaqiyatsizligi borasida zamonaviy rus tarixshunosligida quyidagi fikrlarni ham uchratish mumkin: -“Shaxsan Petr I tomonidan tashkil etilgan va yuqori darajada ta’minlangan birinchi Xiva ekspeditsiyasining muvaffaqiyatga erishish ehtimoli juda yuqori edi. Biroq, bir qator sub’ektiv omillar, jumladan ekspeditsiya boshlig‘ining shaxsiy kamchiliklari, noma’lum ob-havo sharoitini inobatga olmaganligi hamda unga tayyor emasligi, Xiva xonligining tajovuzkor va harbiy hiyla bilan harkat qilganligi bu missiyaning to‘laligicha barbod bo‘lishiga sabab bo‘ldi”.

Tadqiqotchilarning fikricha, -“Rossiya imperiyasining birinchi ekspeditsiyasi imperiyaning bo‘lajak hukmdorlari uchun razvedka vazifasini

bajarib, Xiva xonligi bilan harbiy jihatdan emas, balki savdo-iqtisodiy va tinch diplomatik munosabatlarni o‘rnatish o‘zaro manfaatli bo‘lishini ko‘rsatib berdi, hukumat esa A.Bekovich-Cherkasskiy ekspeditsiyasining halokatiga deyarli munosabat bildirmadi”.

Aleksandr Bekovich-Cherkasskiy ekspeditsiyasining yo‘q qilinishi haqida A.Andreev ham to‘xtalib o‘tadi, jumladan, Xiva xonligi tomonidan ekspeditsiyaning qirib tashlanishi nafaqat Rossiya, balki bir qator Yevropa davlatlarida ham favqulodda olamshumul voqea sifatida ko‘rildi. Bu fojeali voqea tafsilotlarini O‘rta Osiyo xonliklari tarixnavislari ham o‘z asarlarida ma’lum darajada yoritib berganlar. Jumladan, “Firdavs-ul iqbol” asarida Sherg‘ozixon Qulmuhammad otaliq va nayman amir Avaz inoqlarni behisob lashkarga bosh qilib, muzokara o‘tkazish uchun yuborganligi va ular Davlat Girey bilan tinchlik sulhiga erishib, buni nishonlash uchun ziyofat uyushtirish taklifi bilan hiyla ishlatib ularni qirib tashladilar. Davlat Gireyning maqsadi “o‘ttiz ming kishilik” qo‘shin bilan kelganligi bu elchilik ishlari bilan emas, balki “Xorazmni egallash” maqsadida Orol yaqinidagi “oltin va kumushga boy Shayx Jalil tog‘iga kelgan”ligi haqida to‘xtalib o‘tadi. A.B.Cherkasskiy ekspeditsiyasining halokati, ekspeditsiya rahbari A.B.Cherkasskiy va boshqa ekspeditsiya a’zolarining qatl etilishi Xiva xonligi va Rossiya davlatlari o‘rtasidagi munosabatlarni uzoq vaqtgacha murakkablashtirib qo‘ydi, garchi Florio Beneveni elchiligi orqali bu holatni bartaraf etishga urinish bo‘lgan bo‘lsada, u natija bermadi.

Shu o‘rinda Petr I tomonidan elchi sifatida Buxoro xonligiga yuborilgan italyan sayyohi Florio Benevenining Rossiyaga qaytish jarayonlari ham e’tiborni tortadi. 1718 yilda Petr I tomonidan elchi sifatida Astraxan orqali yo‘lga chiqqan Florio Beneveni 1721 yilda Buxoroga yetib keladi. 1723 yilga qadar Buxoroda bo‘lgan elchi Rossiya-Buxoro munosabatlari borasida podsho tomonidan qo‘yilgan talablarning bajarib bo‘lmasligini anglagach, 1723 yilda ortga qaytishga ruxsat oladi, biroq buxoroliklar unga faqat 1725 yildagina qaytishga ruxsat bersalarda, uning ketishiga to‘sqinlik qiladilar. Florio Beneveni unga o‘z yordamini taklif qilgan Xiva xoni Sherg‘ozixonning yordami bilan 1725 yil 8 aprelda Buxorodan qochishga va Xivaga borishga muvaffaq bo‘ladi. Xiva xoni esa uning 1825 yilning avgust oyida A.Bekovich-Cherkasskiy ekspeditsiyasi vaqtida asir olingan 92 nafar rus askarlari bilan birgalikda Rossiyaga jo‘natib yuborganligi ham ilmiy adabiyotlarda ko‘rsatib o‘tilgan.

Ayrim tadqiqotchilarning ishlarida Aleksandr Bekovich Cherkasskiy ekspeditsiyasining harakati va halokatga uchrashi borasida alohida to‘xtalib o‘tilgan, jumladan, A.Popov hamda D.Golosovlarning ma’lumotlariga asoslanib tadqiqotchi V.Chichagov quyidagilarni ko‘rsatib o‘tadi: -“Ustyurt tabiati haqida ancha salmoqli ma’lumot to‘plagan dastabki rus ekspeditsiyasi Petr I ning ko‘rsatmasiga asosan tashkil etilgan Aleksandr Bekovich Cherkasskiy ekspeditsiyasi sanalib, ekspeditsiya 1717 yilda Ustyurtni shimoliy-g‘arbidan janubiy-sharqi tomon Som va Beleuli quduqlari orqali kesib o‘tgan bo‘lsada, uning podsho tomonidan belgilangan asosiy vazifasi rus savdogarlariga suv orqali Moskvadan O‘rta Osiyo shaharlariga hech qanday to‘siqlarsiz qatnashlari uchun

Amudaryo suvining Kaspiyga quyilgan o‘zanini aniqlash edi”. Garchi ekspeditsiya to‘g‘ridan-to‘g‘ri harbiy bosqinchilik maqsadlarini ko‘zlamagan bo‘lsada, ayni vaqtda u harbiylashtirilgan ekspeditsiya bo‘lib, tarkibida 4000 dan ortiq harbiy bor edi. Rossiya davlati Xiva xonligi bilan avvalgi diplomatik aloqalaridan xulosa qilib garchi Amudaryo o‘zanini topish imkoni kam bo‘lsada, biroq xonlik bilan boshqa masalalarning ijobiy yechim topishiga umid qilar edi. Ekspeditsiya tayyorgarlik ko‘rayotgan bir vaqtda Xiva xonligida hokimiyat o‘zgardi va taxtga Sherg‘ozixon o‘tirdi. Sherg‘ozixonning qo‘shni davlatlar, ayniqsa Rossiya davlati bilan hech qanday kelishuvlari bo‘lmaganligi sababli Aleksandr Bekovich-Cherkasskiy boshchiligidagi to‘rt mingdan ortiq qo‘shinning xonlik hududlariga kirib kelishiga umuman befarq qaramasligi aniq edi. Dastlab A.Bekovich-Cherkasskiy qo‘shinlarining Xiva tomon yo‘lini to‘sishga uringan Sherg‘ozixon bu maqsadi amalga oshmagach, muzokaralarga kirishdi. Ekspeditsiyaning ko‘p sonli ekanligi ularni bir shaharga sig‘masligi vajidan qo‘shinni kichik-kichik qismlarga bo‘lingan holda Xiva atrofidagi qishloqlarga ham bo‘lib joylashtirilishiga erishgach, keyinchalik ularning katta qismini qatl qildirdi. Keyinchalik asirlikdan qutulib qaytgan ekspeditsiyaning bir qancha a’zolari bu holatni batafsil tasvirlab berdilar”.

Xiva xonligiga qarshi bir necha marta amalga oshirilgan harbiy ekspeditsiyalar va yurishlarning tarixiga oid asar muallifi M.Terentevning yozishicha, -“A.Bekovich-Cherkasskiy ekspeditsiyasi haqida avval yozgan kishilarning fikriga ko‘ra, 3720 kishining halokatiga xivaliklarning hiylakorligi va qalmiqlar xoni Ayukaxonning xoinligi, Bekovichning ishonuvchanligi sabab bo‘lgan. Maksheevning aytishicha, -“muhim sabab ... Bekovichning [bu ekspeditsiyadagi-Z.I.] g‘alati va noaniq pozitsiyasidir, ya’ni, bir tomondan [do‘stona munosabatlar o‘rnatish maqsadida kelgan-Z.I.]tinchlik elchisi sifatida kelgan bo‘lsa, ikkkinchi tomondan qurollangan harbiy qo‘shinning qo‘mondoni, ya’ni dushman edi”.

Ayrim mualliflarning ko‘rsatishicha, Bekovich va Samonov ko‘p o‘tmay qatl etildi. Ekspeditsiyaning bir qancha a’zolari esa tirik qoldilar va yana bir qismi esa ortga qaytishga muvaffaq bo‘ldi. Ajablanarlisi, mana shu ekspeditsiyaning asosiy sababchilaridan biri sanalgan Ho‘ja Nafas hamda Bekovichning birodarlarining hayoti saqlab qolindi va avf etilib, qo‘yib yuborildi. Kaspiy dengizining bo‘yida barpo etilgan uchta harbiy qal’aning qo‘shinlari esa turli kasalliklar va o‘limning ko‘payishi oqibatida zaiflashdi, Bekovich-Cherkasskiy ekspeditsiyasining halokati haqida xabar kelishi bilan suv orqali Astraxanga qaytib keta boshladilar. Polkovnik fon der Viden qo‘mondonligi ostidagi Krasnovodsk qal’asi turkmanlarning kuchli zarbasiga uchradi, suv tomonga chekingan rus qo‘shinlari to‘rt yuz kishidan ortiq talafot berdilar. Xiva ekspeditsiyasi shu tariqa yakun topdi, va xalq orasida keyinchalik “Bekovich kabi izsiz yo‘qoldi” degan iborani qoldirdi.

Hujjatlarda general-leytenant Shubert hamda polkovnik Folton-de-Verasonlarning ma’lumotnomasida Aleksandr-Bekovich Cherkasskiy ekspeditsiyasining muvaffaqiyatsizlikka uchrashi va halokatining sababi sifatida

quyidagilar ko‘rsatiladi: -“...birinchidan, ekspeditsiya 1350 verst masofada tayanch punktlarisiz suvsiz cho‘llar orqali amalga oshirilib ikki oyga cho‘zildi va qo‘shinlarni holdan toydirdi, ikkinchidan, Xivaliklar yigirma to‘rt ming kishilik otliq qo‘shin bilan holdan toygan rus qo‘shinlariga zarar yetkaza olmadi, uchinchidan, yurishning omadsizlikka uchrashi tasodif hamda Bekovichning ehtiyotsiziligi tufayli edi”. Biroq amalda aynan bunday bo‘lmaganligini yuqoridagi ma’lumotlardan ham ko‘rish mumkin, bu borada bir tarixchilar ham o‘z ishlarida to‘xtalib o‘tganlar.

Tarixchi V.Kosteskiyning yozishicha, -“...ekspeditsiyaning yo‘q qilinganligi haqida xabar asirlikdan qochgan bir necha kishilar tomonidan Rossiyaga yetkazildi. Petr I ekspeditsiyaning yo‘q qilinganligi va o‘zining O‘rta Osiyoga nisbatan barcha rejalari chippakka chiqqanligi haqida 1717 yilning sentyabrida xabar topdi. U To‘pqarag‘an va Qizilsuvdagi gornizonlarni kuchaytirish haqida buyruq bersada, uni bajarishning imkoni yo‘q edi. Chunki bu vaqtda har ikki qal’aning komendantlari turkmanlardan haddan tashqari xavfsirab va biron-bir buyruq ham olmasdan o‘z otryadlarini qutqarish maqsadida Astraxanga qaytib ketgan edilar.

1720 yilda Rossiyaga Xiva xoni nomidan Avaz Muhammad boshchiligida elchilar keldi. Elchilikning asosiy maqsadi Rossiya davlati bilan savdo-iqtisodiy munosabatlarini qaytadan tiklash edi. Shuningdek, elchi Avaz Muhammadning Aleksandr Bekovich-Cherkasskiy ekspeditsiyasining Xiva xonligida yo‘q qilinishiga podsho hukumatining munosabatini aniqlash maqsadi ham bo‘lgan ehtimol, biroq Petr I ning farmoni bilan u hibsga olindi va 1721 yilda qamoqda vafot etdi. Elchilik a’zolaridan faqatgina bir kishi Petr I maktubini Xiva xoniga yetkazish uchun ozod etildi. U bilan birga Rossiya imperiyasi kanslerining Xiva xonligi elchisi Avaz Muhammad vafot etganligi haqidagi maktubi ham yuborildi. Keyinchalik asirlikdan qaytgan rus harbiylari Xiva xoni Petr I ning maktubini oyoq osti qilib tepkilaganligi haqida aytgan edilar. A.Bekovich-Cherkasskiy ekspeditsiyasining Xiva xonligi tomonidan yo‘q qilinishi Rossiyaning O‘rta Osiyodagi harbiy harakatlarini yuz yilga to‘xtatib qo‘ydi”.

Xulosa

Petr I ning Sharq siyosatiga nisbatan bildirilgan munosabatlardan birida -“Petr o‘zining “buyuk maqsadi” – Rossiyani Boltiq dengiziga olib chiqishni amalga oshirishga intilishi bilan bir vaqtda Sharqdan ham ko‘z uzmadi. U Sharqning Rossiya uchun ahamiyatini, ya’ni, Rossiya Yevropa va Osiyo o‘rtasidagi iqtisodiy munosabatlarning markazida bo‘lgandagini uning iqtisodiy ahvoli yuksalishi juda yaxshi bilardi, shu sababli Xitoydan Turkiyagacha bo‘lgan sharq mamlakatlari Petrning asosiy diqqat e’tiborida edi”[40.345], - kabi jumlalarni uchratish mumkin.

Pyotr I ning 1714-1717 yillarda tashkil etgan Bekovich Cherkasskiy ekspeditsiyasi o‘sha vaqtdagi qudratli Rossiya davlatining Xorazmni o‘z ta’siriga bo’ysundirish uchun qilgan, lekin fojiali natija bilan tugagan birinchi urinishi bo‘ldi. Xivaning hukmron doiralari Bekovich Cherkasskiyning olti mingdan ko‘proq askarlaridan iborat butun qo’shinini qirib tashladilar. Dastlabki

urinishdagi omadsizlik Rossiya imperiyasini to‘xtatib qololmadi, keyingi harakatlar ikki tomonlama - g‘arbdan Yoyiq (Ural) daryosi orqali, sharqdan - G‘arbiy Sibir orqali olib borildi. Turli yo‘llar bilan qozoq yerlariga kirib kelgan imperiya qo‘shinlari birin-ketin zabt etilgan yerlarda harbiy qal’alar va istehkomlar qura boshladi. 1717 yilda qurilgan Omsk, 1718 yilda qurilgan Semipalatinsk, 1720 yilda qurilgan Ust-Kamenogorsk, 1735 yil qurilgan Orenburg qal’alari kabi mustahkam harbiy istehkomlar Rossiya imperiyasining bu yerdagi harbiy hukmronligi hali uzoq davom etishi va ular faqatgina qo‘lga kiritgan yerlar bilan qanoatlanib qolmasliklarni bildirardi.

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THE ROLE OF MODERN MANAGEMENT ACCOUNTING TOOLS IN ENHANCING SUSTAINABLE VALUE CHAIN MANAGEMENT

Abstract. *Modern industrial companies face increasing pressure to align their profitability with environmental sustainability and social responsibility. Management accounting — which used to be restricted to cost control and mandatory financial reporting — has also undergone significant evolution to accommodate the information needs created by sustainability-oriented value chain governance. Using the purposively selected Wasit Textile and Sewing Factory as a single qualitative case, this study seeks to investigate whether Activity-Based Costing (ABC) and the Balanced Scorecard (BSC) meaningfully contribute to Sustainable Value Chain Management (SVCM) within the context of the textile manufacturing sector in Iraq.*

A quantitative design was employed. We conducted a structured questionnaire among all 76 employees working in the managerial, accounting, and technical departments; 71 completed responses were retained for analysis, yielding a response rate of 93.42%. Data processing was performed using descriptive statistical analysis, Cronbach's alpha reliability test, one-sample t-test, Pearson correlation analysis, and multiple linear regression using IBM SPSS 26.

SVCM is positively affected by both ABC ($p < 0.001$) and BSC ($p < 0.001$), and their combined effect is statistically significant ($R^2 = 0.681$). Accordingly, ABC appears as the stronger predictor (standardized $\beta = 0.504$; reflecting variance explained in overhead structures), while BSC contributes through strategic alignment with sustainability ($\beta = 0.348$). Recently published in the journal Business Strategy and the Environment, the research highlights the importance of translating sustainability into financial terms, indicating the need for systematic investment by industrial firms to expand sustainability measurement into cost accounting systems and to develop internal capabilities for sustainability-based performance assessment. This framework requires replication across manufacturing industries and organizational types in developing economy contexts as a direction for future research.

Keywords: *Management Accounting Tools; Activity-Based Costing; Balanced Scorecard; Sustainable Value Chain Management; Textile Manufacturing; Iraq.*

Introduction

The global sustainability imperative — which has accelerated in recent decades — is among the few developments that have redefined industrial strategy.

Global frameworks — such as the UN Sustainable Development Goals (SDGs), the Paris Climate Agreement, and ISO 14001 — have elevated environmental and social performance from a liability and low-level corporate responsibility to a strategic asset that drives market access, influences investor confidence, and determines regulatory outcomes. In this context, management accounting has been challenged to extend far beyond its traditional limits. While traditional accounting systems focused mainly on external financial reporting and internal cost management, they are not well suited to multivalue ecosystems or to representing the multidimensional nature of sustainability performance across long-term value chains [25,17].

Since its inception, the value chain concept — encompassing the entire series of activities that an organization performs to add economic value to its products — has remained central to strategic management. However, it cannot be managed sustainably solely through operational efficiency; it must also account for environmental impacts, socio-economic outcomes, and the long-term use of natural resources at every stage of production and distribution. To meet the information requirements of sustainable value chain governance, two contemporary management accounting tools have received significant attention as potentially effective instruments for bridging the gap between traditional financial management and its sustainability-oriented counterpart: Activity-Based Costing (ABC) and the Balanced Scorecard (BSC) [12,34,35]. These instruments help organizations reveal hidden environmental costs, track resource use at the activity level, align departmental objectives with overall corporate sustainability strategy, and report non-financial performance credibly to various stakeholders [16], [19], [20].

Activity-Based Costing (ABC) is a technique that identifies indirect and overhead costs and assigns them to products, services, or processes based on the actual consumption of organizational activities, thereby producing more accurate cost information than volume-based allocation systems. When applied to environmental cost drivers — such as energy use, chemical consumption, water usage, and waste disposal — ABC becomes a powerful tool for revealing embedded environmental costs in industrial operations and supports decision-making aimed at shifting away from unsustainable production practices [22]. The Balanced Scorecard (BSC) [12] operates at a strategic level by translating organizational strategy into a balanced set of financial and non-financial performance measures across four perspectives: financial, customer, internal processes, and learning and growth. Its flexibility enables organizations to explicitly integrate sustainability goals into their strategic architecture — an evolution formalized through the Sustainability Balanced Scorecard (SBSC), which connects environmental and social performance measures with traditional financial perspectives [7], [16], [4], [5].

Sustainable Value Chain Management (SVCM), in turn, refers to the deliberate integration of environmental, social, and economic considerations into each primary and support activity, from raw material extraction through inbound

logistics, production, outbound distribution, and end-of-life processes [23]. A robust informational infrastructure is a prerequisite for effective SVCM: without systems to track sustainability impacts and associated costs, organizations cannot manage what they cannot measure [3], [6], [26]. This information gap represents precisely the challenge that modern management accounting tools are designed to address.

At the same time, this research area is particularly important in developing economy industrial contexts, where empirical evidence linking the sophistication of accounting systems to sustainability performance remains limited. Iraq's manufacturing sector faces a dual challenge: it must modernize production processes to remain competitive globally while also addressing environmental degradation resulting from resource-intensive legacy practices. The textile industry is especially significant in this regard, as it is one of the most resource-intensive manufacturing sectors, characterized by high water consumption, chemical waste, and energy use throughout the production cycle [11], [10]. Despite its environmental relevance, empirical studies on management accounting in Iraqi industrial firms are largely absent from the international sustainability accounting literature [13], which this research seeks to address directly.

In this context, the present study aims to investigate the role of ABC and BSC in improving sustainable value chain management at the Wasit Textile and Sewing Factory. Using purposive sampling, the factory was selected as a relevant and accessible case representing typical sustainability challenges in developing economy textile production. Accordingly, the main research question is: to what extent does the implementation of modern management accounting tools act as an enabler for improving SVCM in this industrial environment? The study is guided by four specific objectives: to measure the level of ABC application and its statistical relationship with SVCM; to assess the role of BSC in facilitating sustainability-oriented strategic management along the factory's value chain; to test the joint significance of ABC and BSC as predictors of SVCM; and to derive practical implications for integrating sustainability into management accounting practices in the Iraqi industrial sector.

This research contributes in three ways. Academically, it extends sustainability accounting research into the underexplored Iraqi industrial context and provides empirical evidence to a literature largely dominated by Western and East Asian studies. Theoretically, it integrates ABC, BSC, and SVCM into a unified framework, offering a foundation for future research examining both conceptual relationships and methodological validity (emphasizing statistical rigor over purely qualitative approaches in this field). Practically, it provides insights for factory managers, policymakers, and accounting standard-setters interested in promoting sustainable manufacturing in Iraq and similar developing economy contexts [24], [18], [8].

3. Research Methodology

3.1 Research Design

The research follows a quantitative design grounded in the positivist epistemological tradition. The quantitative approach is appropriate for the central purpose of the study: to empirically test hypothesized relationships between specified variables using numerical data presented in a clearly structured manner. This study adopts a case study strategy, whereby the relevant unit of analysis is the Wasit Textile and Sewing Factory. However, while case studies are more traditionally associated with qualitative inquiry, quantitative case studies — particularly those employing a survey instrument within a single organization — are well established in the management accounting and broader organizational research literature. Such an approach allows for contextual depth while maintaining statistical rigor.

3.2 Sample and Data Collection

3.2.1 Population and Sampling Strategy

The study population included all managerial, accounting, financial, technical, and supervisory personnel working at the Wasit Textile and Sewing Factory in Wasit Governorate, Iraq. Purposive sampling, a non-probability sampling method that involves the deliberate selection of participants based on their knowledge and/or experience with the phenomena under investigation, was used to select the factory. This case is justified for three reasons: (1) it represents a real industrial setting directly relevant to the core focus of this study — environmental manufacturing strategy and SVCM; (2) it is situated within the Iraqi industrial sector, where substantial underinvestment in management accounting systems has occurred over the past four decades, making this context particularly significant; and (3) the research team obtained full cooperative access from both administrative and technical staff at the site, ensuring the accuracy and reliability of data collection [33].

3.2.2 Administration and Characteristics of the Questionnaire Response

A structured questionnaire was designed and distributed to 76 employees of the factory, including staff from managerial, accounting, and technical departments. Of these, 71 questionnaires were returned complete and usable; five were excluded due to incomplete responses or evidence of systematic answering patterns indicating lack of attention. The achieved response rate of 93.42% is considered excellent according to established standards in survey research.

Table 1.
Questionnaire Distribution and Return Summary

Description	Count
Distributed	76
Returned	71
Excluded (Incomplete)	5
Valid for Analysis	71
Response Rate (%)	93.42%

3.3 Measurement Instruments

3.3.1 Independent Variable 1: Activity-Based Costing (ABC)

Activity-Based Costing (ABC) is defined as a structured approach to managing indirect and overhead costs by assigning such costs to appropriate products, services, and processes based on the activities that drive actual resource consumption. ABC measures the extent to which activity-level environmental and operational costs are identified, traced, and reported within the factory's accounting system to support decision-making regarding resource allocation, process efficiency, and environmental resource expenditure. This construct is measured using a 10-item, five-point Likert scale (1 = Strongly Disagree; 5 = Strongly Agree).

Table 2a.
ABC Measurement Items

Item	Description
ABC1	The factory uses ABC to accurately allocate overhead costs to production activities
ABC2	ABC enables identification of environmental cost drivers within production processes
ABC3	The accounting system traces resource consumption at the activity level
ABC4	ABC information supports decisions about environmental waste reduction
ABC5	Activity cost pools are clearly defined and regularly reviewed
ABC6	ABC provides more accurate product costing than traditional volume-based methods
ABC7	Environmental costs are explicitly included within the ABC model
ABC8	ABC outputs are integrated into sustainability performance reports
ABC9	Management uses ABC information for strategic sustainability decisions
ABC10	The ABC system is regularly updated to reflect changes in production activities

3.3.2 Independent Variable 2: Balanced Scorecard (BSC)

The Balanced Scorecard (BSC) is operationalised as a strategic performance management framework that translates organizational strategy into a balanced set

of financial and non-financial measures across multiple perspectives. In this study, the BSC is used to assess the extent to which sustainable development goals are integrated into the factory's strategic performance measurement system by linking environmental and social objectives with the operational objectives of departmental functions. This construct is measured using a 10-item, five-point Likert scale (1 = Strongly Disagree; 5 = Strongly Agree).

Table 2b
BSC Measurement Items

Item	Description
BSC1	The factory uses a BSC to link sustainability goals to financial performance
BSC2	Environmental performance indicators are included in the factory's BSC framework
BSC3	The BSC communicates sustainability targets clearly to operational staff
BSC4	Customer satisfaction related to sustainable products is tracked within the BSC
BSC5	Internal process metrics within the BSC include environmental efficiency indicators
BSC6	The BSC includes learning and growth objectives related to sustainability capability
BSC7	Sustainability performance is regularly reviewed through the BSC framework
BSC8	The BSC aligns departmental objectives with the factory's sustainability strategy
BSC9	Management uses BSC feedback to adjust sustainability-related operational decisions
BSC10	The BSC framework has contributed to improvements in sustainable value chain practices

3.3.3 Dependent Variable: Sustainable Value Chain Management (SVCM)

Sustainable Value Chain Management (SVCM) is defined as the degree to which the factory systematically integrates environmental, social, and economic sustainability factors into all primary and support activities of its value chain — from the procurement of raw materials and inbound logistics to production, outbound distribution, and end-of-life management — with the objectives of minimizing environmental impact, maximizing social performance, and preserving long-term economic viability. This construct is measured using a 10-item, five-point Likert scale (1 = Strongly Disagree; 5 = Strongly Agree).

Table 2c.
SVCM Measurement Items

Item	Description
SVCM1	The factory prioritises environmental criteria in procurement decisions
SVCM2	Production processes are managed to minimise environmental waste and emissions
SVCM3	The factory implements systematic programmes for waste reduction and recycling
SVCM4	Energy efficiency objectives are integrated into production planning
SVCM5	Social responsibility standards govern workforce management across the value chain
SVCM6	Sustainability requirements are communicated to suppliers and logistics partners
SVCM7	Environmental performance data is regularly collected and reported
SVCM8	Stakeholders are actively engaged in sustainability planning and reporting
SVCM9	The factory complies with all applicable environmental regulatory requirements
SVCM10	Long-term sustainability planning is integrated into the factory's strategic management

3.4 Analytical Procedures

IBM SPSS Statistics Version 26 was used to analyze all data. The analytical sequence was as follows. First, means, standard deviations, and standard errors were calculated for all items and composite dimensions in the study. Second, internal consistency reliability was assessed using Cronbach's alpha (α), with a minimum threshold of $\alpha \geq 0.70$ and $\alpha \geq 0.80$ considered indicative of high reliability. Third, corrected item-total correlations were examined, following the recommendations of Anderson and Gerbing (1988), with items showing values below 0.30 flagged for review as potential concerns for convergent validity. Fourth, one-sample t-tests were conducted for each variable using a test value of 3.0 — the midpoint of the Likert scale — to determine whether mean responses significantly deviated from neutrality. Fifth, Pearson product-moment correlation analysis was employed to examine the bivariate relationships among ABC, BSC, and SVCM. Sixth, and most importantly, multiple linear regression analysis was conducted to estimate the individual and combined effects of ABC and BSC on SVCM, using the model: $SVCM = \beta_0 + \beta_1(ABC) + \beta_2(BSC) + \varepsilon$. Standardized beta coefficients and R^2 were reported to assess the relative strength of predictors and overall model fit, respectively.

4. Results and Discussion

4.1 Descriptive Statistics

Table 3.
Descriptive Statistics for Study Variables

Item	Mean	Std. Dev.	Std. Error
ABC1	3.94	0.712	0.085
ABC2	4.03	0.698	0.083
ABC3	3.87	0.741	0.088
ABC4	4.11	0.663	0.079
ABC5	3.76	0.805	0.096
ABC6	4.07	0.677	0.080
ABC7	3.89	0.734	0.087
ABC8	3.72	0.819	0.097
ABC9	4.01	0.688	0.082
ABC10	3.83	0.762	0.090
ABC Total	3.92	0.530	0.063
BSC1	3.85	0.744	0.088
BSC2	3.97	0.701	0.083
BSC3	3.79	0.771	0.092
BSC4	3.68	0.832	0.099
BSC5	3.91	0.722	0.086
BSC6	3.74	0.789	0.094
BSC7	4.02	0.681	0.081
BSC8	3.88	0.733	0.087
BSC9	3.81	0.758	0.090
BSC10	3.95	0.710	0.084
BSC Total	3.86	0.512	0.061
SVCM1	3.99	0.694	0.082
SVCM2	4.08	0.672	0.080
SVCM3	3.93	0.718	0.085
SVCM4	3.86	0.741	0.088
SVCM5	3.77	0.793	0.094
SVCM6	3.71	0.822	0.098
SVCM7	4.05	0.665	0.079
SVCM8	3.82	0.755	0.090
SVCM9	4.12	0.648	0.077

Item	Mean	Std. Dev.	Std. Error
SVCM10	3.89	0.728	0.086
SVCM Total	3.92	0.508	0.060

Perceptions are highly positive across all three constructs among respondents. Item means range from 3.68 (good) to 4.12 (excellent), with all values exceeding the neutral midpoint of 3.0 by a substantial margin (corrected for potential bias). The standard deviations, ranging from 0.648 to 0.832, are relatively moderate, indicating a considerable degree of homogeneity in respondents' views and suggesting that the results are not driven by a small number of extreme outliers. The aggregate mean scores of 3.92 for ABC, 3.86 for BSC, and 3.92 for SVCM indicate a high perceived level of adoption of management accounting tools and a strong level of SVCM effectiveness within the factory.

4.2 Reliability and Validity Analysis

Table 4.
Internal Consistency — ABC Scale

Item	Scale Mean if Deleted	Scale Var. if Deleted	Item-Total r	α if Deleted
ABC1	35.28	21.43	0.612	0.891
ABC2	35.19	21.78	0.638	0.889
ABC3	35.35	21.02	0.594	0.893
ABC4	35.11	22.04	0.659	0.888
ABC5	35.46	20.67	0.573	0.895
ABC6	35.15	21.92	0.643	0.889
ABC7	35.33	21.18	0.606	0.892
ABC8	35.50	20.44	0.561	0.896
ABC9	35.21	21.63	0.627	0.890
ABC10	35.39	20.89	0.584	0.894

Table 5.
Internal Consistency — BSC Scale

Item	Scale Mean if Deleted	Scale Var. if Deleted	Item-Total r	α if Deleted
BSC1	34.76	21.15	0.598	0.889
BSC2	34.64	21.52	0.621	0.887
BSC3	34.82	20.88	0.581	0.891
BSC4	34.93	20.44	0.558	0.893
BSC5	34.70	21.29	0.607	0.888
BSC6	34.87	20.71	0.572	0.892
BSC7	34.59	21.67	0.634	0.886
BSC8	34.73	21.08	0.596	0.889
BSC9	34.80	20.95	0.584	0.891
BSC10	34.66	21.39	0.614	0.887

Table 6.
Cronbach's Alpha Reliability Summary

Variable	Items	Cronbach's α	Reliability Assessment
ABC	10	0.897	Excellent
BSC	10	0.893	Excellent
SVCM	10	0.901	Excellent

All three scales demonstrate high internal consistency, with Cronbach's alpha coefficients exceeding 0.89 — well above both the minimum acceptable threshold of 0.70 and the high-reliability benchmark of 0.80. Individual items also show strong convergence with their respective constructs, as all corrected item-total correlations are greater than 0.55. Furthermore, the overall alpha values could not be substantially improved by deleting any items, indicating strong dimensional integrity and structural stability of each scale.

4.3 Hypothesis Testing: One-Sample t-Tests

Table 6.
One-Sample t-Test Results — ABC Dimension (Test Value = 3)

Item	Mean	t-value	df	p-value	Decision
ABC1	3.94	11.06	70	< 0.001	Accept H1
ABC2	4.03	12.41	70	< 0.001	Accept H1
ABC3	3.87	9.89	70	< 0.001	Accept H1
ABC4	4.11	13.97	70	< 0.001	Accept H1
ABC5	3.76	7.92	70	< 0.001	Accept H1
ABC6	4.07	13.38	70	< 0.001	Accept H1
ABC7	3.89	10.23	70	< 0.001	Accept H1
ABC8	3.72	7.41	70	< 0.001	Accept H1
ABC9	4.01	12.32	70	< 0.001	Accept H1
ABC10	3.83	9.21	70	< 0.001	Accept H1
ABC Overall	3.92	14.60	70	< 0.001	Accept H1

Table 7.
One-Sample t-Test Results — BSC Dimension (Test Value = 3)

Item	Mean	t-value	df	p-value	Decision
BSC1	3.85	9.66	70	< 0.001	Accept H2
BSC2	3.97	11.69	70	< 0.001	Accept H2
BSC3	3.79	8.59	70	< 0.001	Accept H2
BSC4	3.68	6.87	70	< 0.001	Accept H2
BSC5	3.91	10.58	70	< 0.001	Accept H2
BSC6	3.74	7.87	70	< 0.001	Accept H2
BSC7	4.02	12.59	70	< 0.001	Accept H2
BSC8	3.88	10.11	70	< 0.001	Accept H2
BSC9	3.81	9.01	70	< 0.001	Accept H2
BSC10	3.95	11.31	70	< 0.001	Accept H2
BSC Overall	3.86	14.16	70	< 0.001	Accept H2

Mean scores for both ABC and BSC significantly exceed their neutral midpoints (all $p < 0.001$ based on one-sample t-tests for each item and aggregate measure). For ABC, the mean value of 3.92 yields $t(70) = 14.60$, $p < 0.001$, providing strong support for H1. Similarly, the overall mean of 3.86 for BSC produces $t(70) = 14.16$, $p < 0.001$, supporting H2. These results confirm that employees perceive clearly above-neutral levels of both ABC implementation and BSC-based sustainability performance management within the factory, rather than marginal deviations from neutrality.

4.4 Pearson Correlation Analysis

Table 8.
Pearson Correlation Matrix (p < 0.01, two-tailed)**

Variable	ABC	BSC	SVCM
ABC	1.000		
BSC	0.714**	1.000	
SVCM	0.783**	0.741**	1.000

Correlation analysis reveals strong, statistically significant, positive relationships among all three constructs. The correlation between ABC and SVCM (r = 0.783) is slightly higher than that between BSC and SVCM (r = 0.741), offering preliminary support for H4, suggesting that ABC's operational cost transparency may be more directly associated with SVCM outcomes than BSC's strategic alignment function. Additionally, the correlation between ABC and BSC (r = 0.714) indicates that the two tools are complementary rather than redundant. Importantly, none of the correlation coefficients exceed 0.85, indicating that multicollinearity is unlikely to bias regression estimates.

4.5 Multiple Regression Analysis

Table 9.
Multiple Regression Results — Dependent Variable: SVCM

Predictor	Unstd. β	Std. Error	Std. β	t-value	p-value
Constant	0.487	0.241	—	2.021	0.047
ABC	0.512	0.074	0.504	6.919	< 0.001
BSC	0.389	0.081	0.348	4.802	< 0.001
R^2	0.681				
Adj. R^2	0.671				
F-statistic	73.44			p < 0.001	

The regression model is highly statistically significant ($F(2,68) = 73.44$, $p < 0.001$) and explains 68.1% of the variance in SVCM ($R^2 = 0.681$, Adjusted $R^2 = 0.671$). Confirming H1 and H4, ABC emerges as the strongest predictor (standardized $\beta = 0.504$, $t = 6.919$, $p < 0.001$). BSC also contributes independently and significantly ($\beta = 0.348$, $t = 4.802$, $p < 0.001$), supporting H2. These findings provide additional support for H3 and H5, as both predictors are simultaneously significant within the model. Variance Inflation Factors for both variables are 2.04 — well below the conventional threshold of 10 — indicating no multicollinearity concerns. The Kolmogorov–Smirnov test ($D = 0.071$, $p = 0.200$) confirms the normality of residuals, while visual inspection of residual-versus-fitted plots shows no evidence of heteroscedasticity.

4.6 Discussion in Relation to Previous Research

The finding that ABC exerts a stronger predictive effect on SVCM (H1 supported, $\beta = 0.504$) is both theoretically consistent and practically insightful. ABC's activity-level approach to cost attribution is particularly suited to

identifying environmental cost drivers embedded within complex manufacturing overhead structures — including chemical inputs, water consumption, energy use in dyeing processes, and waste disposal — which are often obscured in traditional costing systems. By making these costs visible and linking them to specific processes and outputs, ABC provides critical information that supports managerial decisions aimed at reducing environmental impact, improving process efficiency, and enhancing resource utilization. This result aligns with contingency theory, which suggests that the effectiveness of management accounting tools depends on their fit with the operational context. In production environments where environmental costs are deeply embedded in activities, ABC offers a more direct pathway to improving SVCM outcomes than tools primarily focused on strategic communication.

The significant positive impact of BSC on SVCM (H2 supported, $\beta = 0.348$) highlights its role in translating sustainability objectives into measurable operational targets. By incorporating sustainability indicators across its financial, customer, internal process, and learning perspectives, the BSC creates an integrated system of performance management that embeds sustainability throughout the organizational structure. The comparatively lower beta coefficient for BSC supports H4, indicating that strategic alignment functions as a more indirect driver of SVCM compared to the immediate operational insights provided by ABC. This does not indicate a limitation of the BSC, but rather reflects its position within the broader causal chain linking strategy to operational outcomes.

The model's explanatory power ($R^2 = 0.681$; H3 supported) is substantial, indicating that the combined implementation of ABC and BSC accounts for a significant proportion of variation in SVCM performance. The remaining unexplained variance (31.9%) suggests the influence of additional factors not included in the model, such as organizational culture, leadership commitment, availability of environmental technologies, and regulatory enforcement. These factors represent important avenues for future research.

4.7 Robustness Diagnostics

Variance Inflation Factors indicate no multicollinearity between ABC (VIF = 2.04) and BSC (VIF = 2.04), as both values are well below the critical threshold of 10, confirming that coefficient estimates are not biased. The Kolmogorov–Smirnov test ($D = 0.071$, $p = 0.200$) supports the assumption of residual normality. Furthermore, visual inspection of residual-versus-fitted-value plots reveals no systematic patterns, indicating the absence of heteroscedasticity. Collectively, these diagnostics provide strong support for the validity of the regression model and the reliability of the substantive conclusions drawn from it.

5. Conclusions, Recommendations, and Future Directions

5.1 Summary of Principal Findings

This study examined the role of Activity-Based Costing and the Balanced Scorecard in enhancing Sustainable Value Chain Management at the Wasit Textile and Sewing Factory, a private-sector manufacturing enterprise in Iraq. All five hypotheses received strong empirical support. Both tools positively and

significantly influence SVCM and together explain 68.1% of its variance. ABC emerges as the stronger predictor (β = 0.504), reflecting its effectiveness in improving operational efficiency through cost traceability and in identifying and mitigating environmental costs embedded in complex production processes. The BSC also contributes significantly (β = 0.348) through its role in aligning sustainability strategy and enhancing performance measurement. Collectively, these findings provide novel quantitative evidence from an underrepresented developing economy context on the effectiveness of integrated sustainability-oriented management accounting systems.

5.2 Practical Recommendations

Factory managers should prioritize expanding ABC systems to incorporate environmental cost drivers such as chemical usage, water consumption, and energy utilization, supported by targeted staff training in sustainability-oriented cost accounting. Additionally, the factory should implement a Sustainability Balanced Scorecard framework, integrating environmental and social key performance indicators across all perspectives. At the policy level, Iraqi industrial authorities should develop accounting modernization programs targeting manufacturing firms, particularly state-owned enterprises, providing technical support and capacity-building initiatives to facilitate the adoption of sustainability-oriented accounting systems. Given the institutional barriers identified in prior research [13], such programs should address both technical and organizational challenges.

5.3 Limitations

This study has four primary limitations. First, the single-case design limits the generalizability of the findings. Second, the use of self-reported questionnaire data introduces the potential for social desirability bias. Third, the cross-sectional nature of the study restricts causal inference, allowing only for correlational interpretation. Fourth, the focus on ABC and BSC excludes other relevant accounting tools, such as Life Cycle Costing and Material Flow Cost Accounting, potentially limiting the comprehensiveness of the accounting–SVCM relationship examined.

5.4 Directions for Future Research

Future research should extend this framework to multi-firm and cross-sector studies to assess the generalizability of the ABC–BSC–SVCM relationship across different industrial and institutional contexts. Longitudinal designs would be particularly valuable in establishing causal relationships and tracking changes in sustainability performance over time. Additionally, integrating objective sustainability performance data — such as energy consumption, waste generation, and emissions — with perceptual survey data would strengthen empirical validity. Qualitative and mixed-method approaches could further explore the organizational processes through which ABC and BSC implementation translates into sustainability outcomes. Finally, replication studies in other Iraqi regions and developing economy contexts would help address the limitations inherent in single-case research designs.

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ODAM ORGANIZMIDA UCHRAYDIGAN ICHAK PARAZITLARI VA ULARNING AHAMIYATI

Annotatsiya: *Ushbu akademik maqola odam organizmida uchraydigan ichak parazitlari, ularning xilma-xilligi, hayot sikllari, yuqish yo'llari, patogen ta'sirlari hamda klinik ko'rinishlarini chuqur tahlil qiladi. Global sog'liqni saqlash muammosi sifatida ichak parazitozlari millionlab odamlarning salomatligiga salbiy ta'sir ko'rsatib, ayniqsa rivojlanayotgan mamlakatlarda jiddiy ijtimoiy-iqtisodiy yukni keltirib chiqaradi. Maqolada parazitlarning diagnostika usullari, davolash printsiplari va jamoat salomatligini himoya qilishdagi profilaktika tadbirlarining ahamiyati atroflicha yoritiladi.*

Kalit so‘zlar: *Ichak parazitlari, Gelmintozlar, Protozoozlar, Diagnostika, Profilaktika, Jamoat salomatligi, Patogenez*

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INTESTINAL PARASITES IN THE HUMAN BODY AND THEIR SIGNIFICANCE

Abstract: *This academic article provides a comprehensive analysis of intestinal parasites in the human body, including their diversity, life cycles, transmission routes, pathogenic effects, and clinical manifestations. As a global health concern, intestinal parasitoses negatively impact the health of millions worldwide, imposing a significant socio-economic burden, particularly in developing countries. The article thoroughly examines diagnostic methods, treatment principles, and the importance of preventive measures in public health protection.*

Keywords: *Intestinal parasites, Helminthiasis, Protozoosis, Diagnosis, Prevention, Public health, Pathogenesis*

Kirish

Ichak parazitlari insoniyat tarixida doimiy sog'liqni saqlash muammosi bo'lib kelgan. Bu mikroskopik va makroskopik organizmlar odam organizmining ichaklarida parazitlik qilib, turli xil kasalliklarni, ya'ni parazitozlarni keltirib chiqaradi. Butun dunyo bo'ylab, ayniqsa tropik va subtropik mintaqalarda, shuningdek sanitariya-gigiyena sharoitlari yomon bo'lgan hududlarda ichak parazitozlari keng tarqalgan. Jahon sog'liqni saqlash tashkiloti ma'lumotlariga ko'ra, milliardlab odamlar bir yoki bir nechta ichak paraziti bilan infeksiyalangan bo'lib, bu ularning jismoniy va aqliy rivojlanishiga, o'qish qobiliyatiga, mehnat unumdorligiga hamda umumiy hayot sifatiga salbiy ta'sir ko'rsatadi. Ushbu muammo bolalar salomatligi uchun alohida ahamiyatga ega, chunki ular ko'pincha eng zaif guruhni tashkil etadi. Ichak parazitlari ozuqa moddalarining so'rilishini buzadi, immunitet tizimini zaiflashtiradi va jiddiy asoratlarga, ba'zan esa o'limga olib kelishi mumkin. Shu sababli, ichak parazitlarini chuqur o'rganish, ularning oldini olish va davolash usullarini takomillashtirish global sog'liqni saqlash strategiyalarining muhim qismidir. Ushbu maqola odam organizmida uchraydigan asosiy ichak parazitlari turlarini, ularning biologiyasini, keltirib chiqaradigan kasalliklarining patogenezi va klinik ko'rinishlarini, shuningdek diagnostika va profilaktika choralarini kompleks tahlil qilishga qaratilgan.

Mavzuga oid adabiyotlar tahlili

Odam organizmidagi ichak parazitlari biologik xususiyatlari, hayot sikllari va keltirib chiqaradigan kasalliklariga ko'ra keng doiradagi organizmlarni o'z ichiga oladi. Ular asosan ikki katta guruhga: bir hujayrali organizmlar bo'lgan protozoalar va ko'p hujayrali chuvalchanglar bo'lgan gelmintlarga bo'linadi.

Protozoalar 15000 dan ortiq mikroskopik parazit turlarini o'z ichiga olgan xilma-xil guruh bo'lib, odamlarda turli og'irlikdagi kasalliklarni keltirib chiqaradi. Yadro va sitoplazmadan tashkil topgan protozoalar noqulay sharoitlarda himoya kistalarini hosil qilib, uzoq muddatli yashashni va yuqishni ta'minlaydi. Odam organizmida uchraydigan ichak protozoalaridan Balantidium coli yo'g'on ichakda parazitlik qilib, og'ir diareya va ba'zan o'limga olib keladi. Entamoeba histolytica

(dizenterik amyoba) ichaklardan jigar, o'pka yoki miya kabi hayotiy organlarga metastaz berishi mumkin, bu jiddiy asoratlar va ko'pincha o'lim bilan yakunlanadi. Giardia intestinalis (lyambliya) o'n ikki barmoqli ichak va o't yo'llarini zararlab, ozuqa moddalarining so'rilishini buzadi, doimiy diareya va sariqlikka sabab bo'ladi.

Natija va Muhokama

Gelmintozlar inson, hayvonlar va o'simliklarni zararlaydigan parazit chuvalchanglar keltirib chiqaradigan kasalliklardir. Odam organizmida 150 dan ortiq turdagi gelmintlar parazitlik qilishi mumkin, ularning tarqalishi iqlim, tuproq, qishloq xo'jaligi va gigiyena sharoitlariga bog'liq holda geografik jihatdan o'zgarib turadi. Gelmintlar asosan uchta guruhga bo'linadi: nematodalar (yumaloq chuvalchanglar), sestodalar (tasmasimon chuvalchanglar) va trematodalar (so'rg'ichli chuvalchanglar). Har bir guruhga oid turli kasalliklar mavjud. Nematodalardan Ascaris lumbricoides (askarida) odamning ingichka ichagida yashaydigan yirik yumaloq chuvalchang bo'lib, asosan bolalarda uchraydigan askaridozni keltirib chiqaradi. Enterobius vermicularis (ostrisa) enterobiozga, Trichuris trichiura (vlasoglav) trixotsefalyozga sabab bo'ladi. Sestodalardan Hymenolepis nana (mitti zanjir) bolalar orasida eng keng tarqalgan ichak parazitlaridan biri bo'lib, gimenolepiozni keltirib chiqaradi. Taenia saginata (mol zanjiri) taeniozga va Taenia solium (cho'chqa zanjiri) teniozga sabab bo'ladi. Diphyllobothrium latum (keng tasmasimon) difillobotriozni keltirib chiqaradi. Trematodalardan Opisthorchis felineus (mushuk so'rg'ichi) opistorxozga sabab bo'ladi. Shuningdek, Echinococcus granulosus (exinokokk) va Alveococcus multilocularis (alveokokk) kabi gelmintlar ko'proq organlarni (jigar, o'pka) zararlaydi, lekin ularning tuxumlari ichak orqali tarqaladi va odam ularni asosan itlar orqali yuqtiradi.

Ichak parazitlarining hayot sikllari murakkab bo'lib, ularning yuqish yo'llari turlicha. Ko'pgina ichak parazitlari najas-og'iz yo'li orqali tarqaladi. Ascaris va Trichuris tuxumlari ifloslangan tuproq orqali, ya'ni bunday tuproqda o'stirilgan xom sabzavotlar, qaynatilmagan suv yoki iflos qo'llar orqali yuqadi. Askaridoz bilan kasallangan shaxslar infeksiya manbai bo'lib xizmat qiladi. Enterobioz va gimenolepioz esa faqat odamdan odamga yuqadi, ya'ni kasallangan shaxslar yagona manba hisoblanadi. Ko'rinmas tuxumlar uy-ro'zg'or buyumlari orqali va yomon gigiyena sababli, ayniqsa 2-10 yoshli bolalar orasida tarqaladi.

Taenioz va tenioz kasalliklari chala pishirilgan mol go'shti va cho'chqa go'shti iste'mol qilinganda yuqadi. Opistorxoz va difillobotrioz esa baliq mahsulotlari bilan bog'liq. Protozoalar, masalan, amyoba va lyambliya kistalari ifloslangan suv va oziq-ovqat orqali yuqadi. Exinokokk va alveokokk asosan itlardan odamga yuqadi. Epidemiologik omillar parazitlar tarqalishida muhim rol o'ynaydi. Iqlim sharoitlari, tuproq turlari, qishloq xo'jaligi amaliyotlari (masalan, axlatni o'g'it sifatida ishlatish), sanitariya-gigiyena holati, toza ichimlik suvining yetishmasligi va qashshoqlik kabi ijtimoiy-iqtisodiy omillar parazitar kasalliklarning keng tarqalishiga xizmat qiladi.

Ichak parazitozlari turli patogen mexanizmlar orqali odam salomatligiga zarar yetkazadi. Bu mexanizmlarga ozuqa moddalarining so'rilishini buzilishi, ichak shilliq qavatining mexanik shikastlanishi, yallig'lanish reaksiyalari, toksik va allergik ta'sirlar, shuningdek asab tizimiga ta'sir kiradi.

Protozoalar keltirib chiqaradigan kasalliklar: Balantidium coli tomonidan chaqirilgan balantidiozda og'ir, qonli diareya kuzatiladi, bu suvsizlanish va anemiyaga olib kelishi mumkin. Entamoeba histolytica amyobiazni keltirib chiqarib, ichak devorida yaralar va nekrozga sabab bo'ladi, bu ichakdan tashqariga tarqalib jigar, o'pka va miya abssesslarini hosil qilishi mumkin, ko'pincha o'limga olib keladi. Giardia intestinalis tomonidan chaqirilgan lyambliozda esa o'n ikki barmoqli ichak va o't yo'llarining yallig'lanishi tufayli yog'lar va yog'da eruvchi vitaminlarning so'rilishi buziladi, bu doimiy diareya, qorin og'rig'i, vazn yo'qotish va sariqlikka sabab bo'ladi.

Gelmintozlar keltirib chiqaradigan kasalliklar: Askaridozning dastlabki bosqichlarida (lichinkalar migratsiyasi paytida) umumiy holsizlik, yo'tal, isitma va toshma kabi alomatlar paydo bo'ladi. Kasallik rivojlanishi bilan bosh aylanishi, bosh og'rig'i, ko'ngil aynishi, qusish, ortiqcha so'lak ajralishi, charchoq va tungi qo'rquvlar kuzatilishi mumkin. Bolalarda uyquda tish g'ichirlatish, kamqonlik va asabiylashish tez-tez uchraydi. Ascaris o't yo'llariga yoki ichak traktiga kirsa, yiringli xolesistit, jigar abssesslari, peritonit, sepsis, o'tkir pankreatit, appenditsit yoki ichak tutilishi kabi og'ir asoratlar kelib chiqishi mumkin. Enterobius vermicularis (ostrisa) chaqiradigan enterobiozning asosiy belgisi anal sohasida kuchli qichishish bo'lib, u ko'pincha tunda kuchayadi. Bu uyqusizlik, asabiylashish, vaqti-vaqti bilan qorin og'rig'i, tish g'ichirlatish, so'lak oqishi, teri dog'lari, bosh og'rig'i, enurez, vazn yo'qotish va ishtahaning o'zgarishiga olib kelishi mumkin. U bolalarda nevrologik buzilishlar, rivojlanishdagi kechikishlar va immunitetning pasayishiga olib kelishi mumkin. Hymenolepis nana (mitti zanjir) infeksiyasi ozuqa moddalarining so'rilishini buzib, gipovitaminoz, temir tanqisligi, vazn yo'qotish va anemiyaga olib keladi. Parazit ichak shilliq qavatiga mexanik zarar yetkazib, yallig'lanish, og'riq va ichak harakatining o'zgarishiga olib keladi, uning metabolik mahsulotlari esa allergik reaksiyalarni keltirib chiqarishi mumkin. Bundan tashqari, u asab tizimiga ta'sir qilib, asabiylashish, uyqusizlik va bosh og'rig'iga sabab bo'ladi, bolalarda jismoniy va aqliy rivojlanishni kechiktirishi mumkin. Umumiy gelmintozlar vazn yo'qotish, charchoq, bosh aylanishi va ovqat hazm qilish muammolariga olib keladi, bu bolalarda rivojlanish va xotira qobiliyatini zaiflashtirishi mumkin.

Ichak parazitozlarini aniq diagnostikasi samarali davolash va nazorat qilish uchun juda muhimdir. Diagnostika odatda najas namunalarini mikroskopik tekshirish orqali tuxum, lichinka yoki kistalarni aniqlashga asoslanadi. Enterobiozni aniqlash uchun ertalabki perianal surtma yoki najas namunasi mikroskopik tekshiruvi qo'llaniladi va aniqlikni oshirish uchun 3-5 marta takrorlash talab qilinishi mumkin. Ba'zi hollarda, masalan, migratsiya bosqichidagi gelmintozlar yoki invaziv protozoozlar uchun serologik testlar (qonda antitanachalar aniqlash) erta diagnostikaga yordam berishi mumkin. Og'ir

asoratlarda endoskopik yoki radiologik tekshiruvlar (KT, UZI) zararlangan organlarning holatini baholash uchun qo'llanilishi mumkin.

Shaxsiy gigiena qoidalariga rioya qilish, ayniqsa ovqatlanishdan oldin va hojatxonadan keyin qo'llarni sovun bilan yaxshilab yuvish eng muhim chora hisoblanadi. Sabzavot va mevalarni iste'mol qilishdan oldin toza suvda sinchkovlik bilan yuvish shart.

Tadqiqot metodologiyasi

Ushbu maqola odam organizmida uchraydigan ichak parazitlari va ularning ta'siri mavzusidagi mavjud ilmiy adabiyotlar, epidemiologik ma'lumotlar va klinik tadqiqotlar natijalarini kompleks tahlil qilish va sintez qilishga asoslangan. Tadqiqotda sohaga oid dolzarb nashrlar, ilmiy maqolalar va xalqaro tashkilotlar hisobotlari ko'rib chiqilgan bo'lib, ular parazit turlarining tasnifi, hayot sikllari, patogenezi, diagnostika va davolash usullari hamda profilaktika choralari bo'yicha eng so'nggi ma'lumotlarni o'z ichiga olgan. Maqola informatsiyani tizimli yig'ish, qayta ishlash va umumlashtirish orqali mavzuni chuqur tushunish va kritik baholashga intiladi.

Xulosa

Odam organizmida uchraydigan ichak parazitlari global miqyosda jiddiy sog'liqni saqlash muammosi bo'lib, uning yechimi kompleks yondashuvni talab qiladi. Protozoalar va gelmintlarning xilma-xilligi, ularning murakkab hayot sikllari va turli xil patogen ta'sirlari inson salomatligiga keng ko'lamli zararlar yetkazadi, jumladan, ovqat hazm qilish tizimining buzilishi, ozuqa moddalarining so'rilishini kamayishi, jismoniy va aqliy rivojlanishning sekinlashishi, shuningdek og'ir holatlarda hayot uchun xavfli asoratlar. Ushbu kasalliklarning tarqalishiga gigiena sharoitlarining yetishmasligi, toza ichimlik suvi va xavfsiz oziq-ovqatga kirish imkoniyatining cheklanganligi kabi ijtimoiy-iqtisodiy omillar sezilarli ta'sir ko'rsatadi.

Samarali diagnostika usullari (najasni mikroskopik tekshirish, serologik testlar) va tegishli davolash (antiparasitar dorilar) kasallikni bartaraf etishda muhimdir. Biroq, eng samarali kurash usuli bu keng qamrovli profilaktika va nazorat choralari hisoblanadi. Shaxsiy gigiyena qoidalariga rioya qilish, oziq-ovqat va suv xavfsizligini ta'minlash, sanitariya sharoitlarini yaxshilash va aholining sanitariya madaniyatini oshirish kabi chora-tadbirlar parazitar kasalliklar tarqalishini sezilarli darajada kamaytirishga qodir. Kelajakda diagnostika usullarini takomillashtirish, yangi va samaraliroq davolash usullarini ishlab chiqish, shuningdek doimiy jamoat salomatligi kampaniyalarini olib borish ichak parazitozlari bilan kurashishda ustuvor yo'nalishlar bo'lib qoladi.

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EXPERIMENTALLY INDUCED CHANGES IN THE HISTOLOGICAL STRUCTURE OF THE ADRENAL GLANDS UNDER THE ACTION OF METHYLVINYLPYRIDINE

Abstract. *The experiment investigated the effect of methylvinylpyridine on the histological structure of the adrenal glands of white rats. This substance is colorless, has a sharp odor, and is used in the chemical production of polymers and rubber materials. Examination of histological sections revealed lymphocytic infiltration of adrenal tissue, a pronounced vascular reaction in the connective tissue capsule, as well as in the vessels of all zones of the cortex and the sinuses of the medulla.*

Keywords: *experiment, methylvinylpyridine, rat, adrenal gland, glomerular zone, hematoxylin-eosin, Van Gieson method.*

Introduction

In modern conditions, due to the widespread use of antibiotics in medicine, veterinary medicine, and agriculture, as well as a number of other unfavorable factors (environmental pollution with industrial waste, including radioactive substances), a shift in the microbial ecology of humans and animals has been observed [1]. Traditional approaches in recent decades to the etiopathogenesis of many common diseases in humans and animals do not provide new constructive ideas that would allow the development of highly effective means and methods for the prevention and treatment of various pathological conditions and syndromes [2]. Currently, the problem of therapy and especially the restoration of the normal structure and function of organs and tissues in farm animals remains far from resolved; therefore, the search for new, more effective methods and means of targeted influence on the development of restorative processes in them seems justified [3]. Methylvinylpyridine (MVP), as a pyridine derivative, is a colorless liquid with an unpleasant odor and is widely used in the chemical industry for the synthesis of various polymers and synthetic rubber. For the prevention of occupational poisonings, it is of interest to study the degree of toxicity of this substance. This substance primarily affects the central nervous system and causes dystrophic changes in a number of parenchymal organs [4]. This work is a morphological study conducted on experimental animals and presents the results obtained from studying the effect of MVP on the histostructure of the organs of the neurohumoral system — the adrenal glands.

Objective of the study

To study the histological changes in the adrenal glands under the action of methylvinylpyridine.

Materials and methods

The experiments were carried out on 12 white rats weighing 180–240 g. The test animals were administered a solution of MVP perorally into the esophagus using a syringe with a needle fitted with a chloroprene tip. Control animals were administered tap water in the same manner. The test substance was used by us in various doses. In the first series, 12 white rats received MVP at a dose of 0.01 mg/kg; in the second, 12 animals received up to 0.1 mg/kg; and in the third, 27 rats received 1.0 mg/kg of their body weight. For histological processing, the adrenal glands were taken and fixed in calcium-formalin. Sections obtained on a freezing microtome were stained with hematoxylin-eosin and by the Van Gieson method.

Results of the study

When studying histological sections taken from the adrenal glands of the experimental animals, we note that the effect on the body of white rats at doses of 0.01, 0.1, and 1.0 mg/kg for 20 and 40 days caused changes in the histostructure of these organs. This was expressed in lymphocytic infiltration of the adrenal tissue, a significant reaction from the vessels of the connective tissue capsule, as well as the vessels of all zones of the cortex and the sinuses of the medulla. In this case, the vessels were dilated and filled mainly with lymphocytes and a small number of erythrocytes; marginal standing of the latter was often observed. It should be noted that the walls of small vessels were more thickened, and the connective tissue capsule covering the adrenal glands was more expanded and rich in cells of the fibroblastic series under the action of MVP at doses of 0.1 and 1.0 mg/kg. From the capsule, connective tissue strands descended in coarse layers into the fascicular zone. When stained with hematoxylin-eosin, the glomerular, fascicular, and reticular zones were clearly defined in the adrenal cortex. Under the connective tissue capsule, groups of smaller dark cells were visible. In the glomerular zone, among the not very large cells with lighter cytoplasm and a dark nucleus, mitoses were often encountered. The cells of the fascicular zone varied in size, had a polygonal shape and a reticular cytoplasm; however, the reticularity was unclear under the action of MVP at a dose of 1.0 mg/kg. Many cells contained large light nuclei with a well-visible nucleolus, while at the same time, on significant areas, cells with a darker, structureless, smaller nucleus and dark cytoplasm were visible. The reticular zone, when stained with hematoxylin-eosin, appeared as a darker background; its small cells in the form of strands intertwined into a network. In this area, scattered and focal lymphocytic infiltration was most pronounced. Some sinusoidal capillaries of this zone were overfilled with erythrocytes. The chromaffin cells of the medulla were located densely next to each other, in nests, between which there were rather wide sinuses with single lymphocytes at their inner edge, lying in foci at their outer wall and scattered against the background of the chromaffin cells themselves. Some smaller sinuses

were filled with erythrocytes, which were also observed outside their walls; this was especially pronounced under the action of MVP at doses of 0.1 and 1.0 mg/kg. It should be noted that the action of MVP on the body of white rats at doses from 0.01 to 1.0 mg/kg by the end of the 20th day caused a significant decrease in lipid substance in the interrenal cells of all zones of the adrenal cortex; however, after 40 days, on the contrary, an accumulation of sudanophilic inclusions was observed in the cells of all zones except the glomerular one. When studying the histostructure of the adrenal glands exposed to MVP at doses from 0.1 to 1.0 mg/kg for 40 days followed by a one-month recovery period in the animals, we found pronounced signs of edema from the adrenal capsule and interepithelial connective tissue layers of the cortex, areas of hemorrhages (especially at the border of the reticular zone and the medulla), signs of vascular stasis, more intense scattered and perivascular infiltration (mainly lymphocytic), and diapedesis of erythrocytes into the tissue of the fascicular and reticular zones.

In cases of MVP exposure to the adrenal glands for 70 and 90 days at doses from 0.01 to 1.0 mg/kg, the above-described phenomena in the tissues were more pronounced, especially in the reticular zone and the medulla (edema, scattered and focal lymphocytic infiltration, dilation and blood filling of vessels, diapedesis of erythrocytes). In the fascicular zone, a gross disruption of the radial course of the interrenal strands predominated, among the cells of which dividing and groups of dystrophically altered cells were found. At the same time, hypertrophy of the fascicular zone and its interrenal cells was determined, along with the presence of dystrophic forms, disruption of the radiality of the epithelial strands, and weak accumulation of acid mucopolysaccharides in the glomerular and reticular zones.

Conclusion

Analysis of the obtained data allows us to note that prolonged exposure to methylvinylpyridine (for 20, 40, 70, and 90 days) on the animal body at doses of 0.01–1.0 mg/kg causes adverse changes in the histostructure of the adrenal glands, namely: scattered and focal lymphocytic infiltration in all zones and the medulla; dilation and blood filling of vessels up to their stasis, especially in the reticular and medullary substance; gross disruption of the radial arrangement of epithelial strands in the fascicular zone; reactive and dystrophic cellular shifts; a decrease in the content of acid mucopolysaccharide granules in the cortex.

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STREPTOCOCCUS PNEUMONIAE: YUQISHI, KOLONIZATSIYASI VA INVAZIYASI MEXANIZMLARI

Annotatsiya. *Ushbu maqolada Streptococcus pneumoniae ning yuqishi, nasofarinksda kolonizatsiyalanishi va invaziv kasallik rivojlanish mexanizmlari tahlil qilindi. Pnevmokokkning inson yuqori nafas yo‘llarida opportunistik patogen sifatida tutgan o‘rni hamda uning pnevmoniya, otit, sepsis va meningit kabi kasalliklar etiologiyasidagi ahamiyati yoritildi. Tadqiqot davomida kapsula polisaxaridi, pneumolizin, yuzaki adgezinlar va bakteriyaning mezbon immun tizimi, xususan komplement tizimi bilan o‘zaro ta’siri baholandi. Shuningdek, virusli ko-infeksiyalarning, ayniqsa gripp infeksiyasining, pnevmokokk transmissiyasi va invaziv salohiyatini kuchaytiruvchi omil sifatidagi roli ko‘rsatildi. Olingan xulosalar pnevmokokk patogenezini chuqurroq tushunish hamda samarali profilaktika va vaksina strategiyalarini ishlab chiqishda muhim ilmiy asos bo‘lib xizmat qiladi.*

Kalit so‘zlar: *Streptococcus pneumoniae, kolonizatsiya, transmissiya, pneumolizin, kapsula polisaxaridi, invaziv pnevmokokk kasalligi, immunitet, komplement tizimi*

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STREPTOCOCCUS PNEUMONIAE: MECHANISMS OF TRANSMISSION, COLONIZATION, AND INVASION

Abstract. *This article analyzes the mechanisms of transmission, nasopharyngeal colonization, and the development of invasive disease caused by Streptococcus pneumoniae. The role of pneumococcus as an opportunistic*

pathogen of the human upper respiratory tract and its significance in the etiology of pneumonia, otitis media, sepsis, and meningitis are highlighted. The study evaluates the contribution of capsular polysaccharide, pneumolysin, surface adhesins, and the interaction of the bacterium with the host immune system, particularly the complement system. In addition, the role of viral co-infections, especially influenza, as factors enhancing pneumococcal transmission and invasive potential is demonstrated. The findings provide an important scientific basis for a deeper understanding of pneumococcal pathogenesis and for the development of effective preventive and vaccination strategies.

Keywords: *Streptococcus pneumoniae, colonization, transmission, pneumolysin, capsular polysaccharide, invasive pneumococcal disease, immunity, complement system*

Kirish

Streptococcus pneumoniae *(pnevmokokk) inson organizmi bilan yaqin evolyutsion munosabatga ega bo‘lgan gram-musbat, kapsulali bakteriya bo‘lib, asosan yuqori nafas yo‘llari, xususan, nasofarinks shilliq qavatida kommensal sifatida yashaydi [1,3]. Ko‘plab hollarda pnevmokokk tashuvchiligi klinik belgilar bilan namoyon bo‘lmaydi, biroq u epidemiologik jihatdan muhim bo‘lib, infeksiya tarqalishining asosiy manbai hisoblanadi [2]. Tadqiqotlar natijalariga ko‘ra, bolalarning 27–65% ida, kattalarning esa 10% dan kam qismida pnevmokokk tashuvchiligi aniqlanadi, bu esa yosh omili kolonizatsiya intensivligida muhim rol o‘ynashini ko‘rsatadi [1,2].*

Pnevmokokkning hayot sikli shartli ravishda uch asosiy bosqichga bo‘linadi: birinchi bosqich — mezbondan mezbonga yuqish, ikkinchi bosqich — nasofarinksda kolonizatsiya va uzoq muddat saqlanib turish, uchinchi bosqich esa bakteriyaning epitelial to‘siqlardan o‘tib, quyi nafas yo‘llari, qon oqimi yoki markaziy asab tizimiga tarqalishi natijasida invaziv kasalliklarning rivojlanishi [3,18]. Ushbu bosqichlar bir-biri bilan chambarchas bog‘liq bo‘lib, pnevmokokkning patogen salohiyatini belgilaydi.

Pnevmokokkning eng muhim virulentlik omili kapsula polisaxaridi (CPS) hisoblanadi. Kapsula bakteriyani mezbon immun tizimining asosiy komponentlaridan biri bo‘lgan komplement tizimi va fagotsitozdan himoya qiladi [19,22], shu orqali uning yashovchanligini va invaziv salohiyatini oshiradi. Bundan tashqari, pneumolizin toksini epitelial hujayralarga zarar yetkazib, kuchli yallig‘lanish javobini chaqiradi va bakteriyaning to‘qimalar bo‘ylab tarqalishiga qulay sharoit yaratadi [16,29]. Virusli infeksiyalar, ayniqsa gripp, pnevmokokk patogenezida muhim qo‘zg‘atuvchi omil sifatida e’tirof etiladi. Virus ta’sirida nafas yo‘llari epiteliyasida retseptorlar ekspressiyasi kuchayadi, shilliq qavat bar’yeri zaiflashadi va bakterial yuklama oshadi [8–14]. Natijada pnevmokokkning kolonizatsiya samaradorligi hamda transmissiya ehtimoli sezilarli darajada kuchayadi, bu esa invaziv pnevmokokk kasalliklari rivojlanish xavfini oshiradi.

Maqsad

Pnevmokokkning yuqish mexanizmlarini, kolonizatsiya jarayonini, immun tizimidan qochish strategiyalarini, invaziv kasallik rivojlanish bosqichlarini zamonaviy ilmiy ma'lumotlar asosida tizimli tahlil qilish.

Material va metodlar

Mazkur maqola ikkilamchi ma'lumotlarga asoslangan tahliliy tadqiqot bo'lib, unda Streptococcus pneumoniae *ning yuqishi, kolonizatsiyasi va invaziv salohiyatiga oid zamonaviy ilmiy ma'lumotlar tizimli ravishda umumlashtirildi. Tadqiqot jarayonida xalqaro miqyosda nufuzli ilmiy jurnallarda chop etilgan mikrobiologik, immunologik va eksperimental tadqiqotlar natijalari tahlil qilindi. Ma'lumotlar manbasi sifatida molekulyar biologiya usullari orqali olingan natijalar, laboratoriya hayvonlari ishtirokida o'tkazilgan eksperimental modellar (shu jumladan, yangi tug'ilgan sichqon va ferret modellarida bajarilgan kolonizatsiya hamda transmissiya tadqiqotlari), shuningdek, insonlarda nazorat ostida olib borilgan kolonizatsiya tajribalari va klinik kuzatuvlar ma'lumotlaridan foydalanildi. Olingan ma'lumotlar pnevmokokkning virulentlik omillari, mezbon immun javobi bilan o'zaro ta'siri hamda tashqi va ichki omillarning bakterial transmissiyaga ta'sirini baholash maqsadida qiyosiy va integrativ yondashuv asosida tahlil qilindi. Ushbu yondashuv pnevmokokk patogenezining asosiy bosqichlarini kompleks yoritish imkonini berdi.*

Natijalar

O'tkazilgan tahlil natijalari *Streptococcus pneumoniae* ning yuqishi, kolonizatsiyasi, immun tizimidan qochish mexanizmlari hamda invaziv kasallik rivojlanishida bir qator muhim omillar ishtirok etishini ko'rsatdi [1–3,18].

Pnevmokokkning yuqishi asosan yaqin va davomli kontakt orqali amalga oshishi aniqlandi [6,7]. Nafas yo'llaridan ajralib chiqadigan shilliq sekretsiya bakteriyaning tashqi muhitga chiqarilishida asosiy rol o'ynaydi [7]. Virusli ko-infeksiyalar, xususan, gripp viruslari bilan birga kechgan holatlarda burun shilliq qavatida sekretsiya miqdori oshib, bakterial "shedding" jarayoni kuchayadi [8–11]. Bunda pneumolizin toksinining yallig'lanishni kuchaytiruvchi ta'siri transmissiyani yanada faollashtiradi [16]. Shu bilan birga, kapsula polisaxaridining qalinligi pnevmokokkning shilliq qavatdan ajralib chiqishini osonlashtirib, yuqish ehtimolini oshirishi kuzatildi [19,22].

Kolonizatsiya bosqichida pnevmokokkning nasofarinks epiteliyasiga mahkam yopishishi uning barqaror saqlanib qolishida hal qiluvchi ahamiyatga ega ekanligi aniqlangan [1,3]. Bu jarayonda PavA, PavB, CbpA, NanA va BgaA kabi yuzaki oqsillar epitelial hujayralar bilan o'zaro ta'sirga kirishib, bakteriyaning shilliq qavat yuzasida mustahkam joylashishini ta'minlaydi [15,17]. Bundan tashqari, hujayra membranasidagi fosforilxolin (ChoP) bilan trombotsit faollashtiruvchi omil retseptori (PAFR) o'rtasidagi o'zaro ta'sir pnevmokokkning epitelial hujayralarga kirib borishini osonlashtiradi [15]. Kolonizatsiya samaradorligi shuningdek, nasofarinks mikrobiotasi bilan bo'ladigan raqobatga bog'liq bo'lib, bakteriosinlar ishlab chiqarilishi pnevmokokkning ustunligini ta'minlovchi muhim omil sifatida namoyon bo'ldi [20,21].

Immun tizimidan qochish mexanizmlari tahlili pnevmokokkning mezbon himoya tizimini samarali ravishda chetlab o‘tishini ko‘rsatdi [18]. Kapsula polisaxaridi komplement tizimining muhim komponenti bo‘lgan C3b ning bakteriya yuzasiga birikishini cheklab, opsonizatsiya va fagotsitozni susaytiradi [19,22]. Shu bilan birga, PspA va CbpA oqsillari komplement faolligini inhibe qilib, bakteriyaning immun hujayralar tomonidan tanilib yo‘q qilinishidan saqlanishiga yordam beradi [17,19]. Mukozal immunitet darajasida esa IgA1 proteazaning ta’siri natijasida sekretor immunoglobulin A parchalanib, shilliq qavatdagi himoya mexanizmlari zaiflashadi [26]. Pneumolizin pora hosil qiluvchi xususiyati orqali hujayra membranalarini shikastlab, sitokinlar ishlab chiqarilishini kuchaytiradi va yallig‘lanish javobini rag‘batlantiradi [16,29].

Invaziya bosqichida kuchli yallig‘lanish jarayoni va epitelial to‘siqlarning shikastlanishi pnevmokokkning nasofarinksdan quyi nafas yo‘llari, qon oqimi hamda boshqa steril to‘qimalarga o‘tishiga imkon yaratishi aniqlangan [25,26]. Ayniqsa, yosh bolalar va keksalarda immun tizimining yetilmaganligi yoki zaiflashganligi invaziv pnevmokokk kasalliklarining ko‘proq uchrashiga olib keladi [1,25]. Ushbu guruhlarda bakteriyaning tarqalishi tezlashib, og‘ir klinik holatlar rivojlanish xavfi ortadi [25].

Muhokama

Olingan natijalar *Streptococcus pneumoniae* ning patogenezi mezbon organizm bilan murakkab o‘zaro ta’sirga asoslanganligini ko‘rsatadi [1,3,18]. Pnevmokokk uchun eng muhim bosqich nasofarinksda kolonizatsiya bo‘lib, aynan shu jarayon bakteriyaning saqlanib qolishi va mezbondan mezbonga yuqishini ta’minlaydi [1,3]. Invaziv kasalliklar esa ko‘pincha ushbu jarayonlarning ikkilamchi natijasi sifatida rivojlanadi [18]. Yuqish jarayonida yaqin kontakt va shilliq sekretsiyaning ahamiyati yuqori bo‘lib, virusli ko-infeksiyalar, ayniqsa gripp, yallig‘lanishni kuchaytirish orqali bakterial yuklamani va transmissiya ehtimolini oshiradi [6–11]. Pneumolizinning proyallig‘lanish ta’siri ushbu jarayonni yanada faollashtiradi [16,29]. Kolonizatsiya bosqichida pnevmokokkning epiteliyga yopishishi hal qiluvchi rol o‘ynaydi [3]. Yuzaki adgezinlar va ChoP–PAFR o‘zaro ta’siri bakteriyaning shilliq qavatda mustahkam joylashishiga yordam beradi, mikrobiota bilan raqobat esa kolonizatsiya muvaffaqiyatini belgilovchi muhim omil hisoblanadi [15,17,20,21].

Immun tizimidan qochish mexanizmlari pnevmokokkning yashovchanligini oshiradi [18]. Kapsula polisaxaridi va yuzaki oqsillar komplement tizimini susaytirib, opsonofagotsitozni cheklaydi, IgA1 proteaza esa mukozal immunitetni zaiflashtiradi [19,22,26]. Invaziya asosan kuchli yallig‘lanish va epitelial to‘siqlarning shikastlanishi fonida yuzaga kelib, yosh bolalar va keksalarda og‘ir kechish xavfi yuqori bo‘ladi [25]. Shu sababli pnevmokokk infeksiyalarini oldini olishda kolonizatsiya va transmissiyani cheklashga qaratilgan profilaktik yondashuvlar muhim ahamiyatga ega [24,27,28].

Xulosa

Streptococcus pneumoniae inson yuqori nafas yo‘llarida keng tarqalgan kolonizator bo‘lib, uning patogenligi asosan yuqish, kolonizatsiya va immun

tizimidan qochish mexanizmlarining samarali ishlashi bilan belgilanadi [1,3,18]. Nasofarinksda kolonizatsiya pnevmokokk hayot siklining markaziy bosqichi hisoblanib, bakteriyaning saqlanib qolishi va tarqalishini ta’minlaydi [3].

Kapsula polisaxaridi, pneumolizin va yuzaki adgezinlar pnevmokokkning asosiy virulentlik omillari bo‘lib, ular orqali bakteriya mezbon immun javobini chetlab o‘tadi va shilliq qavatda barqaror joylashadi [16,19,22]. Virusli respirator infeksiyalar, xususan gripp, yallig‘lanishni kuchaytirib, pnevmokokk transmissiyasi va invaziya xavfini oshiradi [8–14]. Invaziv pnevmokokk kasalliklari ko‘pincha immun himoyasi zaiflashgan guruhlarda, jumladan yosh bolalar va keksalarda rivojlanadi [25]. Shu bois pnevmokokk infeksiyalarining oldini olishda kolonizatsiyani cheklashga qaratilgan profilaktik choralar, ayniqsa vaksinalar va mukozal immunitetni mustahkamlovchi yondashuvlar muhim ahamiyatga ega [24,25,27–30].

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INCREASE THE EFFICIENCY OF THE FINANCIAL SYSTEM OF THE NATIONAL ECONOMY

Abstract. *The article covers issues of increasing the effectiveness of the financial system of the national economy. The annual plan and the analysis of indicators for the object of practice have been opened. In the economy, it is required to fully ensure the functions of commercial banks in order to strengthen their functions in the market infrastructure according to the results of production, which, in turn, ensures the financial system of banks and government.*

Key words: *national economy, financial system, bank, technology, transfer, technology transfer, modernization.*

In the development of the national economy, international financial relations are the main factor that ensures growth through investment attraction, foreign trade financing and technology transfer. They are important in the modernization of infrastructure, industry and social spheres by attracting technology transfer, loans and funds from international financial institutions.

The role and importance of international financial relations in the national economy is reflected in the following:

Attracting investments: Attracting direct and portfolio investments through international financial markets allows for modernization of the national economy and expansion of production.

Ensuring financial stability: covering the balance of payments deficit and stabilizing the exchange rate through international loans and financial institutions (International Monetary Fund, World Bank).

Technology transfer: Inflow of advanced technology, management experience and innovation along with foreign capital.

Economic integration: integration of the national economy into the world economic system, acceleration of international trade and financial flows.

Infrastructure development: Use of international bonds and soft loans to finance major infrastructure projects.

In short, international financial relations increase the openness of the national economy and serve as a source of necessary resources for implementing structural changes and achieving sustainable economic growth.

It would be challenging to envision a world without the intervention of a financial sector, given the roles it performs and facilitates in the current dynamics that define our societies. Consequently, it would be difficult to argue against the notion that its intervention and development do not contribute positively to the growth of regions lacking in resources and investment.

With that said, our research sought to contribute by addressing the question of whether, with some level of development already present in this financial system, its further enhancement (as evidenced by the increase in selected variables that characterize it) brings additional benefit to a process of economic convergence from an economy to its potential output level. In this case, the answer is not straightforward, and as observed in the extensive existing literature, multiple outcomes could be possible.

In the economy, it is required to fully ensure the functions of commercial banks in order to strengthen their functions in the market infrastructure according to the results of production, which, in turn, ensures the financial system of banks. The primary prerequisite for ensuring personal income of commercial banks is to ensure capital adequacy, to ensure the achievement of the level of profitability of bankers, to increase and improve bank profits, and help to reduce bank costs.

Therefore, income and its importance in the activity of commercial banks are important factors in ensuring the stability of the banking and financial system of our republic.

The basis for ensuring the financial stability of the bank is its capital and the level of profitability of banking activities. In the market economy, the goal of every commercial bank is to increase its income and decrease its costs, to obtain high or maximum profit due to optimization.

In the case of Southern Europe, the effects of the financial crisis are undeniable, given that this crisis originated in the financial sector itself and may thus account for the negative impact.

The party carried out its financial activities in accordance with the Laws of the Republic of Uzbekistan and the Regulations of the Cabinet of Ministers of the Republic of Uzbekistan, its Charter and Program.

According to the Charter of the Democratic Party "National Revival", the sources of funding of the party's activities are the funds allocated from the state budget, membership fees, donations of legal and natural persons and all other incomes that do not contradict the current laws.

39 billion 481 million to party accounts in 2025 Funds in the amount of 249,000 soums were received.

Including 23 billion 083 million soums, 65.1%, for the expenses of wages and similar payments and employer's deductions;

254,286,000 soums, 0.7% for business travel expenses;

6 billion in expenses related to program tasks

976 million soums, 19.7%;

807 million 151 thousand soums, 2.3%, for expenses on fixed assets;

213 million in the cost of inventory

771 thousand soums, 0.6%;

3 billion 045 million soums, 8.6%, were spent on utility services;

Other expenses amounted to 1 billion 050 million soums, 3%. By the end of the year, the balance in the party accounts amounted to 13 billion 677 million soums.

It is expected that our total income from financial activities in 2026 will be 56 billion 218 million soums, and these incomes are planned to be distributed as follows:

of the total funds allocated from the state budget

-75.5 percent for the wages and equivalent payments of employees at all levels,

- 15.3 percent for expenses related to business trip, communal services, maintenance, rent and operation of party property,

- 0.7 percent for the purchase of goods, - 4.5 percent for the training of party activists, communication and other expenses related to the Internet

It is planned to allocate 4.0 percent for the purchase of vehicles, furniture and office equipment, and computer equipment.

In 2026, it is planned as follows, the cost estimate, which will be financed from extra-budgetary funds

- 64.0 percent to the wages, bonuses, material support and related funds of employees at all levels

- 7.3 percent for utilities, party property maintenance, and operating expenses

- 9.2 percent to conduct party events, including training of party activists, holding roundtable discussions and meetings, - 8.2 percent for the purchase of fixed assets, including motor vehicles, office equipment, communication tools, furniture, goods,

- 11.0 percent was allocated to other expenses related to the implementation of the party's statutory activities.

These indicators were distributed after studying the needs of Central, regional and local organizations of UzMTDP.

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MELIORATSIYA TARMOQLARINI TADQIQ QILISHDA INTERAKTIV KARTALARNING AHAMIYATI

Annotatsiya. *Mazkur maqolada melioratsiya tarmoqlarini Geografik axborot tizimlari yordamida tadqiq qilish va interaktiv kartalarni yaratish metodologiyasi Shovot tumani misolida yoritilgan. Tadqiqot doirasida arxiv kartalarini geofazoviy bog‘lash, kollektorlarning atributiv ma’lumotlar bazasini shakllantirish va ularni veb-muhitda vizuallashtirish bosqichlari tahlil qilingan. Yaratilgan interaktiv modelning soha mutaxassislari uchun tushunarliligi va qaror qabul qilishdagi samaradorligi respondentlar o‘rtasida o‘tkazilgan so‘rovnomalar orqali baholangan. Natijalar asosida melioratsiya tizimlarini GAT texnologiyalari yordamida raqamli monitoring qilish uchun amalga oshirilishi lozim bo‘lgan vazifalar belgilangan.*

Tayanch so‘zlar: *GAT, interaktiv karta, melioratsiya tarmoqlari, Shovot tumani, ma’lumotlar bazasi, vizuallashtirish, samaradorlik.*

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THE IMPORTANCE OF INTERACTIVE MAPS IN THE STUDY OF RECLAMATION NETWORKS

Abstract. *This article explores the methodology for studying land reclamation networks and creating interactive maps using Geographic Information Systems (GIS), focusing on the Shovot district. The research breaks down the key stages of the process, including the georeferencing of archival maps, building an attribute database for collector-drainage networks, and visualizing this data in a web environment. To ensure the interactive model is practical and easy for industry experts to use, its effectiveness in decision-making was evaluated through participant surveys. Based on the findings, the study outlines the*

necessary steps for implementing digital monitoring of reclamation systems through GIS technologies.

Keywords*: GIS, interactive map, reclamation networks, Shovot district, database, visualization, efficiency.*

Kirish

Global iqlim o‘zgarishi va suv resurslarining tanqisligi sharoitida qishloq xo‘jaligi yerlarining meliorativ holatini barqaror saqlash strategik ahamiyatga ega. Ayniqsa, murakkab gidrogeologik tuzilishga ega bo‘lgan hududlarda kollektor-drenaj tarmoqlarining holatini doimiy monitoring qilish va ularni boshqarishda GAT texnologiyalarining o’rni beqiyosdir. Viloyatimizda GIS asosida qator tadqiqotchilar kollektor-drenaj tarmoqlarining holati bilan bog‘liq turli tarmoqlarda ilmiy izlanishlar olib bormoqdalar. Jumladan GAT texnologiyalari asosida suv havzalari monitoringini tashkil qilish tartibi (Matchanov, 2022) tadqiq qilingan. Suv havzalarining chuqurligini aniqlash ushun DEM ma’lumotlari taxlil qilingan (Matchanov & Bekmetova, 2021), suv havzalarining kollektor-drenaj tarmoqlariga nisbatan gorizontal (Matchanov & Matsopoeva, 2022) va vertikal (Matchanov & Matchanov, 2022) joylashuvi tahlil qilingan va o‘tgan asr o‘rtalaridagi suv havzalari hozirgilari bilan solishtirilgan (Matchanov, 2020). Natilada viloyat suv havzalarining bor yo‘g’i 55.4% qismi iqlim o‘zgarishlariga nisbatan moslasha olishi aniqlangan (Nigmatov, 2022).

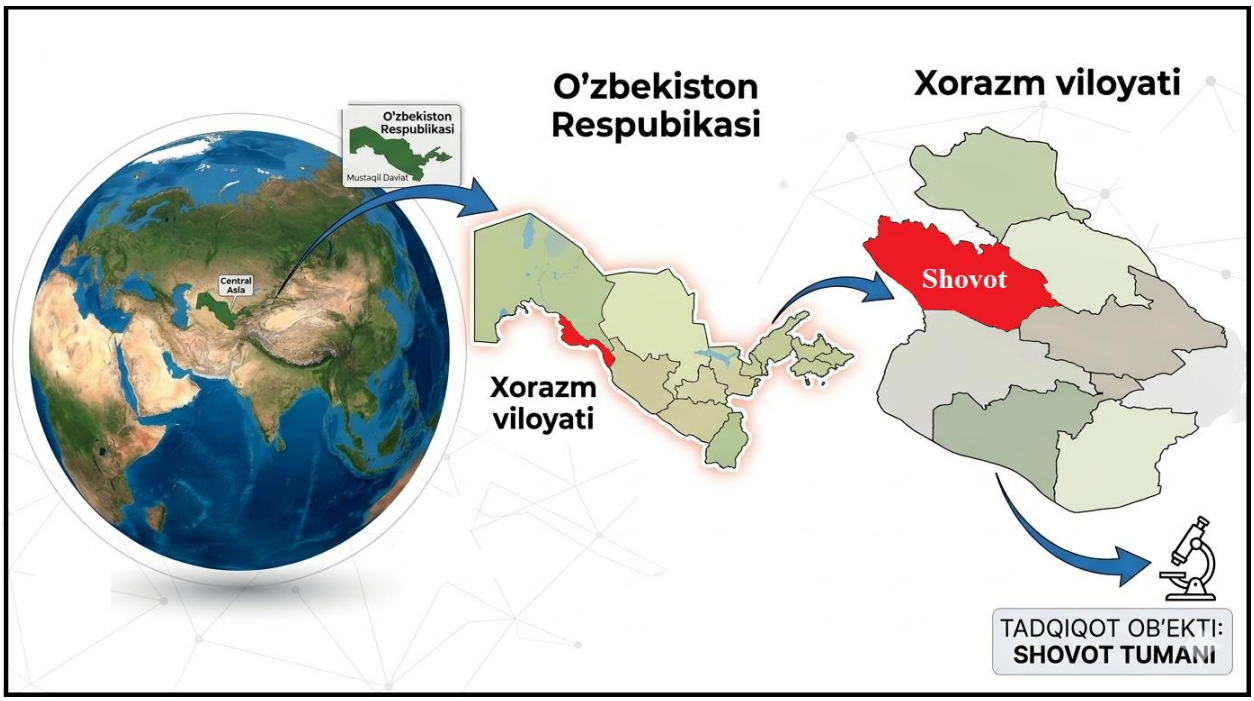
Shuningdek, atmosfera havosining davriy o‘zgarishi geofazoviy tahlili (Baxtiyorova & Matchanov, 2025) hamda Xorazm vohasidagi qurg‘oqchilik darajasini tahlil qilib (Matchanov va boshqalar, 2025) uning bor-yo‘g‘i 13,73% qismi xavfsiz hudud sifatida baholangan.

Ammo yuqoridagi tadqiqotlarda melioratsiya tarmoqlari tadqiqot ob’ekti sifatida qaralmagan, ularni loyihalash va ekspluatatsiya qilish jarayonlari o‘rganilmagan.

Mazkur tadqiqotda Shovot tumani misolida melioratsiya ob’ektlari raqamli ma’lumotlari asosida interaktiv kartasi yaratiladi soha mutaxassislari va keng jamoatchilik o‘rtasida uning avzalliklari o‘rganiladi. Natijalar asosida keying vazifalar belgilab olinadi.

Tadqiqot metodologiyasi.

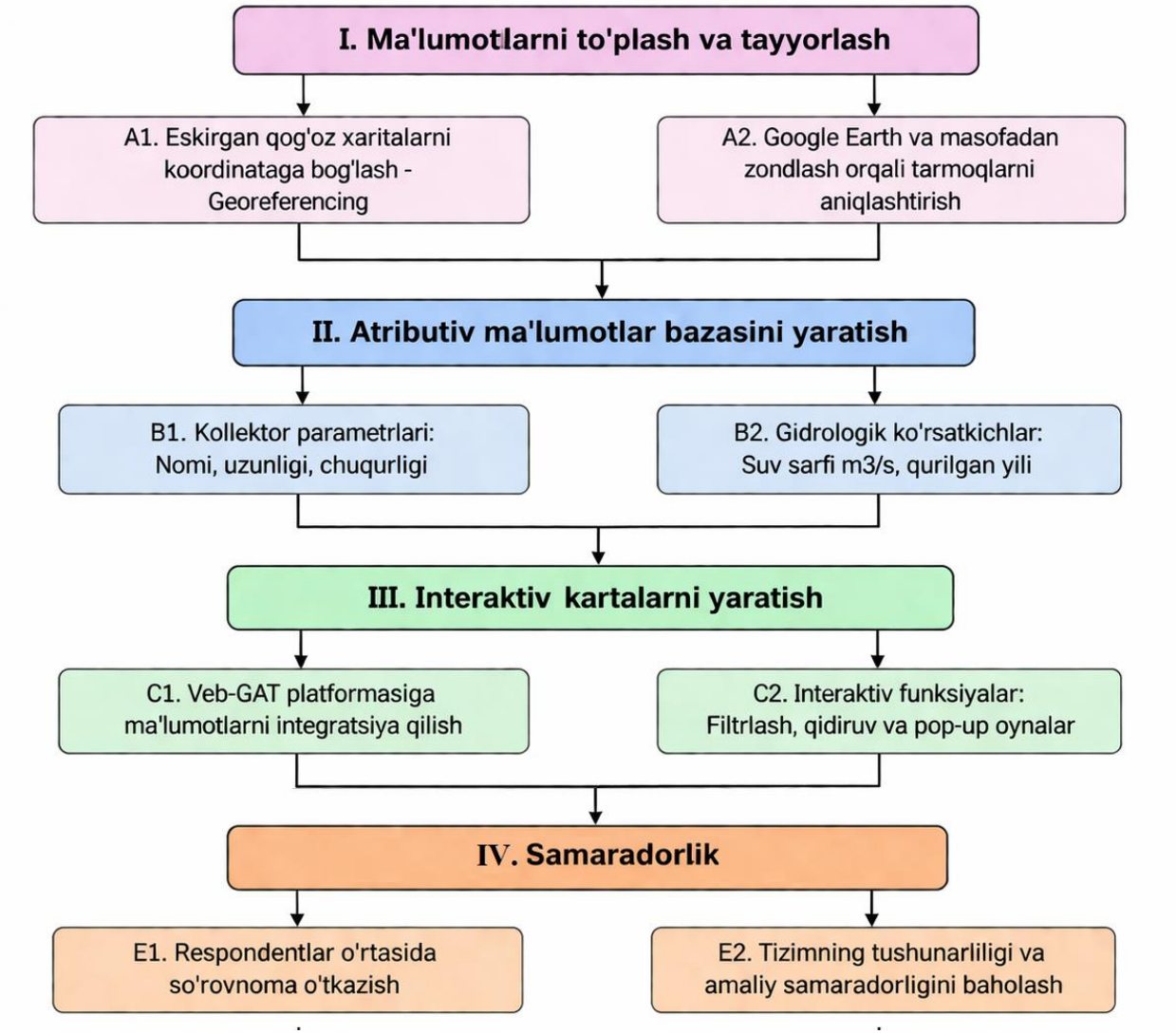
Tadqiqot O‘zbekistonning Amudaryo quyi oqimida joylashgan qadimiy qishloq xo‘jaligi vohasi – Xorazm viloyatining (41°–42° shimoliy kenglik, 60°–61° sharqiy uzunlik) Shovot tumanida olib borildi (1-rasm).



1-rasm. Tadqiqot hududi

Ushbu tadqiqot metodologiyasi to‘rt bosqichli tizimga asoslangan bo‘lib, melioratsiya tarmoqlarini interaktiv kartalarda aks ettirish va ularning samaradorligini baholashni qamrab oladi (2-rasm).

Birinchi bosqich ma’lumotlarni shakllantirish va tayyorlash bosqichi bo‘lib, unda Shovot tumani melioratsiya tizimlarining kameral tahlili amalga oshiriladi. Bunda arxivda saqlangan, eskirgan qog‘oz kartalar zamonaviy koordinatalar tizimiga georeferencing qilinib, bog‘lanadi. Tarmoqlarning fazoviy aniqligini ta’minlash maqsadida Google Earth dasturi va masofadan zondlash ma’lumotlaridan foydalanib, har bir kollektorning amaldagi o‘rni va yo‘nalishi raqamli formatga o‘tkaziladi.



2-rasm. Tadqiqot metodologiyasi.

Keyingi bosqichda har bir obyekt uchun atributiv ma’lumotlar to‘plami yaratiladi. Bunda kollektorlarning nomi, uzunligi va chuqurligi kabi texnik ko‘rsatkichlar bilan birga, gidrologik ma’lumotlar jumladan, suv sarfi, inshootning qurilgan yili, chuqurligi kabi muhim atributlar ma’lumotlar bazaga kiritiladi.

Shundan keyin yig‘ilgan fazoviy va statistik ma’lumotlar Veb-GIS platformalariga integratsiya qilinadi. Bu tizim orqali kerakli ma’lumotlarni qidirish va kartadagi ob’ekt ustiga bosganda pop-up oynalar orqali barcha tavsiflarni ko‘rish imkoniyati shakllantiriladi.

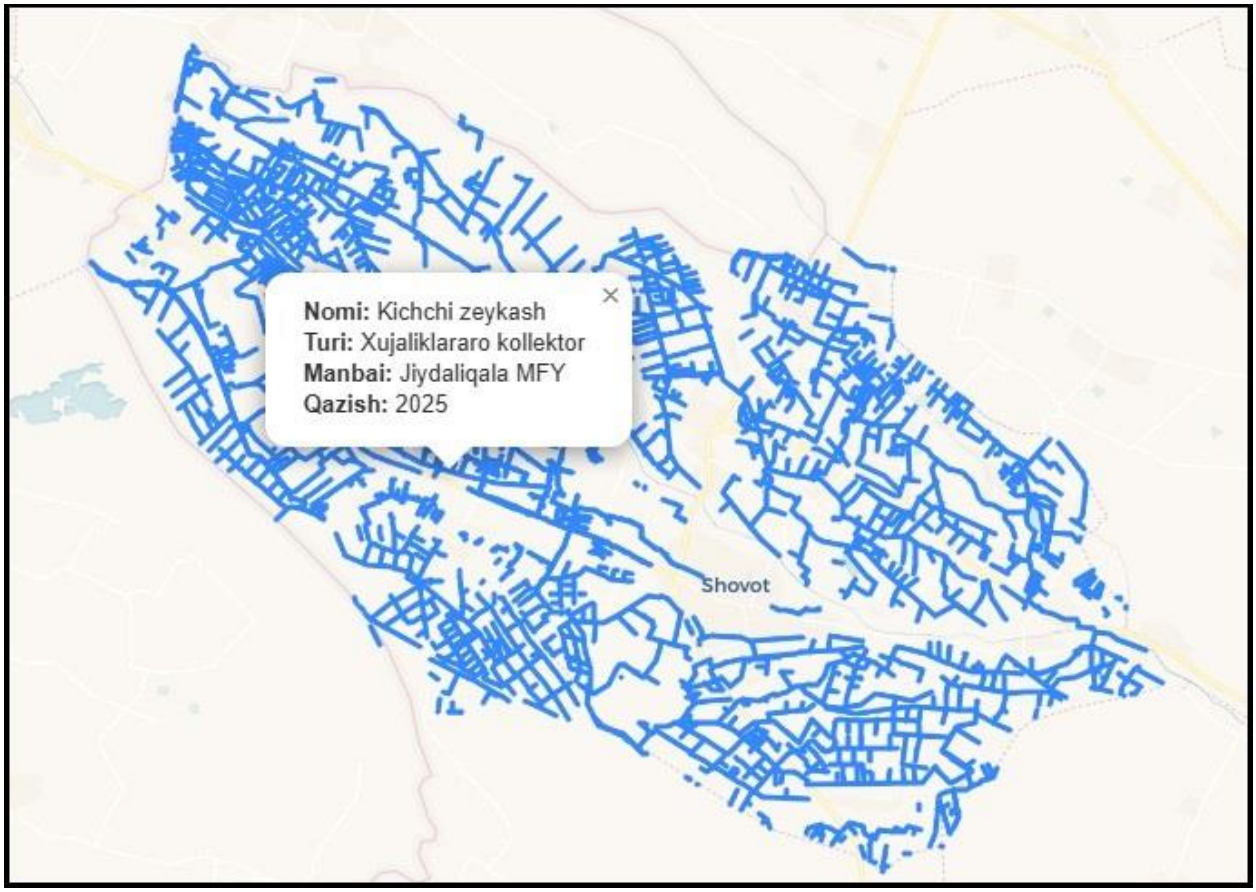
Ishning yakuniy bosqichida taklif etilayotgan raqamli tizim soha mutaxassislari va foydalanuvchilar o‘rtasida o‘tkazilgan so‘rovnomalar yordamida baholanadi. Olingan statistik natijalar interaktiv kartalarning an’anaviy usullarga nisbatan samaradorlik koeffitsientini belgilab beradi. Natijalar asosida melioratsiya tizimlarini GAT texnologiyalari yordamida raqamli monitoring qilish uchun zarur bo‘lgan vazifalar aniqlab olinadi.

Asosiy qism.

Melioratsiya tarmoqlarini tadqiq qilishdagi asosiy muammolardan biri ularni identifikatsiya qilishdagi qiyinchilik hisoblanadi. Tadqiqot olib borilayotgan Shovot tumanida jami 25,7 ming gektar ekin maydonini meliorativ xolatini yaxshilash uchun 1200 km ga yaqin melioratsiya tarmoqlari yaratilgan bo‘lib, bu ulkan tizimni raqamli muhitga o‘tkazishda bir qator tizimli qiyinchiliklar mavjud. Eng dolzarb muammolardan biri – tarmoqlarni aniq identifikatsiya qilish masalasidir. Ko‘plab kollektor va drenaj inshootlari rasmiy kadastr hujjatlarida maxsus kodlar yoki raqamlar bilan yuritilsada, amaliyotda aholi va fermerlar va tomorqa egalari orasida mutlaqo boshqa nomlar bilan ataladi. Bunday toponimik tafovutlar va ayrim tarmoqlarning rasmiy nomga ega emasligi arxiv ma’lumotlarini real geofazoviy koordinatalar bilan bog‘lashda chalkashliklarni keltirib chiqaradi. Shuningdek, tarmoqlarning chuqurligi va suv o‘tkazish qobiliyati kabi atributiv ko‘rsatkichlarning yetishmasligi hamda qog‘oz kartalardagi yo‘nalishlarning bugungi relyef o‘zgarishlariga mos kelmasligi raqamli monitoring jarayonini murakkablashtiradi.

Mazkur muammolarni bartaraf etish maqsadida tadqiqot doirasida arxiv kartalarini geofazoviy bog‘lash, kollektorlar ma’lumotlarini veb-muhitda vizuallashtirish bosqichlari amalga oshirildi. Veb kartalar interaktivligi sababli foydalanuvchiga ma’lumotni tezroq va aniqroq qabul qilish imkonini beradi (Matchanov, 2025). Shuningdek, ma’lumotlarni vizuallashtirishda interaktiv kartalar sohaga oid statistik ma’lumotlarni tahlil qilishda yuqori samaradorlik ko‘rsatadi (Matchanov & Karimova, 2024; Matchanov, 2024).

Tadqiqot uchun geofazoviy ma’lumotlari hamda zamonaviy veb-kartografiya uslublari (Matchanov & Matchanov, 2024) asosida melioratsiya tarmoqlarining interaktiv kartalari ishlab chiqildi. Mazkur kartalarga ob’ektlarning texnik-iqtisodiy tavsiflarini o‘z ichiga olgan atributiv ma’lumotlar bazasi integratsiya qilinib, foydalanuvchilar uchun ma’lumotlarni real vaqt rejimida taqdim etuvchi interaktiv darchalar (pop-up) biriktirildi (2-rasm).



2-rasm. Shovot tumani melioratsiya tarmoqlarining interaktiv kartasi va ob’ektlarning atributiv ma’lumotlar oynasi (Pop-up).

Tadqiqotning amaliy samaradorligini baholash maqsadida soha mutaxassislari o‘rtasida o‘tkazilgan so‘rovnomalar kutilgan natijalarni berdi. Respondentlarning 80 foizdan ortig‘i interaktiv kartadagi vizuallashtirish darajasi va ma’lumotlarni tushuna oldilar va yuqori baholadilar. Mutaxassislarning ta’kidlashicha, interaktiv darchalar orqali ob’ekt haqida tezkor ma’lumot olish meliorativ holatni tahlil qilish vaqtini o‘rtacha 60-70% ga qisqartiradi. Eng muhimi, tarmoqlarga ham rasmiy, ham mahalliy nomlarning biriktirilishi operativ boshqaruvdagi chalkashliklarni bartaraf etdi.

Natijalar asosida melioratsiya tizimlarini raqamli monitoring qilish uchun har bir tarmoqqa “yagona identifikatsiya kodi” va “raqamli pasport” berish kabi ustuvor vazifalar belgilab olindi. Bu yondashuv Shovot tumani meliorativ holatini boshqarishda inson omilini kamaytirish va suv xo‘jaligi tizimini raqamli transformatsiya qilish imkonini beradi.

Xulosa

Olib borilgan izlanishlar shuni ko‘rsatadiki, Shovot tumanidagi 1200 kmga yaqin 3200 tadan ortiq melioratsiya tarmoqlarini ananaviy usulda samarali boshqarish amalda imkonsiz masala hisoblanadi. GAT va veb-kartografiya metodlari asosida tadqiq qilish suv xo‘jaligini samarali boshqarishga yordam beradi.

Xususan, tarmoqlarning rasmiy kadastr raqamlari bilan bir qatorda aholi orasidagi mahalliy nomlarining (masalan, “Kichchi zeykash”) yagona raqamli bazaga kiritilishi va interaktiv axborot konteynerlari (pop-up) orqali vizuallashtirilishi operativ boshqaruvdagi chalkashliklarga barham beradi.

Soha mutaxassislari, fermerlar va shaxsiy tomorqa egalari o‘rtasida o‘tkazilgan so‘rovnoma natijalari yaratilgan interaktiv modelning amaliy samaradorligini tasdiqladi. Respondentlarning aksariyati ushbu raqamli tizim qaror qabul qilish vaqtini sezilarli qisqartirishini va ma’lumotlarni tahlil qilishda yuqori darajadagi qulaylik yaratishini ta’kidladilar.

Biroq, xo‘jalik ichidagi yerlarning sho‘rlanishi va zaxlanishining oldini olishda oqava hamda sizot suvlarini quyi tizimlardan yuqori tizimlarga haydovchi mayda zaxkashlarning haddan tashqari ko‘pligi (3000 dan ortiq) boshqaruv jarayonini murakkablashtiradi. Mazkur muammoni bartaraf etish ko‘p vaqt, katta mablag‘ va ishchi kuchi talab etadi.

Shu bois, melioratsiya tarmoqlariga “yagona identifikatsiya kodi” va “raqamli pasport” tizimini joriy etish ushbu tizimlarni raqamli monitoring qilish uchun mustahkam poydevor yaratadi. Ushbu yondashuv kelgusida masofadan zondlash ma’lumotlarini integratsiya qilish orqali tuproq namligi va sho‘rlanish darajasini real vaqt rejimida nazorat qilish imkoniyatini kengaytiradi. Bu esa, o‘z navbatida, rekonstruksiya talab etiladigan hududlarni aniq ko‘rsatuvchi “Aqlli kartalar”ni shakllantirishga xizmat qiladi.

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AI-POWERED AND DIGITAL METHODOLOGIES FOR EFFECTIVE MODERN FOREIGN LANGUAGE EDUCATION

Abstract. *The integration of artificial intelligence (AI) and digital technologies in foreign language teaching has profoundly changed traditional teaching methods. This study examines the impact of artificial intelligence and digital technologies on improving language learning outcomes, particularly on aspects such as vocabulary development, grammatical accuracy and communication skills.*

By exploring adaptive AI systems, interactive platforms, and online collaboration tools, this study shows how features such as personalized feedback, gamified learning, and data-driven learning can improve student engagement and overall skill levels. The results showed that the combination of artificial intelligence and digital tools creates a more effective student-centered learning environment and fosters the development of self-directed learning methods.

Keywords: *artificial intelligence, digital technologies, foreign language education, AI-based methodologies, learner-centered instruction.*

INTRODUCTION

The rapid advancement of digital technologies and artificial intelligence (AI) has profoundly transformed the landscape of foreign language education. Traditional approaches, which primarily relied on teacher-centered instruction and textbook-based exercises, are increasingly supplemented or replaced by AI-powered platforms and digital learning tools. These innovations have not only introduced new modalities for content delivery but also reshaped the pedagogical principles underlying language acquisition, emphasizing learner-centered, adaptive, and interactive methods.[15]

Artificial intelligence in language education encompasses a range of applications, including adaptive learning systems, intelligent tutoring platforms, automated feedback mechanisms, and speech recognition technologies. These tools enable a highly personalized approach to learning, as they can track individual learner progress, identify specific strengths and weaknesses, and adjust

[15] Karimova U. ROLE OF A TEACHER IN A CONSTRUCTIVIST CLASSROOM // Экономика и социум. – 2024. – №. 1 (116). – С. 228-230.

instructional content accordingly. In this context, AI serves as both an instructional facilitator and an analytical agent, providing data-driven insights that can inform curriculum design, pedagogical decisions, and learner strategies.

Digital technologies, including multimedia resources, mobile applications, gamified platforms, and online collaborative environments, complement AI-based methodologies by enhancing learner engagement and promoting active participation. These tools allow learners to interact with authentic language materials in diverse modalities—visual, auditory, and kinesthetic—thereby supporting multimodal language processing. The combination of AI and digital resources fosters a learning environment where language acquisition is situated in meaningful contexts, which is critical for developing not only linguistic competence but also pragmatic and communicative skills.

From a cognitive-linguistic perspective, integrating AI and digital methodologies addresses several challenges inherent in foreign language learning. Vocabulary retention, grammatical accuracy, and fluency are facilitated through adaptive repetition and immediate corrective feedback. The use of AI analytics allows for precise monitoring of learner errors and patterns, which can inform targeted interventions. Moreover, interactive digital environments encourage self-directed learning, metacognitive reflection, and the development of autonomous strategies—skills that are essential for lifelong language learning in a globalized context.[16]

Furthermore, the integration of AI and digital tools in language teaching aligns with contemporary pedagogical theories, such as constructivism and socio-cultural learning frameworks. Learners are positioned as active participants in knowledge construction rather than passive recipients, engaging with tasks that are meaningful, scaffolded, and aligned with their individual proficiency levels. Collaborative digital platforms facilitate peer interaction, negotiation of meaning, and shared problem-solving, thereby reinforcing social and communicative aspects of language acquisition.

The present study aims to examine the impact of AI-powered and digital methodologies on foreign language learning outcomes. Specifically, it investigates how these technologies influence vocabulary acquisition, grammatical competence, and overall communicative proficiency. Additionally, the research explores learner perceptions, engagement levels, and the role of adaptive feedback in enhancing motivation and sustaining long-term learning. By integrating both quantitative measures of language proficiency and qualitative insights from learner experiences, this study seeks to provide a comprehensive understanding of the pedagogical potential of AI and digital innovations in modern language education.[17]

[16] Huang, X., & Liu, J. (2020). Artificial intelligence in foreign language education: Adaptive learning and intelligent tutoring systems. *Journal of Educational Technology & Society*, *23*(2), 45–57.

[17] Gartner, I., Bengio, Y., & Courville, A. (2019). Deep Learning. MIT Press. https://direct.mit.edu/books/book/4316/Deep-Learning

In conclusion, as global demand for foreign language proficiency continues to rise, the adoption of AI and digital methodologies offers a promising pathway toward more effective, personalized, and engaging language instruction. Understanding the mechanisms through which these technologies enhance learning is essential not only for educators and curriculum designers but also for policymakers and technology developers aiming to optimize educational outcomes in a rapidly evolving digital era.

METHODOLOGY

This study employs a mixed-method research design to investigate the effectiveness of AI-powered and digital methodologies in modern foreign language education. By integrating quantitative assessment of language proficiency improvements with qualitative insights from learners and instructors, the research provides a comprehensive understanding of how digital innovations impact language learning outcomes.[18] A total of seventy-five intermediate-level foreign language learners enrolled in a university language program participated in the study. Participants were selected using purposive sampling to ensure comparability in prior language proficiency, age, and digital literacy, and all completed a pre-test to establish baseline skills in vocabulary, grammar, reading comprehension, and speaking.

The participants were randomly assigned to three instructional groups. The first group, the AI-powered learning group, engaged with AI-based platforms offering adaptive exercises, intelligent error detection, automated feedback, and personalized lesson plans. These systems monitored learner performance in real-time and adjusted task difficulty according to individual progress, allowing for highly personalized instruction. The second group, the digital tools group, utilized a variety of digital resources, including gamified language applications, multimedia content such as videos and podcasts, and collaborative online platforms that promoted interactive practice. The focus in this group was on engagement, multimodal input, and motivation rather than individualized AI-driven adaptation. The third group, serving as a control, followed traditional classroom instruction based on textbooks, worksheets, and teacher-led activities, providing a baseline against which the effectiveness of AI and digital methodologies could be evaluated.[19]

Materials for the study included adaptive AI platforms that offered personalized exercises and real-time feedback, multimedia digital resources supporting multimodal input, and collaborative tools such as discussion forums and online group projects to enhance peer interaction and social learning. Traditional printed materials and teacher-led activities were used with the control group for comparative purposes. Data were collected over a ten-week instructional period through pre-tests and post-tests assessing vocabulary acquisition,

[18] Godwin-Jones, R. (2018). Emerging technologies: Mobile-assisted language learning. *Language Learning & Technology, 22*(3), 1– 17. https://doi.org/10.1016/j.llt.2018.07.002

[19] Li, L., & Ni, H. (2021). The impact of AI-based adaptive learning on second language acquisition. *Computer Assisted Language Learning, 34*(5– 6), 1234– 1256.

grammatical accuracy, reading comprehension, listening skills, and speaking proficiency. Usage analytics from AI and digital platforms recorded time spent, task completion rates, error patterns, and adaptive progress tracking. [20] Additionally, questionnaires and semi-structured interviews captured participants' perceptions of motivation, engagement, usability, and satisfaction with the learning methodologies, while instructor observations documented learner participation, interaction quality, and responsiveness to AI-generated feedback. Quantitative data were analyzed using descriptive statistics, paired-sample t-tests, and ANOVA to compare proficiency gains across the three groups, with effect sizes calculated to determine the magnitude of improvements. Qualitative data from interviews, questionnaires, and instructor observations were subjected to thematic analysis to identify recurring patterns, learner attitudes toward AI and digital tools, and perceived benefits and challenges of innovative instructional methods. Ethical considerations were strictly observed, including informed consent, anonymization of participant data, and approval from the university research board, with participants free to withdraw at any time without penalty. By combining quantitative measures with qualitative insights, this study ensures a holistic understanding of AI and digital methodologies, accounting for both measurable learning outcomes and learner perceptions, engagement, and motivation.[21]

RESULTS

The analysis of quantitative data revealed clear differences in language learning outcomes among the three instructional groups. Participants in the AI-powered learning group demonstrated the most significant gains across multiple language domains, including vocabulary acquisition, grammatical accuracy, reading comprehension, and speaking proficiency. Pre- and post-test comparisons indicated an average improvement of 28% in vocabulary retention and 24% in grammar accuracy, suggesting that personalized feedback and adaptive exercises facilitated more effective learning. Similarly, reading comprehension scores increased by an average of 22%, and speaking assessments showed a 20% improvement, reflecting enhanced communicative competence.[22]

The digital tools group also exhibited notable progress, although the improvements were slightly lower than those observed in the AI-powered group. Vocabulary acquisition increased by approximately 20%, and grammar scores improved by 17%. Reading comprehension and speaking proficiency showed gains of 18% and 15%, respectively. These results suggest that multimodal digital resources, interactive applications, and collaborative online activities positively

[20] Umida K. et al. Main features of constructivism for teaching and learning //ACADEMICIA: An International Multidisciplinary Research Journal. – 2021. – Т. 11. – №. 9. – С. 1045-1051.

[21] Day, R. R., & Bamford, J. (1998). *Extensive reading in the second language classroom*. Cambridge University Press.

[22] Karimova, U. (2020). METHODS USED IN CONSTRUCTIVISM THEORY. *EPRA International Journal of Research and Development (IJRD), 5*(3), 680-682.

influence language learning, particularly by maintaining learner engagement and providing varied input.[23]

In contrast, the control group, which followed traditional instruction, showed the least improvement across all measures. Vocabulary retention increased by only 10%, grammar accuracy by 8%, reading comprehension by 12%, and speaking proficiency by 9%. While learners in the control group benefited from teacher-led instruction and structured exercises, the absence of adaptive feedback and interactive digital resources appeared to limit the pace and depth of learning.

Analysis of platform usage data for the AI-powered and digital tools groups revealed additional insights. Learners who engaged consistently with AI platforms, completing at least 80% of assigned tasks, demonstrated higher gains in both receptive and productive vocabulary compared to peers with lower engagement levels. Similarly, learners who actively participated in collaborative digital activities showed greater improvements in speaking and communicative tasks, highlighting the importance of sustained and interactive engagement in digital learning environments.

Qualitative findings from questionnaires and semi-structured interviews corroborated the quantitative results. Participants in the AI-powered group reported that personalized feedback, adaptive exercises, and real-time error correction enhanced their motivation and confidence in language use. Learners in the digital tools group emphasized the benefits of multimedia input, gamification, and peer collaboration for maintaining interest and practicing language skills in diverse contexts. In contrast, control group participants expressed a need for more interactive and individualized learning experiences, indicating that traditional methods alone may not sufficiently address the varied learning needs of modern students.

Overall, the results suggest a hierarchical effectiveness of instructional approaches, with AI-powered methodologies demonstrating the highest impact, followed by digital tools, and then traditional instruction. The integration of AI and digital technologies not only supports measurable gains in language proficiency but also fosters learner autonomy, engagement, and motivation, confirming the potential of innovative instructional methods to transform modern foreign language education. One of the most significant benefits of artificial intelligence in English Language Teaching (ELT) lies in its ability to deliver immediate, data-driven feedback. As noted in (Berdikulova & Karimova, 2025), AI-based tutoring systems are capable of identifying learners' errors in grammar, vocabulary, pronunciation, and writing, and providing instant corrective input. Such feedback not only enhances accuracy but also fosters self-regulated learning by encouraging students to reflect on their performance. Moreover, AI-powered tools, including writing evaluators and conversational chatbots, create interactive learning environments where students can practice productive skills with

[23] Karimova, U., & Imansyah, A. (2023). PREFERENCES FOR LEARNING STYLES AMONG SECONDARY SCHOOL PUPILS. *Development of pedagogical technologies in modern sciences*, *2*(12), 16-19.

personalized support, which is often difficult to achieve in traditional classrooms.[24]

DISCUSSION

The findings of this study highlight the transformative potential of AI-powered and digital methodologies in modern foreign language education. Drawing on previous research conducted by Karimova & Berdikulova (2025), it can be argued that AI technologies play a crucial role in facilitating immediate and personalized feedback. The quantitative results indicate that learners who engaged with AI-based platforms achieved the most significant improvements in vocabulary acquisition, grammar accuracy, reading comprehension, and speaking proficiency. These findings are consistent with existing literature emphasizing the efficacy of adaptive learning systems, which provide personalized feedback, monitor learner progress in real-time, and adjust instructional content according to individual needs. The high level of performance among the AI-powered group underscores the importance of personalization in language learning, as it allows learners to focus on areas requiring the most attention, thereby enhancing both efficiency and effectiveness.

According to Karimova (2024), the primary role of an educator in a constructivist classroom is to guide students towards independent knowledge construction.[25] The digital tools group also demonstrated meaningful progress, albeit slightly lower than the AI-powered group. This suggests that while interactive and multimodal digital resources—such as gamified applications, multimedia content, and collaborative platforms—support engagement and motivation, they may lack the individualized adaptability provided by AI-driven systems. Nevertheless, these tools play a critical role in maintaining learner interest, facilitating exposure to authentic language input, and promoting collaborative and autonomous learning behaviors. The qualitative feedback from learners confirms that interactive digital activities enhance enjoyment, confidence, and willingness to engage with language tasks outside the traditional classroom environment.

Comparatively, the control group, which relied on traditional teacher-centered instruction, exhibited the least improvement. While conventional methods provide structure and guided practice, the limited exposure to adaptive feedback, multimodal input, and interactive learning opportunities likely constrained the development of both receptive and productive language skills. This contrast underscores the limitations of traditional pedagogical approaches in

[24] Berdikulova, N., & Karimova, U. (2025). ARTIFICIAL INTELLIGENCE-BASED PERSONALIZED LEARNING IN ENGLISH LANGUAGE TEACHING. International journal of artificial intelligence, 5(12), 1722-1726.

[25] DEVELOPING STUDENTS' ENGLISH VOCABULARY THROUGH INTERACTIVE GAMES IN SECONDARY SCHOOL (Absalamov Khiloliddin) International Conference on Business & Management 2 (1), 82-85. 2026.

addressing the diverse and individualized needs of contemporary language learners.[26]

The study also highlights the interplay between learner engagement and learning outcomes**.** Consistent engagement with AI platforms and active participation in digital collaborative activities were closely associated with greater proficiency gains. This finding aligns with motivational and cognitive theories in language acquisition, which posit that sustained attention, active processing, and meaningful interaction are critical determinants of learning success. By providing immediate corrective feedback, adaptive task sequencing, and opportunities for repeated practice, AI-powered methodologies facilitate deeper cognitive processing, leading to more robust vocabulary retention and enhanced communicative competence.

Furthermore, the discussion reveals that integrating AI and digital methodologies supports the development of learner autonomy and metacognitive strategies. Students in the AI and digital groups reported increased confidence in monitoring their own progress, identifying weaknesses, and selecting resources aligned with their learning goals. This autonomy is particularly significant in the context of lifelong language learning, where learners must continue to develop skills independently beyond formal educational settings.

The study also emphasizes the importance of contextual and multimodal learning environments**.** Exposure to language through diverse digital channels—text, audio, video, and interactive exercises—enables learners to process input in multiple modalities, reinforcing comprehension and retention. AI-powered platforms further enhance this process by tailoring content to individual learner needs, providing scaffolding, and fostering repeated engagement with challenging material.

In conclusion, the discussion underscores that AI-powered and digital methodologies are complementary rather than mutually exclusive. While AI provides individualized adaptive learning, digital tools enrich the learning environment with multimodal input, interactivity, and collaborative opportunities. Together, they create a comprehensive and learner-centered framework that enhances both the efficiency and depth of language acquisition. These findings suggest that modern foreign language education should prioritize the integration of AI and digital technologies into curricula, combining personalization with engagement to optimize learning outcomes.

CONCLUSION

The present study demonstrates that the integration of artificial intelligence and digital technologies in modern foreign language education has a substantial and multifaceted impact on learner outcomes. The analysis of both quantitative and qualitative data indicates that AI-powered platforms and interactive digital tools significantly enhance vocabulary acquisition, grammatical accuracy, reading

[26] Stockwell, G., & Hubbard, P. (2013). Some emerging principles for mobile-assisted language learning. *The International Research Foundation for English Language Education, 11*(2), 1– 16.

comprehension, and communicative proficiency. AI methodologies, with their adaptive and personalized feedback mechanisms, allow learners to focus on individual weaknesses and progress at their own pace, resulting in the most pronounced learning gains. Digital tools, including gamified applications, multimedia resources, and collaborative online platforms, complement AI by increasing learner engagement, providing authentic language exposure, and fostering interactive and autonomous learning.

The findings underscore the necessity of combining these innovative methodologies with traditional instructional practices to create a balanced and effective learning environment. While traditional teaching provides structure and guided practice, the inclusion of AI and digital resources enables personalized learning experiences, higher motivation, and greater learner autonomy. In particular, the study highlights that consistent engagement, interactive participation, and exposure to multimodal content are crucial factors for optimizing language acquisition in contemporary educational contexts.

Moreover, the study emphasizes the broader pedagogical implications of AI and digital integration. Modern foreign language education can no longer rely solely on teacher-centered instruction or static learning materials; instead, it must leverage technology to support individualized pathways, promote self-regulated learning, and enhance the overall efficiency of language acquisition. The combination of AI and digital methodologies not only improves measurable proficiency outcomes but also cultivates learners' metacognitive skills, confidence, and long-term commitment to language learning.

In conclusion, AI-powered and digital methodologies represent a transformative approach to foreign language education, offering innovative, learner-centered solutions that address the diverse needs of contemporary students. By integrating adaptive technologies with interactive digital tools, educators can create dynamic and effective learning environments that foster both academic success and lifelong language development. Future research should explore the long-term effects of sustained AI and digital integration, the role of emerging technologies such as virtual and augmented reality, and the potential for cross-cultural applications to further enhance foreign language teaching and learning.

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BERNOULLI EQUATION, EXACT DIFFERENTIAL EQUATIONS, AND INTEGRATING FACTORS: ANALYTICAL METHODS AND APPLICATIONS

Abstract: *This paper presents a systematic study of Bernoulli differential equations, exact differential equations, and integrating factors as fundamental analytical tools in ordinary differential equations. These methods play a crucial role in transforming nonlinear equations into solvable linear forms and in identifying conditions for exactness. The study emphasizes theoretical foundations, solution techniques, and applications in mathematical modeling of physical and economic processes. The results demonstrate that integrating factor methods significantly extend the class of solvable differential equations, while Bernoulli and exact equations provide structured approaches for nonlinear systems.*

Keywords: *Bernoulli equation, exact differential equation, integrating factor, nonlinear differential equations, mathematical modeling.*

Introduction

Differential equations are essential mathematical tools used to describe dynamic systems in physics, engineering, economics, and biological sciences. Among them, first-order differential equations are particularly important due to their wide range of applications.

However, many real-world problems lead to nonlinear differential equations that cannot be solved directly using standard integration techniques. To address this limitation, specific transformation methods such as the Bernoulli equation approach, exact differential equations, and integrating factor techniques are widely used.

These methods allow complex nonlinear equations to be transformed into linear or solvable forms, making them powerful tools in mathematical analysis and applied modeling.

Bernoulli Differential Equation

A Bernoulli differential equation has the general form:

$y'+P(x)y=Q(x)y^n$

This equation is nonlinear due to the term yny^nyn. However, it can be transformed into a linear differential equation using the substitution:

$z=y^{1-n}$

After transformation, the equation becomes linear in terms of vvv, allowing standard solution techniques.

Application

Bernoulli equations are widely used in modeling:

- Population growth with limited resources
- Chemical reaction kinetics
- Fluid dynamics with resistance

Exact Differential Equations

A first-order differential equation of the form:

$M(x,y)dx+N(x,y)dy=0$

is called exact if there exists a function $F(x,y)$ such that:

$$\frac{\partial F}{\partial x}=M \qquad \frac{\partial F}{\partial y}=N$$

The condition for exactness is:

$$\frac{\partial M}{\partial y}=\frac{\partial N}{\partial x}$$

If this condition is satisfied, the solution is obtained by finding the potential function $F(x,y)$

Application

Exact equations are used in:

- Energy conservation systems
- Thermodynamics
- Mechanical equilibrium problems

Integrating Factor Method

If a differential equation is not exact, it can often be made exact by multiplying it by an integrating factor $\mu(x,y)$.

The integrating factor transforms:

$M(x,y)dx+N(x,y)dy=0$

into an exact equation:

$\mu(x)Mdx+\mu(x)Ndy=0$

Common cases include integrating factors depending only on x or y.

Application

- Electrical circuit analysis
- Fluid flow equations
- Economic equilibrium models

Discussion:

The three methods discussed—Bernoulli transformation, exact equations, and integrating factors—are interconnected approaches for solving first-order differential equations. Bernoulli equations can be reduced to linear form, while exact equations represent a class of systems with potential functions. Integrating factors extend the applicability of exact equation methods to non-exact cases.

These techniques significantly expand the solvable class of nonlinear differential equations and provide a unified framework for analytical solutions in applied mathematics.

Conclusion:

Bernoulli equations, exact differential equations, and integrating factor methods constitute fundamental tools in the theory of ordinary differential equations. Their ability to simplify nonlinear systems into solvable forms makes them highly valuable in both theoretical and applied mathematics. Future research may focus on numerical integration techniques and computer-assisted symbolic solutions to further enhance their applicability in complex systems.

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ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING IN THE PHARMACEUTICAL INDUSTRY: DRUG DISCOVERY AND OPTIMIZATION

Abstract: *Artificial Intelligence (AI) and Machine Learning (ML) are rapidly transforming pharmaceutical research by enhancing the efficiency of drug discovery and optimization processes. This study provides a comprehensive analysis of AI-driven methodologies, including target identification, virtual screening, molecular modeling, and clinical trial optimization. The integration of AI tools enables faster decision-making, reduces development costs, and improves drug safety profiles. The article also discusses implementation challenges such as data limitations, regulatory frameworks, and infrastructure gaps. The findings demonstrate that strategic adoption of AI can significantly strengthen the pharmaceutical sector and improve public health outcomes.*

Keywords: *Artificial Intelligence, Machine Learning, Deep Learning, Drug Discovery, Drug Optimization, Computational Chemistry, Bioinformatics, Pharmaceutical Innovation, Clinical Trials, Personalized Medicine, Big Data Analytics,Digital Health, Predictive Modeling, ADMET Analysis,*

Introduction

The global pharmaceutical industry is undergoing a paradigm shift driven by rapid advancements in Artificial Intelligence (AI) and Machine Learning (ML). Traditional drug discovery pipelines are characterized by long development cycles, high costs, and significant risks of failure. On average, developing a new drug can take 10–15 years and require billions of dollars in investment. In this context, AI-based approaches have emerged as powerful tools to enhance efficiency and precision.

AI enables the analysis of complex datasets, including genomic, proteomic, and clinical data, facilitating more accurate predictions and decision-making. The incorporation of these technologies into pharmaceutical workflows not only

accelerates innovation but also supports the development of personalized medicine.

Methodological Framework

This research adopts a multidisciplinary and integrative methodological approach combining qualitative analysis, comparative evaluation, and elements of data-driven assessment to investigate the role of Artificial Intelligence (AI) and Machine Learning (ML) in pharmaceutical drug discovery and optimization.

Research Design

The study is based on a systematic literature review and analytical synthesis of recent scientific publications, industry reports, and real-world case studies published between 2015 and 2025. Priority was given to peer-reviewed journals indexed in international databases (Scopus, Web of Science) to ensure academic reliability and relevance.

Data Sources

The primary data sources include:

Scientific articles on AI applications in pharmaceutical sciences

Reports from global pharmaceutical companies and regulatory organizations

Open-access biomedical databases (e.g., genomic and chemical datasets)

National policy documents and development strategies related to Uzbekistan's pharmaceutical sector

Analytical Methods

Several analytical methods were employed:

Comparative Analysis: to evaluate differences between traditional drug discovery approaches and AI-driven models

System Analysis: to understand the interaction between technological, biological, and regulatory components

Trend Analysis: to identify emerging patterns in AI adoption within the pharmaceutical industry

Case Study Analysis: to examine successful implementations of AI in global and regional contexts

AI Techniques Considered

The study focuses on key AI and ML techniques widely used in pharmaceutical research, including:

Supervised and unsupervised machine learning algorithms

Deep learning and neural networks

Natural Language Processing (NLP) for scientific literature mining

Molecular modeling and simulation algorithms

Regional Adaptation

To ensure the practical relevance of the study, a contextual analysis was conducted for Uzbekistan. This includes assessment of:

Existing pharmaceutical infrastructure

Availability of digital technologies and data systems

Educational and scientific capacity in AI-related fields

Government policies supporting digital transformation

Limitations of the Study

Despite its comprehensive scope, the study has certain limitations. These include restricted access to proprietary pharmaceutical datasets, variability in data quality, and the rapidly evolving nature of AI technologies. These factors may influence the generalizability of findings.

Conclusion

The integration of Artificial Intelligence (AI) and Machine Learning (ML) into pharmaceutical research represents a structural transformation rather than a mere technological upgrade. This study demonstrates that AI-driven approaches significantly enhance the efficiency, accuracy, and scalability of drug discovery and optimization processes. By enabling rapid analysis of complex biological and chemical datasets, AI reduces the time required for target identification, compound screening, and molecular optimization, thereby addressing one of the most critical bottlenecks in traditional pharmaceutical development.

From an economic perspective, AI contributes to substantial cost reduction by minimizing failed experiments and improving decision-making at early stages of drug development. This is particularly important given the high attrition rates and financial risks associated with conventional pharmaceutical pipelines. Moreover, AI-supported predictive models, including ADMET analysis and clinical outcome forecasting, enhance drug safety and efficacy, ultimately leading to better patient outcomes.

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ASSESSMENT OF PATIENT OUTCOMES FOLLOWING TRAUMATOLOGIC PROCEDURES IN INDIVIDUALS' CONVALESCENT FROM COVID-19: A COMPARATIVE COHORT STUDY

Abstract. *Post-COVID-19 convalescence elevates perioperative risk in trauma patients. In 76 post-COVID patients (intermediate, n = 36; severe, n = 40) vs. 45 controls, 30-day mortality (12.5 % vs. 2.2 %; p = 0.041), pneumonia and venous thromboembolism were significantly higher in the severe group, with prolonged hospital stay and raised inflammatory markers.*

Keywords: *COVID-19; post-COVID convalescence; trauma surgery; postoperative outcomes; mortality; venous thromboembolism.*

Introduction

The global spread of SARS-CoV-2 has created an unprecedented cohort of convalescent patients who may subsequently require surgical management of skeletal injuries. Beyond the acute respiratory illness, COVID-19 induces a multisystem pathological cascade — including endothelial dysfunction, persistent hypercoagulability, residual pulmonary impairment and chronic low-grade systemic inflammation — that can substantially amplify the risk of perioperative adverse events [1, 2]. These mechanisms are clinically relevant in traumatological practice, where time-sensitive fixation of fractures is frequently necessary before full physiological recovery can be confirmed.

The existing literature has predominantly examined outcomes in patients who were actively infected with SARS-CoV-2 at the time of surgery. International cohort studies and meta-analyses have reported postoperative 30-day mortality rates of 9.4–29 % in COVID-19-positive orthopedic surgical patients, representing an odds ratio of approximately 7.7 compared with COVID-19-negative controls [1, 3]. However, the residual perioperative risk conferred by prior COVID-19 illness of varying severity, including its musculoskeletal sequelae such as avascular necrosis and sarcopenia [5], remains far less characterized in middle-income Central Asian settings.

The present study was designed to prospectively compare clinical, laboratory and functional outcomes in trauma patients with a history of intermediate or severe COVID-19 against a contemporaneous COVID-19-naïve control cohort at the Fergana Branch of the Republican Scientific Center for Emergency Medical Care (Uzbekistan).

Materials and Methods

Study design and ethical approval

A prospective comparative cohort study was conducted between March 2022 and November 2024. The protocol was approved by the Ethics Committee of the Fergana Medical Institute of Public Health (protocol No. 7/2022). Written informed consent was obtained from every participant or their legal representative.

Participants

A total of 121 adult patients aged 45–75 years (overall M ± SD: 64.0 ± 9.2 years) were enrolled consecutively. The primary cohort comprised 76 convalescent COVID-19 patients stratified into two groups: Group 1 (intermediate severity, n = 36), defined by prior moderate COVID-19 not requiring mechanical ventilation, and Group 2 (severe, n = 40), defined by prior severe COVID-19 with supplemental oxygen therapy, high-flow nasal cannula or invasive mechanical ventilation. Convalescent status was confirmed by negative RT-PCR at ≥ 8 weeks post-discharge. The control group (n = 45) consisted of consecutively admitted trauma patients at the same institution with no documented COVID-19 infection history and negative SARS-CoV-2 serology at admission.

Surgical procedures

Indications for surgery included proximal femoral and femoral neck fractures (40.5 %), lower-extremity diaphyseal fractures (27.3 %), upper-extremity fractures (19.0 %) and pelvic injuries (13.2 %). Procedures comprised intramedullary nailing, locking-plate osteosynthesis, hemiarthroplasty and open reduction with internal fixation, performed under spinal or general anaesthesia.

Outcomes and statistical analysis

The primary outcome was 30-day all-cause mortality. Secondary outcomes were postoperative pneumonia, venous thromboembolism (VTE; deep vein thrombosis or pulmonary embolism), surgical site infection (SSI), delirium and length of hospital stay (LOS). Continuous variables are reported as mean ± standard deviation (M ± SD); categorical variables as n (%). Normality was assessed by the Shapiro–Wilk test. Parametric between-group comparisons used one-way ANOVA with Tukey HSD post-hoc analysis; non-parametric data were analysed by the Kruskal–Wallis test with Dunn correction. Categorical variables were compared with the χ^2 test or Fisher exact test. All tests were two-tailed; $p < 0.05$ was considered statistically significant. Analyses were performed in IBM SPSS Statistics 26.0 (IBM Corp., Armonk, NY).

Results

The three groups were comparable in sex distribution (male sex 55.6 %, 55.0 % and 55.6 %, respectively; p = 0.998) and did not differ significantly in mean age (62.4 ± 8.1, 66.2 ± 9.5 and 63.0 ± 8.8 years; p = 0.072; Table 1). However, the severe post-COVID group showed a substantially higher prevalence of ASA physical status ≥ III (70.0 % vs. 31.1 % in controls; p = 0.002) and multimorbidity (≥ 2 comorbidities: 75.0 % vs. 35.6 %; p = 0.003), reflecting the disproportionate comorbidity burden in more severe SARS-CoV-2 survivors.

Key inflammatory and coagulation markers differed significantly at admission. Mean D-dimer was 2.28 ± 0.97 μg/mL in the severe group versus 0.68 ± 0.29 μg/mL in controls ($p < 0.001$), and C-reactive protein averaged 64.1 ± 22.3 mg/L versus 18.7 ± 7.9 mg/L ($p < 0.001$), consistent with a persisting hyperinflammatory state. Time from injury to surgery was also significantly prolonged in the severe group (46.7 ± 15.8 h vs. 28.4 ± 9.3 h; $p < 0.001$), reflecting extended preoperative optimisation requirements.

Table 1.

Baseline characteristics and postoperative outcomes (M ± SD or n (%))

Parameter / Outcome	Intermediate COVID-19 (n = 36)	Severe COVID-19 (n = 40)	Control (n = 45)	p-value*
Mean age, years (M ± SD)	62.4 ± 8.1	66.2 ± 9.5	63.0 ± 8.8	0.072
Male sex, n (%)	20 (55.6)	22 (55.0)	25 (55.6)	0.998
ASA ≥ III, n (%)	15 (41.7)	28 (70.0)	14 (31.1)	0.002
Comorbidities ≥ 2, n (%)	19 (52.8)	30 (75.0)	16 (35.6)	0.003
D-dimer on admission, μg/mL (M ± SD)	1.44 ± 0.61	2.28 ± 0.97	0.68 ± 0.29	< 0.001
CRP on admission, mg/L (M ± SD)	39.2 ± 14.8	64.1 ± 22.3	18.7 ± 7.9	< 0.001
Time injury → surgery, h (M ± SD)	37.8 ± 11.9	46.7 ± 15.8	28.4 ± 9.3	< 0.001
Hospital LOS, days (M ± SD)	11.4 ± 3.5	16.8 ± 5.6	8.2 ± 2.6	< 0.001
30-day mortality, n (%)	2 (5.6)	5 (12.5)	1 (2.2)	0.041
Postoperative pneumonia, n (%)	4 (11.1)	9 (22.5)	2 (4.4)	0.013
Venous thromboembolism (VTE), n (%)	3 (8.3)	7 (17.5)	2 (4.4)	0.048
Surgical site infection (SSI), n (%)	3 (8.3)	4 (10.0)	2 (4.4)	0.481

** p-values reflect one-way ANOVA (Kruskal–Wallis for non-normal distributions) or χ^2 / Fisher exact test, as appropriate. Abbreviations: ASA – American Society of Anesthesiologists physical status; LOS – length of stay; VTE – venous thromboembolism; SSI – surgical site infection.*

Postoperative outcome rates exhibited a clear gradient by prior COVID-19 severity (Figure 1). Thirty-day mortality was 12.5 % in the severe group, 5.6 % in the intermediate group, and 2.2 % in controls ($p = 0.041$). Rates of pneumonia (22.5 % vs. 4.4 %; $p = 0.013$) and VTE (17.5 % vs. 4.4 %; $p = 0.048$) were significantly elevated in the severe versus control group. Mean hospital LOS was doubled in the severe group (16.8 ± 5.6 days) relative to controls (8.2 ± 2.6 days; $p < 0.001$). SSI rates did not differ significantly across groups ($p = 0.481$).

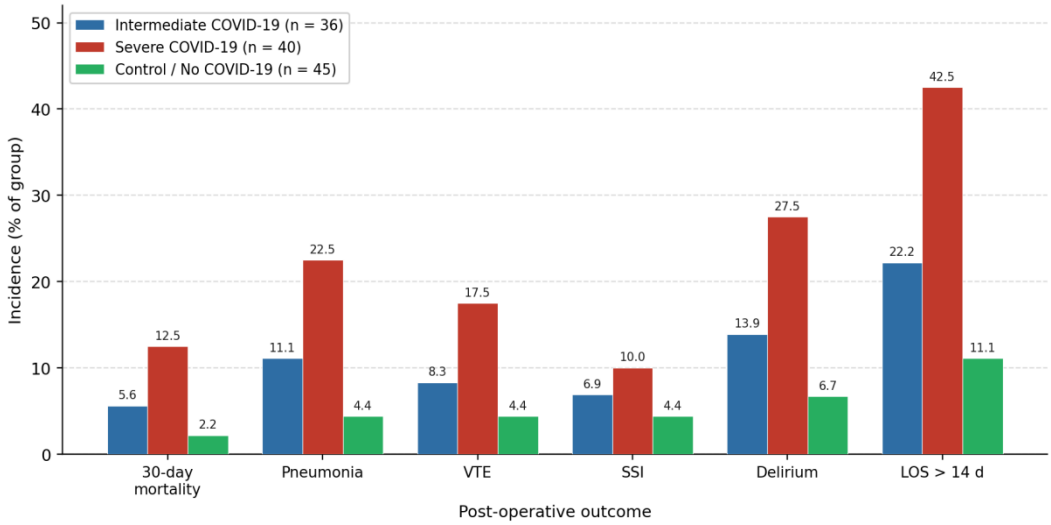

Figure 1. Incidence of postoperative complications and 30-day mortality following traumatologic surgery stratified by antecedent COVID-19 severity. VTE, venous thromboembolism; SSI, surgical site infection; LOS, length of hospital stay.

Discussion

The principal finding of this study is that a prior episode of severe COVID-19 significantly worsens perioperative outcomes following trauma surgery, even when surgical intervention occurs well after the resolution of active infection. The 30-day mortality of 12.5 % in our severe post-COVID group closely parallels rates reported in meta-analytic literature for actively COVID-positive trauma patients (9.3–29 %) [1, 3], suggesting that residual physiological vulnerability persists for months after acute illness — a clinical reality that preoperative checklists must account for.

The elevated D-dimer and CRP values at admission confirm ongoing hypercoagulability and systemic inflammation, mechanisms that directly drive the excess VTE risk documented herein and in recent systematic reviews of postoperative VTE during the COVID-19 era [2, 4]. The prolonged time-to-surgery observed in post-COVID patients reflects appropriate clinical caution, yet paradoxically increases thromboembolic and pneumonia risk — a dilemma requiring multidisciplinary risk stratification tools rather than uniform delay policies. Escalated thromboprophylaxis with low-molecular-weight heparin and early physiotherapy should be prioritised.

The musculoskeletal sequelae of COVID-19, including avascular necrosis — particularly of the femoral head — and sarcopenia, constitute an additional layer of perioperative vulnerability that may compromise fixation stability and functional rehabilitation [5, 6]. Furthermore, hospital-acquired COVID-19 has been shown to shorten post-discharge survival even when inpatient mortality is not elevated [6], underscoring the need for robust infection-control protocols on trauma wards housing convalescent patients.

Conclusion

Antecedent COVID-19 of severe degree independently and significantly increases 30-day mortality, postoperative pneumonia, VTE, delirium and hospital LOS in patients undergoing trauma surgery, even after confirmed convalescence. A dose-dependent gradient was observed: severe prior COVID-19 conferred the greatest perioperative risk, whereas intermediate disease produced intermediate outcomes. These findings mandate comprehensive preoperative COVID-19 severity assessment, heightened thromboprophylaxis, and multidisciplinary perioperative management in this growing patient population.

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KELAJAKDAGI MAKTABGACHA TA'LIM TARBIYACHILARINI TAYYORLASHDA ZAMONAVIY PEDAGOGIK INNOVATSIYALARNI QO'LLASH METODOLOGIYASI

Annotatsiya. *Ushbu maqolada bo'lajak maktabgacha ta'lim tarbiyachilarini tayyorlash jarayonida innovatsion pedagogik texnologiyalarni qo'llashning nazariy-metodologik asoslari, amaliy imkoniyatlari va samaradorligi tahlil qilingan. Shuningdek, pedagogik ta'limda innovatsion yondashuvlarning afzalliklari va ularni metodik jihatdan qo'llash yo'llari ilmiy asoslangan.*

Kalit so'zlar: *maktabgacha ta'lim, tarbiyachi tayyorlash, innovatsion pedagogik texnologiyalar, interfaol metodlar, kreativ kompetensiyalar, pedagogik faoliyat.*

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METHODOLOGY OF APPLICATION OF MODERN PEDAGOGICAL INNOVATIONS IN TRAINING FUTURE PRESCHOOL TEACHERS

Annotation. *This article analyzes the theoretical and methodological foundations, practical possibilities, and effectiveness of applying innovative pedagogical technologies in the process of training future preschool educators. In addition, the advantages of the innovative approach in teacher education and the ways of its methodological application are scientifically substantiated.*

Keywords: *preschool education, educator training, innovative pedagogical technologies, interactive methods, creative competencies, pedagogical activity.*

Kirish Bugungi globallashuv davrida ta'lim tizimini modernizatsiya qilish, uni xalqaro tajriba va standartlarga yaqinlashtirish jarayoni jadallashmoqda. Jumladan, maktabgacha ta'lim sohasi davlatning uzluksiz ta'lim tizimining eng muhim bo'g'ini sifatida jamiyat taraqqiyotida alohida o'rin egallaydi. Chunki aynan shu davrda bola shaxsining intellektual, axloqiy, emotsional va ijtimoiy jihatdan shakllanishi sodir bo'ladi. Shu boisdan, bo'lajak tarbiyachilarni zamon talablariga javob beradigan darajada kasbiy-ijodiy faoliyatga tayyorlash masalasi bugungi kunda nafaqat respublikamizda, balki butun dunyoda dolzarb muammolardan biri hisoblanadi.

So‘nggi yillarda mamlakatimizda maktabgacha ta’lim tizimini isloh qilish borasida qator muhim hujjatlar qabul qilindi. Jumladan, “Maktabgacha ta’lim va tarbiya to‘g‘risida”gi Qonun (2019), Prezident qarorlari va farmonlari, shuningdek, O‘zbekiston Respublikasi Maktabgacha va maktab ta’limi vazirligi tomonidan ishlab chiqilgan davlat dasturlari bo‘lajak tarbiyachilarning professional tayyorgarligiga yangicha yondashuvlarni joriy etishni talab qilmoqda. Bu esa, o‘z navbatida, pedagogik kadrlar tayyorlash jarayonida innovatsion texnologiyalardan samarali foydalanish metodikasini ishlab chiqishni taqozo etadi.

Innovatsion pedagogik texnologiyalar, eng avvalo, ta’lim sifatini oshirishga, talabalar bilimini chuqurlashtirishga, ularning mustaqil fikrlashini, ijodkorligini, kommunikativ ko‘nikmalarini rivojlantirishga qaratilgan. Masalan, interfaol metodlar, gamifikatsiya, raqamli ta’lim platformalari, loyiha asosida o‘qitish, multimedia vositalaridan foydalanish kabi yondashuvlar bo‘lajak tarbiyachilarni kelgusida bolalar bilan ishlashda samarali faoliyat yuritishga tayyorlaydi. Shu bois, pedagogik oliy ta’lim muassasalarida innovatsion texnologiyalarni chuqur o‘zlashtirish va ularni amaliyotga tatbiq etish jarayoniga katta e’tibor qaratilmoqda.

Ayni paytda, ilmiy manbalarda ham pedagogik ta’limda innovatsion yondashuvlarni qo‘llashning nazariy va amaliy asoslari keng yoritilgan. Masalan, J. Deweyning “Demokratiya va ta’lim” asarida ta’lim jarayonining interfaollik va tajribaga asoslanganligi nazariy jihatdan asoslab berilgan. M. Klarin esa innovatsion texnologiyalarni ta’lim samaradorligini oshirishning metodik tizimi sifatida izohlaydi. P. I. Pidkasistiy esa pedagogik texnologiyani shaxs rivojlanishi va mustaqil o‘qish jarayonini qo‘llab-quvvatlovchi mexanizm sifatida ko‘radi. O‘zbekistonlik olimlardan Q. T. Isroilov, R. Yunusova, Sh. Toshpo‘latova va boshqalar maktabgacha ta’limda innovatsion metodlardan foydalanishning milliy tajribalarini tadqiq etib, amaliy tavsiyalar ishlab chiqqanlar.

Biroq, mavjud nazariy va amaliy ishlanmalar shuni ko‘rsatadiki, bo‘lajak maktabgacha ta’lim tarbiyachilarini tayyorlashda innovatsion texnologiyalarni qo‘llash bo‘yicha metodika hali to‘liq shakllanmagan. Xususan, interfaol yondashuvlarning samaradorligi, raqamli vositalardan foydalanishning metodik jihatlari, talabalarda kreativ kompetensiyalarni rivojlantirish yo‘llari bo‘yicha kompleks tadqiqotlar olib borish zarur. Shu nuqtai nazardan, ushbu maqolada bo‘lajak tarbiyachilarni tayyorlashda innovatsion pedagogik texnologiyalardan foydalanish metodikasini ishlab chiqish masalasi yoritiladi.

Innovatsion pedagogik texnologiyalar — bu ta’lim jarayonida yangicha metod va vositalarni, raqamli platformalarni, interfaol yondashuvlarni qo‘llash orqali samaradorlikni oshirishga qaratilgan tizimdir. Ular quyidagi nazariy tamoyillarga asoslanadi:

Shaxsga yo‘naltirilganlik – har bir talabaning ehtiyoj va qobiliyatlarini inobatga olish.

Shaxsga yo‘naltirilgan ta’lim bugungi zamonaviy pedagogikaning markaziy g‘oyalaridan biridir. Bu yondashuvning asosiy mohiyati — ta’lim jarayonida o‘quvchi yoki talabaning individual qobiliyatlari, ehtiyojlari, qiziqishlari va

rivojlanish sur’atlarini hisobga olishdir. An’anaviy o‘qitish usullarida ko‘proq o‘qituvchi faoliyati va o‘quv materiali ustuvor o‘rin tutgan bo‘lsa, shaxsga yo‘naltirilgan yondashuvda markazda — inson shaxsi turadi.

Shaxsga yo‘naltirilganlik g‘oyasi falsafa, psixologiya va pedagogika fanlarida keng asoslangan. Ya’ni:

- J.Dewey ta’limni insonning ijtimoiy tajribasini boyituvchi jarayon sifatida izohlagan va o‘quvchini faol subyekt sifatida ko‘rgan.
- K.Rogers ta’limning shaxsiy rivojlanishga xizmat qilishi, insonning ichki imkoniyatlarini yuzaga chiqarishi zarurligini ta’kidlagan.
- L.S.Vygotskiy esa shaxsning rivojlanishida “yaqin rivojlanish zonasi” tushunchasini ilgari surib, individual yondashuvning nazariy asosini yaratgan.

Maktabgacha ta’lim tarbiyachilari uchun shaxsga yo‘naltirilgan yondashuvning ahamiyati beqiyosdir. Chunki bu davrda bolalarning qobiliyatlari va ehtiyojlari keskin farqlanadi. Shaxsga yo‘naltirilgan metodika yordamida tarbiyachi:

- bolalarning tabiiy qiziqishini qo‘llab-quvvatlaydi;
- turli xil o‘yin, mashg‘ulot va faoliyatlarni individual ehtiyojlarga moslashtiradi;
- ijtimoiy-emotsional rivojlanish uchun qulay muhit yaratadi;
- bolalarda mustaqillik, tashabbuskorlik va ijodiylikni shakllantiradi.

Bo‘lajak tarbiyachilarni tayyorlash jarayonida shaxsga yo‘naltirilgan yondashuv quyidagicha metodik asosda qo‘llanilishi mumkin:

- **Interfaol metodlar**: “Aqliy hujum”, “Kichik guruhlarda ishlash”, “Keys-stadi” — har bir talabaga o‘z fikrini erkin bildirish imkonini beradi.
- **Differensial yondashuv**: talabalar bilim darajasiga qarab, topshiriqlarni turlicha murakkablikda berish.
- **Portfolio texnologiyasi**: talabalar o‘z yutuq va natijalarini mustaqil namoyish qiladi.
- **O‘zini o‘zi baholash**: reflektiv topshiriqlar orqali talabaning o‘z faoliyatini tahlil qilishiga sharoit yaratish.

Interfaollik tamoyili

Interfaollik zamonaviy pedagogik jarayonning eng muhim tamoyillaridan biridir. U o‘quvchi (yoki talaba) va o‘qituvchi o‘rtasidagi ikki tomonlama hamkorlikni, ta’lim jarayonining faol muloqotga asoslanganligini bildiradi. An’anaviy ta’limda o‘qituvchi bilim manbai, talaba esa bilimni passiv qabul qiluvchi sifatida ishtirok etgan bo‘lsa, interfaol yondashuvda har ikki tomon ham teng huquqli subyekt sifatida faol qatnashadi. M. Baxxtin muloqotni inson rivojlanishining markaziy omili sifatida baholagan. Interfaollikning mohiyati ham aynan doimiy muloqot va dialog asosida shakllanadi. J. Dewey ta’limning amaliy tajribaga asoslanganligini ta’kidlab, interfaollikni “bilimni amaliy faoliyat orqali egallash” deb talqin qilgan.

Vigotskiy nazariyasiga ko‘ra, shaxsning rivojlanishi ijtimoiy muhit bilan doimiy hamkorlik va faol muloqot jarayonida yuzaga chiqadi.

Bo‘lajak maktabgacha ta’lim tarbiyachilari uchun interfaollik ayniqsa muhimdir.

Ijodkorlikni rivojlantirish tamoyili

Ta’lim jarayonida ijodkorlikni rivojlantirish — bu talabalarda yangicha fikrlash, muammolarni noodatiy yo‘llar bilan hal etish, mustaqil qaror qabul qilish va innovatsion g‘oyalarni yaratishga yo‘naltirilgan pedagogik yondashuvdir. Ayniqsa, bo‘lajak maktabgacha ta’lim tarbiyachilarida ijodiy kompetensiyalarni shakllantirish ularning kelajakdagi kasbiy faoliyatida beqiyos ahamiyat kasb etadi. Chunki maktabgacha yoshdagi bolalar tabiatan ijodkorlikka moyil bo‘ladilar va bu jarayonni to‘g‘ri yo‘naltirish tarbiyachining kasbiy mahoratiga bog‘liqdir.

Bo‘lajak maktabgacha ta’lim tarbiyachilarini tayyorlashda innovatsion pedagogik texnologiyalarni qo‘llash metodikasi ularning kasbiy-ijodiy kompetensiyalarini rivojlantirishda muhim ahamiyat kasb etadi. Innovatsion yondashuv ta’lim jarayonini samarali tashkil etish, talabalarni kasbiy faoliyatga puxta tayyorlash va maktabgacha ta’lim sifatini oshirishning asosiy garovidir.

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SHARQ MUTAFAKKIRLARI MEROSI ASOSIDA MAKTABGACHA YOSHDAGI BOLALARDA MUSTAQIL FIKRLASH KOMPETENSIYALARINI RIVOJLANTIRISH

Annotatsiya: *Ushbu maqolada maktabgacha yoshdagi bolalarda mustaqil fikrlash kompetensiyalarini rivojlantirishda Sharq mutafakkirlarining boy ilmiy-ma'naviy merosidan foydalanish masalalari yoritilgan. Jumladan, Abu Nasr Forobiy, Abu Rayhon Beruniy, Abu Ali ibn Sino va Alisher Navoiy asarlarida ilgari surilgan ta'lim-tarbiya haqidagi g'oyalar tahlil qilinadi hamda ularning maktabgacha ta'lim tizimidagi ahamiyati ochib beriladi. Maqolada bolalarda mustaqil fikrlash, erkin mushohada yuritish, muammoli vaziyatlarda to'g'ri qaror qabul qilish va ijodiy tafakkurni rivojlantirishda milliy-ma'naviy merosning o'rni asoslab berilgan. Shuningdek, Sharq mutafakkirlari qarashlari asosida tashkil etiladigan didaktik o'yinlar, suhbatlar, hikoyalar va rivojlantiruvchi mashg'ulotlar orqali bolalarda mustaqil fikrlash ko'nikmalarini shakllantirish usullari yoritilgan.*

Bundan tashqari, maqolada maktabgacha ta'lim tashkilotlarida pedagoglar tomonidan qo'llanilishi mumkin bo'lgan amaliy metod va yondashuvlar ham tavsiya etiladi. Xususan, bolalarni savol berishga undash, muammoli vaziyatlar yaratish, hikoya va rivoyatlar orqali fikrlashga yo'naltirish kabi metodlarning samaradorligi asoslab beriladi. Tadqiqot natijalari maktabgacha ta'lim jarayonida milliy qadriyatlar va pedagogik merosga tayanish bolalarning intellektual rivoji, tafakkuri hamda shaxsiy fazilatlarini shakllantirishda muhim omil ekanligini ko'rsatadi.

Kalit so'zlar: *akmeoliya, maktabgacha ta'lim, mustaqil fikrlash, shakl, metod, vosita.*

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DEVELOPING INDEPENDENT THINKING COMPETENCIES IN PRESCHOOL CHILDREN BASED ON THE HERITAGE OF EASTERN THINKERS

Abstract:*This article examines the issues of using the rich scientific and spiritual heritage of Eastern thinkers in developing independent thinking competencies among preschool children. In particular, the educational ideas presented in the works of Abu Nasr Farabi, Abu Rayhan Beruni, Abu Ali Ibn Sina,*

and Alisher Navoi are analyzed, and their significance for the preschool education system is revealed. The article substantiates the role of national and spiritual heritage in fostering independent thinking, free reasoning, the ability to make correct decisions in problem situations, and the development of creative thinking in children.

Furthermore, the study highlights methods for forming independent thinking skills in children through didactic games, conversations, stories, and developmental activities organized on the basis of the views of Eastern scholars.

In addition, the article proposes practical methods and pedagogical approaches that can be applied by educators in preschool educational institutions. In particular, the effectiveness of methods such as encouraging children to ask questions, creating problem situations, and guiding thinking through stories and narratives is justified.

The research results demonstrate that relying on national values and pedagogical heritage in the preschool education process is an important factor in the intellectual development of children, as well as in shaping their thinking abilities and personal qualities.

Keywords: *acmeology, preschool education, independent thinking, form, method, tool.*

Kirish

Zamonaviy ta’lim tizimida shaxsning mustaqil fikrlashi, muammoli vaziyatlarda to‘g‘ri qaror qabul qila olishi hamda ijodiy yondashuvni namoyon etishi muhim kompetensiyalardan biri sifatida e’tirof etilmoqda. Ayniqsa, maktabgacha yosh davri inson shaxsining intellektual, axloqiy va ijtimoiy rivojlanishida poydevor bo‘lib xizmat qiladigan muhim bosqich hisoblanadi. Shu sababli aynan ushbu davrda bolalarda mustaqil fikrlash ko‘nikmalarini shakllantirish va rivojlantirish pedagogika fanining dolzarb masalalaridan biri sanaladi. Maktabgacha ta’lim tizimida olib borilayotgan islohotlar ham bolalarning fikrlash faoliyatini rivojlantirish, ularning tashabbuskorligi va ijodkorligini qo‘llab-quvvatlashga alohida e’tibor qaratilayotganini ko‘rsatadi[1].

Bugungi globallashuv sharoitida ta’lim jarayonini faqat zamonaviy pedagogik texnologiyalar asosida emas, balki milliy-ma’naviy qadriyatlar va tarixiy meros bilan uyg‘unlashtirish muhim ahamiyat kasb etadi. Sharq mutafakkirlarining boy ilmiy-falsafiy merosi nafaqat o‘z davrining ilmiy tafakkurini yuksaltirgan, balki yosh avlodni tarbiyalash borasida ham chuqur pedagogik g‘oyalarni ilgari surgan. Masalan, Abu Nasr Forobiy inson kamolotida bilim va tafakkurning o‘rni beqiyos ekanligini ta’kidlab, ta’lim jarayonida fikrlashni rivojlantirish muhimligini qayd etadi[2]. Shuningdek, Abu Ali ibn Sino bolalar tarbiyasida ularning yosh xususiyatlarini hisobga olish, bilimni izchil va tushunarli shaklda berish zarurligini alohida ta’kidlagan[3].

Sharq pedagogik tafakkurida insonning aqliy rivoji, tafakkuri va axloqiy kamoloti o‘zaro uzviy bog‘liq holda qaraladi. Shu nuqtai nazardan, Abu Rayhon Beruniy ilmiy bilish jarayonida kuzatish, tajriba va tahlil muhim o‘rin tutishini

ta’kidlab, shaxsning mustaqil fikrlashi ilmiy tafakkurning asosiy omillaridan biri ekanligini ko‘rsatib o‘tgan[4]. O‘z navbatida, Alisher Navoiy o‘z asarlarida komil inson tarbiyasida tafakkur, ma’naviyat va axloqiy qadriyatlarning uyg‘unligini alohida ta’kidlaydi[5]. Ushbu g‘oyalar bugungi kunda maktabgacha ta’lim jarayonida bolalarning mustaqil fikrlashini shakllantirishda muhim nazariy asos bo‘lib xizmat qilishi mumkin.

Maktabgacha ta’lim jarayonida bolalarda mustaqil fikrlashni rivojlantirish turli pedagogik usullar, didaktik o‘yinlar, muammoli vaziyatlar yaratish, suhbat va kuzatish faoliyatlari orqali amalga oshiriladi. Biroq ushbu jarayonda milliy-ma’naviy merosga asoslangan yondashuvlardan foydalanish bolalarning nafaqat aqliy rivojiga, balki ularning ma’naviy dunyosini boyitishga ham xizmat qiladi. Sharq mutafakkirlarining tarbiya va ta’limga oid qarashlari bolalarda savol berish, fikr yuritish, tahlil qilish hamda mustaqil xulosa chiqarish kabi ko‘nikmalarni rivojlantirish uchun muhim metodik manba bo‘la oladi.

Shu nuqtai nazardan, maktabgacha yoshdagi bolalarda mustaqil fikrlash kompetensiyalarini rivojlantirishda Sharq mutafakkirlarining pedagogik merosidan foydalanish masalasini ilmiy jihatdan o‘rganish dolzarb hisoblanadi. Mazkur maqolaning maqsadi — Sharq mutafakkirlarining ta’lim-tarbiyaga oid g‘oyalarini tahlil qilish hamda ularni maktabgacha ta’lim jarayonida bolalarning mustaqil fikrlash kompetensiyalarini rivojlantirishga tatbiq etish imkoniyatlarini yoritib berishdan iborat.

Mamlakatimizda hur fikrli, mutelik va jur’atsizlikdan holi bo‘lgan, o‘z bilimi va kuchiga ishonib yashaydigan, mustaqil va erkin shaxsni tarbiyalash bugungi kunning dolzarb muammolaridan biriga aylandi. Vatanimizning ulkan umidi bo‘lgan yosh avlodni kelajakda bilimdon, mustaqil fikrlovchi, o‘z Vatani va xalqini, oilasini sevuvchi insonlar qilib tarbiyalash bizning asl maqsadlarimizdan biri hisoblanadi.

Jamiyat taraqqiyotining barcha davrlarida ham shaxsni xar tomonlama tarbiyalash dolzarb muammo bo‘lib kelgan. O‘zbek xalqi yoshlarni har tomonlama barkamol shaxs qilib tarbiyalashda boy tarixiy tajribaga ega

“Fikr tarbiyasi, - deya ta’kidlagan edi ulkan ma’rifatparvar Abdulla Avloniy, - ko‘p zamonlardan beri tadqiq qilinib kelgan, muallimlarning diqqatlariga suyalgan, vijdonlariga yuklangan muqaddas bir sharofatlik, g‘ayratlik bo‘lishiga sabab bo‘ladir”.

Sharq mutafakkirlarining ta’lim-tarbiyaviy qarashlaridan maktabgacha yoshdagi bolalarning mustaqil fikrlashlarini o‘stirishda foydalanish bugungi kunning muhim vazifalaridan biridir.

Zamonaviy ta’lim ta’lim oluvchilar oldiga quyidagi vazifalarni qo‘yadi:

- tezkor o‘zgarishlarga ko‘nikish, hayotiy faoliyat, shuningdek, mavjud muammolarni hal qilishda o‘zlashtirgan bilimlarini mohirlik bilan qo‘llay olish;

- mustaqil va tanqidiy fikrlash qobiliyatiga ega bo‘lish, real borliq va yuzaga keluvchi muammolar mohiyatini anglay olish, zamonaviy texnologiyalardan foydalangan holda ularni bartaraf etish yo‘llarini izlab topish;

- egallagan bilimlarni amaliyotda qo‘llashning samarali usullarini topish, yangi g‘oyalarni ilg‘ab olish va ijodiy fikrlash;

- axborot texnologiyalaridan o‘z vaqtida samarali foydalana olish va ularni qo‘llay bilish.

Demak, maktabgacha yoshdagi bolalarni har tomonlama rivojlantirishda uning mustaqil fikrlay olish qobiliyatiga ega bo‘lishi muhim ahamiyatga ega. Shu bois ta’lim tizimida talabalarni fikrlashga, o‘zlashtirilgan bilimlarni mushohada qilishga o‘rgatish zarurdir.

Materials and Methods

Sharq mutafakkirlarining asarlarida yosh avlodda yuksak ma’naviy-axloqiy sifatlarni shakllantirish, ularni barkamol shaxs bo‘lib voyaga yetkazishga oid pedagogik g‘oyalar, shaxs tarbiyasining mazmuni, shakl va metodlari o‘z aksini topgan bo‘lib, ular bugungi kunda ham muhim pedagogik qiymatga ega. Ushbu asarlarda inson tafakkurini rivojlantirish, aqliy-axloqiy yetuklik va jismoniy barkamollik, estetik madaniyatni shakllantirish masalalari ham ilmiy, ham amaliy jihatdan o‘z yechimiga ega bo‘lgan.

Xalq og‘zaki ijodi namunalari bo‘lgan doston, ertak, maqol va xalq qo‘shiqlarida, shuningdek, Yusuf xos Hojib, Kaykovus, Ahmad Yugnakiy, Muslihiddin Sa’diy, Abdurahmon Jomiy, Alisher Navoiy, Husayn Voiz Koshifiy va boshqa mutafakkirlarning pedagogik qarashlari bugungi kunda ham o‘z ahamiyatini yo‘qotmagan.

O‘zbek xalq og‘zaki ijodi namunalari bilan tanishish chog‘ida yosh avlodda barkamol shaxsga xos fazilatlarni tarbiyalashga juda qadimdan alohida e’tibor berib kelinayotganligining guvohi bo‘lish mumkin.

Tarbiyaviy mazmunga ega pand-nasihatlarni xalq og‘zaki ijodining ertak, doston, aytishuv, topishmoq kabi janrlarida ko‘plab uchratish mumkin. Pand-nasihat metodi xalq og‘zaki ijodi namunalari bilan birga ta’limiy-axloqiy asarlarda ham samarali qo‘llanilgan.

Yusuf Xos Hojibning “Qutadg‘u bilig” asari pand-nasihat uslubida yozilgan asar sanaladi, unda pand-nasihat tarkibida qiyoslash uslubidan ham samarali foydalangan. Asarda yaxshilik bilan yomonlikni, rostlik bilan yolg‘onchilikni, yorug‘lik bilan qorong‘ulikni, samimiylik bilan quvlikni, kamtarlik bilan takabburlikni, bilimlilik bilan johillikni, saxiylik bilan baxillikni o‘zaro qiyoslash asosida ularning mohiyati ochib berilgan.

Yusuf Xos Hojib kishilarga munosabatda o‘rtamiyona yo‘l tutishni maslahat beradi va “Agar kishilarga o‘rtamiyona munosabatda bo‘lsang, do‘st dushmanga aylanmaydi”, - deydi.

“Qutadg‘u bilig” asarining pedagogik qiymatini belgilovchi jihatlardan biri unda muammo usulining maqsadga muvofiq qo‘llanilganligidir. Milliy pedagogik merosda jumboq – muammoli ta’limga alohida o‘rin ajratilgan bo‘lib, u o‘ziga xos ahamiyatga ega. Didaktik asarlarda munozaraga keng o‘rin ajratilgan bo‘lib, munozara asosida jumboq – muammo yechiladi. Chunonchi, “Qutadg‘u bilig” asarida Kuntug‘mish (Elig) va Oyto‘ldi o‘rtasidagi munozara quyidagi mazmunga ega: Elig Oyto‘ldini ilgiga chaqirib, uni yonimga o‘tir, deb taklif qiladi. Lekin

Oyto‘ldi o‘tirmaydi. Elig unga boqib, taajublansa, Oyto‘ldi ko‘zini yumib oladi va yuzini yashiradi. Xonning yoniga o‘tirmay, yerga koptok qo‘yib unga o‘tiradi.

Eligning jahli chiqib sababini so‘raganda, unga quyidagilarni tushuntiradi: Elig Oyto‘ldiga o‘rin berganda uning yoniga o‘tirmagani “Xon yonida menga o‘rin yo‘q”, degani; yerga koptok qo‘yib, unga o‘tirgani – davlat koptok kabi barqaror emas, qo‘ldan chiqib ketadi, degani, Elig boqqanda ko‘zini yumib olgani – davlat ko‘r kishiga o‘xshaydi, kimga ilashsa, unga yopishib oladi; yuzini yashirgani esa, davlat jafo, unga ishonib g‘ururlanib ketma, deganim edi, deydi. [1]

Ko‘rinib turibdiki, Yusuf Xos Hojib asarning mazkur lavhasida birdaniga uchta metod – munozara, muammoli ta’lim, pand-nasihatdan foydalangan. Demak. Anglanadiki, o‘z davrida mutafakkir asarlarida zamonaviy pedagogik texnologiyaning elementlaridan unumli foydalangan.

Asrlar davomida yosh avlod tarbiyasini muvaffaqiyatli tashkil etishda qo‘llanib kelinayotgan pandnomalardan biri Unsurul-Maoliy Kaykovusning “Qobusnoma” [2] asaridir. “Qobusnoma” boshidan oxirigacha pand-nasihatdan iborat asar. Ayniqsa, sakkizinchi bob “Anushiravon pandlarini yod olmoq zikrida” bobi bunga yaqqon misoldir. Pand-nasihat qiyosiy taqqoslash tahlili orqali olib boriladi.

Kaykovus “Qobusnoma” asarida barkamol inson (shaxs) tarbiyasi haqidagi qarashlarni bayon etar ekan, ayniqsa, jismoniy tarbiyani tashkil etish masalasiga katta e’tibor beradi. Buni asarning “Shikorga chiqmoq zikrida”, “Chavgon o‘ynamoq zikrida”, “Sipohsolarlik shartlari va odatlari zikrida” kabi boblarida ko‘rish mumkin. Ularda mutafakkir barkamol inson (shaxs) avvalo sog‘lom bo‘lishi zarurligini, shuningdek, bilimlarni o‘zlashtirishda mushohada yuritish, fikrni dalillar asosida ifodalash lozimligini alohida uqtiradi. Xususan, asarning “Ilm talabi va qozichilik zikrida” bobida quyidagilar alohida ta’kidlanadi: “Barcha peshalarning (hunar) orasida ilmi tolib bo‘lsang, ... kitob va darsga haris bo‘lg‘il, ishdan malul (qayg‘uli) bo‘lmagil, harna eshitsang yod qilg‘il, taqlidga rozi bo‘lmag‘il ... oz so‘zlag‘il va uzoqni o‘ylag‘il ... Agar munozara qilmoq tilasang, xasmga (raqib) qarag‘il, agar uning bilan tortishmoqqa quvvating bo‘lsa va so‘z uzaysun desang dalillar va misollar bila munozara qilg‘il. Yo‘q ersa so‘zni muquf (qisqartir) qo‘yg‘il va bir misolg‘a qanoat qilg‘il, bir isbot ila tur, rad qilma, ehtiyot bo‘lg‘ilki, keyingi so‘zing avvalgisini teskari bayon qilmasin... Agar faqihlar munozara qilsalar so‘zni urf-odatdin boshlag‘il va urf-odatni qiyos, mumkinot bilan aytg‘il.

Munozara usulida mujbot (sabab) va nomunosabot, mumkinot va nomumkinot bo‘lsa, ayb ermasdur. Oxirgi maqsadni aniq ma’lum qilg‘il va so‘zni ziynat bila deg‘il. Bag‘oyat qisqa va bag‘oyat uzun so‘z aytmag‘il, bema’ni so‘z demag‘il” [2, 99-100].

Mazkur misoldan ko‘rinib turibdiki, ilm olishda munozaradan samarali foydalanish, bu jarayonda shaxsiy fikrni bayon etish fikrlar xilma-xilligini yuzaga keltiradi. Shuningdek, munozara chog‘ida shaxsda faraz, isbot, yakun, bahs yurita olish ko‘nikmalari shakllanadi.

Sharqning buyuk siymolaridan Muslihiddin Sa’diy ta’lim va tarbiya to‘g‘risida fikr yuritar ekan, u bolalardagi tug‘ma qobiliyatni e’tirof etib yozadi:

Qobiliyat bo‘lsa aslida
Tarbiyat unga qiladi asar.
Qancha urinma, bo‘lmas sayqali,
Temir aslida bo‘lmasa javhar [4, 143].

Alloma tarbiyada qattiqqo‘l bo‘lishni, biroq aslo dilozor bo‘lmaslikni tavsiya etadi:

Xush xulq kishiga qattiq gapirma,
Sulh istab kelsa, jangga chaqirma.
Rahmdillik odamga oliy xulq, ammo
Dilozor yarasiga qo‘ymag‘il malham.
Aylama rahm-shafqat ilon-chayonga
Bundan ozor topar farzandi odam [4, 160-161].

Bu o‘rinda qattiqlik va yumshoqlik ham doimo meyorida bo‘lishi lozim, biroq yovuzlarga nisbatan ayovsiz, yaxshilarga esa yumshoq muomala zarurligini uqtiradi.

Muslihiddin Sa’diy ham boshqa mutafakkirlar kabi ilmda munozara uslubini qo‘llashni tavsiya etadi. Lekin munozarani tashkil etish muayyan qoidalarga asoslanishi, unga amal qilinishi zarur. Xususan, bilimdon va nodonlar bilan bahslashishda doimo meyorni bilish zarur: “Johil bilan bahslashgan olim – izzat, umid qilmay qo‘ya qolsin. Basharti bellashuvda johil olimdan ustun chiqsa, ajablanarlik yeri yo‘qdir, chunki, hamisha tosh gavharni sindiradi” [3, 143-146].

Ulug‘ mutafakkir Alisher Navoiy yoshligidan boshlab ilm olishga mehr qo‘yganligi sababli zamonasining ulug‘ shoiri, davlat arbobi bo‘lib yetishadi. Alloma mavjud fanlarning barchasini o‘rganish inson uchun g‘oyatda foydali ekanligini uqtiradi va bu borada amaliy harakatlarni tashkil etadi. Chunonchi, o‘zi tashkil etgan “Ixlosiya” madrasasi yonida maktab ochadi, uni o‘z vaqfidan mablag‘ bilan ta’minlaydi. Ta’lim oluvchilardan ilm o‘rganishda qattiq intizom talab etilgan. Shuningdek, qobiliyatli shaxsni tarbiyalamaslik, uning qobiliyatini rivojlantirmaslik zulm bilan tenglashtiriladi: “Qobiliyatlini tarbiya qilmaslik zulmdir, qobiliyatsizga tarbiya hayf. Uni tarbiya qilmaslik bilan nobud qilma, bunga tarbiyangni nobud qilma” [4, 243].

Alloma tarbiyada namuna metodini ma’qullagan. Bu borada o‘qituvchi va ota-ona namunasi birinchi o‘ringa qo‘yilgan bo‘lsa-da, tarbiyada jismoniy jazoni qoralagan. Bolaga xushmuomalalik bilan munosabatda bo‘lish, lekin qattiqqo‘llikda ham, xushmuomalalikda ham meyor bo‘lishini alohida ta’kidlagan.

Ulug‘ mutafakkir Alisher Navoiy o‘qituvchilarni talabchan va o‘z kasbining bilimdoni bo‘lishga undagan, tarbiya masalasiga jiddiy e’tibor bergan. Mutafakkirning fikricha, bilim olishda uzluksizlik ma’qullab, bilim beruvchi ustoz – murabbiylarning o‘zlari ham ma’lumotli, o‘qitish usullarini chuqur egallagan bo‘lishlarini talab etadi. Johil, mutaasib, nodon domlalarni qoralab, o‘qituvchi mehnatining og‘irligini alohida ta’kidlaydi. Madrasa mudarrislarining fozil, dono,

kamtar, ma’naviy pok insonlar bo‘lishini istaydi va shunday bo‘lishi uchun kurashadi.

Mashhur mutafakkirlar inson aqliy qobiliyatini, ilmiy quvvatini, iste’dodini takomillashtirish uchun o‘zida zukkolik, fahm tezligi, zehn o‘tkirligi, bilimlarni tez egallash, qo‘yilgan muammoni tez anglash, ilgari his etgan va tasavvur qilgan barcha narsalarni esda saqlash, xotira kabilarni rivojlantirishi lozimligiga alohida urg‘u berib o‘tganlar.

Results and Discussion

Ta’lim-tarbiya samaradorligiga erishish maqsadida maktab va madrasalarda ana shu talablarga rioya etilgan, talabalarda yuqorida ta’kidlab o‘tilgan jihatlarni tarbiyalash uchun “Tarbiyai fikriya”, “Tarbiyai tafakkuriya”, “Tarbiyai ixlosiya” kabi metodlar qo‘llanilgan, ular talabalarni fikrlashga o‘rgatib, tafakkurlarini rivojlantirib, bilimlarni egallashga bo‘lgan qiziqishlarini oshirgan. Shuningdek, tafakkurni rivojlanttrishda samarali bo‘lgan ilmiy munozara, sharhli o‘rganish, muammolarni hal etish, kuzatish, savol-javob, bilimlarni sinash, ko‘rgazmali tajriba kabi uslublar qo‘llanilgan.

O‘tmish ta’lim tajribasida ta’lim uslublari har bir talabaning qobiliyatini namoyon etishga, zehnini o‘tkirlashga, tafakkurini rivojlantirishga yordam bergan. Natijada a’lo, yaxshi, o‘rtacha darajada o‘zlashtiruvchi talabalar ajratilib, ular bilan mashg‘ulotlar ham o‘ziga xos individual tarzda olib borilgan.

Iqtidorli bolalarga beriladigan bilimlar hajmi ko‘paytirilib, ularning adabiyotlar bilan mustaqil shug‘ullanishiga ko‘proq e’tibor berilgan. Iqtidorli talabalar maktab yoki madrasalarda talab etiladigan bilim hajmini o‘zlashtirib, ma’lum sinovdan o‘tgach, o‘qishni muddatidan oldin bitirish imkoniyatiga ega bo‘lganlar.

Har bir o‘qituvchi talabalarga umumiy bilimlarni berish bilan bir qatorda, ularni san’at va muammoli masalalarni yechish sirlari bilan ham tanishtirib borganlar.

O‘tmishda muallimlar va madrasa mudarrislari ko‘proq muhokama va munozaralar uyushtirib, matnni sharhli-izohli o‘rganish metodlariga katta e’tibor qaratganlar.

Muhokamalarda avval ma’lum vaqea-hodisalar yuzasidan hukm chiqarib, so‘ngra noma’lum voqea va hodisalarni muhokama etish ko‘zda tutilgan. Talabalarga avval ma’lumotlar berilib, so‘ngra to‘g‘ri va noto‘g‘ri ma’lumotlarni bir-birlaridan ajratib olishga imkon beruvchi qobiliyat tarkib toptirilgan.

Madrasalarda dars berish uchun taniqli olimlarni taklif etish an’anasi shakllangan. Bu an’ana XIV-XV asrlarda Samarqand madrasalarida ham qo‘llanilgan.

Madrasa talabalari oldindan berilgan muammolar bilan tanishtirilib, muhokama etilayotgan muammoni qizg‘in munozara asosida chuqur o‘zlashtirishlari uchun sharoit yaratilgan.

Talabalarda zehnni tarbiyalash, ularning bilimlarini mustahkamlash, tafakkur qobiliyatlarini mustahkamlash, ma’lumotlarni uzoq vaqt esda saqlab qolishlariga erishish maqsadida chiston (topishmoq)larni yechish, muvashshahlar

yozish, o‘rganilayotgan muammoni sharhlash va izohlash kabi usullardan foydalanilgan.

Bu usullar talabalarni rag‘batlantirgan, o‘qishga, ilm olishga bo‘lgan qiziqishlarini oshirgan. Chunonchi, mashhur shoira va mohir muallima Uvaysiy (Jahon otin) o‘zi tashkil qilgan darslarda qizlarning zehnini tarbiyalashda quyidagi chistonlardan samarali foydalangan:

Ul na qush ko‘rinmaskim, shafaq, bolu pari,
Misli ul raf-raf suvoru bilsangiz, yo‘qtur tani,
Voqif erur kecha-kunduz xizmatida to‘rt g‘ulom,
Qon ilan ermish murassa bul chiyiston maskani.
(Qalb, to‘rt g‘ulom – ko‘z, og‘iz, quloq, burun)
Ul nadurkim sabz to‘nliq, yoz yog‘ochning boshida,
Qish yalong‘och aylagay barcha xaloyiq qoshida,
Barcha qushlarning so‘ngoki ichida,
Ul na qushdirkim so‘ngoki toshida.
(Yong‘oq)
Ikki mahbubni ko‘rdim, bir-birisin ko‘rmagan,
Ikkisining o‘rtasida, do‘stlar, qil sig‘magan.
(Kun va tun)
Ul nadurkim, poyi yo‘q, yursa boshi birla yurar,
Yurganida hok surmay, ancha ustolik qilar.
(Suv)
Ul nadurkim, bir kelin o‘zi cho‘tir,
Yetti qat parda ichida misli hur.
(Makkajo‘xori) [5, 16-117].

Bunday chiston, muammo, muvashshah janrlarida yaratilgan asarlardan bugungi kunda ham ta’lim jarayonida foydalanish talabalarning zehnlari, tafakkur qobiliyatlarini oshiradi hamda iqtidorlarini namoyon etishga yordam beradi.

XIX asrda yashab ijod etgan Dilshod Otin o‘zbek va tojik tillarida badiiy jihatdan yuksak she’rlar yozish bilan bir qatorda mohir pedagog ham bo‘lgan. Shoira o‘zining “Tarixi muhojiron” (“Muhojirlar tarixi”) asarida bu haqida quyidagilarni bayon etadi: “... 51 yil maktabdorlik qildim. Maktabda a’lo va o‘rta o‘quvchilardan doim 20 va 30 qiz ta’lim olar edilar. 891 qizni savodli qilib chiqdim. Ulardan yaqin to‘rtdan bir qismi tab’ nazmi bor shoira, oqila qizlar edi... Natijada bir muncha zehn va fasohat egalari ikkiyoqlama zulm: mutlaq hokimlik va islom ulamolarining ikkiyuzlamachiliklarini o‘z ijodlariga maxsus mavzu qilib oldilar. Ijod yo‘lida aksar tab’ egalari buyuk amir va adabiyot shohi Navoiy g‘azallarini o‘rgandilar va Nizomiy, Fuzuliy, Hofiz, Bedil, Umar Hayyomlarni o‘zlariga ustoz deb bildilar. Ikki yuz yigirma shoiradan 24 tasi ilg‘or va o‘tkir edi... ulardan Xayriniso, Bahriniso, Anbaroy va To‘tiqiz nomli qizlar yaxshi shogirdlardan bo‘lib, Hofiz, Navoiy, Bedil, Fuzuliylarga oshiqi payrav edilar” [6, 85].

Anbar otin o‘zining “Qarolar falsafasi” asarida o‘sha davrning ijtimoiy-siyosiy ahvoliga, xotin-qizlar hayotiga nisbatan tanqidiy mulohazalar bildiradi.

Shuningdek, shoiraning asarlari orasida 160 misradan iborat “Yakka baytlar” deb nomlangan turkum baytlar – turkum she’rlar ham borki, bu shoira ijodining keng qamrovligidan darak beradi. Ushbu asarida shoira arab alifbosidagi 27 harfning har biriga alohida bayt bag‘ishlaydi. Har bir bayt misralarining oxirgi so‘zi albatta arab yozuvidagi bitta harf bilan tugallangan bo‘ladi. Masalan: “Alif” harfiga:

Odam ersang ma’ni bil dona-dona,
Vatan erur sanga ikkinchi ona!
So‘zlamasdan oldin so‘zingni sina,
Har bir so‘zdir umring ichinda sina.
Yoki “k-kof” harfiga:
Odam ersang ko‘ngling etgil pok-pok,
Sandin etmasdin o‘zini ulki pok.
Har nafas mazmun ila o‘tsa kerak,
Odamida bo‘lsa gar yaxshi tilak,
Xalq uchun tebratgusi doim bilak [6, 140].

Mazkur she’r mazmun jihatdan pedagogik xususiyatga ega. Unda shoira yoshlarni ilm olish, vatanni sevish, odobli va mehnatsevar bo‘lish, ijod qilish, ona tilida foydali so‘zlarni so‘zlashga da’vat etadi. Asarning eng muhim jihati bolaning tezroq va puxtaroq bilim olishi uchun har bir harfni pand-nasihatga boy misralar orqali qiziqib o‘zlashtirishiga yordam beradi. O‘quvchi ushbu asar orqali bir tomondan badiiy zavq olib, estetik didi o‘ssa, ikkinchi tomondan zehni o‘tkirlashadi. SHe’rni yodlash barobarida harflarni ham puxta o‘zlashtirib oladi [6, 140-141].

Ma’lumki XIX asrning II yarmi XX asrning boshlarida ilg‘or ziyolilar (jadidlar) Buxoroda madrasalarda diniy darslar bilan bir qatorda dunyoviy darslarni ham o‘qitishni shart qilib qo‘ydilar.

Jadidizm vakillari jamiyatni to‘ntarish yo‘li bilan emas, balki isloh qilish orqali rivojlantirishni o‘zlariga maqsad qilib olgan edilar. Jadidchilik harakati g‘oyalarini Turkiston maktablariga tatbiq etishda Isxoqhon Ibrat, Abduqodir Abdurashidxon o‘g‘li, Mahmudxo‘ja Behbudiy, Siddiqiy-Ajziy, Muhammadsharif So‘fizoda, Abdurauf Fitrat, Mashriq Yunusov (Elbek) kabi ma’rifatparvarlarning xizmatlari beqiyos bo‘lgan. Ular maktablarda ta’lim-tarbiyani isloh qilishga qaratilgan yangi o‘quv qo‘llanmalari, darsliklar yaratdilar. Mazkur manbalarda o‘qitishning yangicha shakl va metodlarini bayon etdilar.

Elbek ona tilining mohiyatiga to‘xtalib, uning barcha fanlarga ta’sir etuvchi, ularni o‘z qonun-qoidalari bilan zabt etuvchi keng qamrovli fan ekanligini alohida ta’kidlaydi. “Yolg‘iz kitobdan o‘qitish bilan masala hal bo‘lmaydi, - deb yozgan edi Elbek, “Boshlang‘ich maktabda ona tili” nomli asarida, - balkim ul kitobdagi yozilg‘on narsalarni amalga oshirish kerakdir. Albatta bu ish uchun o‘qitg‘uvchilarning oz bo‘lsa-da, mana shu kitoblar kabi o‘qitish yo‘llarin ko‘rsataturg‘on bir asarni kechirishlari tegishdir...”, yoki “Til o‘qitishda savodxon bo‘laylik” nomli maqolasida “...boshlang‘ich ta’limning tub vazifasi... jo‘g‘rofiya, tabiiyot, tarix, hisob, rasm kabilarni o‘rganish davrida ona tili materiallari orqali bilim berishni tashkil etish bilan ish ko‘rish... Bir elning maktabin tirgizaturg‘on

narsa u elning ona tilisidir. Tili bo‘lak el turi bo‘lak maktab izlaydi. Bir elning maktabi o‘sha elning o‘z tilining negiziga qurilg‘on bo‘lmog‘i tegishdir. El tili el maktabig‘a ona bo‘lmog‘i tegishdir. Chindanda u shunday bo‘ladir. Biroq bir elning tarixida turli sabablar bilan el maktabi bir davrda onasidan ayrilib yetim bo‘lib qolishi mumkindir. Shunday davr biz – o‘zbeklarning maktabining boshidan-da kechdi. To‘g‘risi, endi kechib turibdir” [7, 16-18].

Jadidchilik harakatining bosh masalasi, avvalo xalqni ma’rifatli qilish, buning uchun esa ta’lim-tarbiya sohasini isloh qilishdan iborat edi. Hayotning o‘zi yangi usul maktablarini tashkil etishni taqozo qilar edi. Yangi usul maktablarini tashkil etish hamda ular uchun yangi o‘quv qo‘llanmalari va darsliklar yaratishda Abdulla Avloniy, Abdurauf Fitrat, Munavvarqori kabi o‘nlab ma’rifatparvarlar samarali faoliyat ko‘rsatdilar. Ular tashkil qilgan maktablarda yangicha ta’lim-tarbiya usullari qo‘llanilar, maqsad – yoshlarni o‘z zamonasining ilg‘or kishilari etib tarbiyalash edi.

Abdulla Avloniyning “Birinchi muallim”, “Ikkinchi muallim”, “Turkiy Guliston yohud axloq”, “Maktabi guliston” singari darsliklari bir necha bor bosilib chiqdi hamda bu darsliklar o‘sha davrda ochilgan Turkistonning ko‘plab maktablari uchun muhim qo‘llanma bo‘ldi.

Alloma o‘z davrining dolzarb muammolarini inobatga olgan holda “Turkiy guliston yohud axloq” asarida barkamol insonni tarbiyalashda “Badan tarbiyasi”, “Fikr tarbiyasi”, “Axloq tarbiyasi”ga jiddiy e’tibor qaratdi, barkamol inson egallashi lozim bo‘lgan fazilatlar tizimini yaratadi.

Abdulla Avloniy tomonidan qo‘llanilgan tarbiya metodlarining muhim jihati tarbiya jarayonida nazariy fikrlarga tayanib qolmaslik, balki har bir o‘git va nasihatni dalillar, hayotiy misollar yordamida mustahkamlash asosida o‘rganilayotgan materialni o‘quvchi xotirasida uzoq saqlanishini ta’minlashdan iborat bo‘ldi.

Pedagog olim badan tarbiyasi haqida fikr yuritar ekan, quyidagilarni ta’kidlaydi: “Ichkilik, ko‘knor, nasha, afyun, taryok, chilim, nos, popirus kabi badanning salomatligiga zararli, og‘ulik, ba’zisi harom, ba’zisi makruh, ba’zisi isrof bo‘lgan narsalardan qochmak, saqlanmak shariat, aql, hikmat yuzasidan lozimdur...

Salomatlik saqlov lozim ishdirur,
Gunohdin saqla jisming yozu qishdur.
Kasal bo‘lsang, bo‘lur dunyo qorong‘u,
Maishat talx o‘lib hasrat chekishdur.
Haromu shubhadan pok et o‘zingni,
Bu dunyo ayshu ishratdan kechishdur.
Hamma ishratchi hijronlikda ketdi,
Bu olamda bir ish ishlab ketishdur” [8, 15].

Abdurauf Fitrat, ayniqsa, millatparvarligi, millat vakillarining har tomonlama kamol topishi to‘g‘risida qayg‘uruvchi olim, pedagog, yozuvchi va dramaturg sifatida ijod qildi. Alloma tilni millatning shon-sharafi, or-nomusi deya e’tirof etdi.

Alloma tilni ko‘z qorachig‘idek saqlashga, boyitish, taraqqiy qildirishga e’tibor qaratib, ona tilini xorijiy so‘zlar hisobiga emas, aksincha, ko‘proq o‘z imkoniyatlari negizida boyitish va taraqqiy ettirish maqsadga muvofiq ekanligiga urg‘u beradi.

Fitratning “Oila yoki oila boshqarish tartiblari” asarining ikkinchi qismi farzand tarbiyasiga bag‘ishlangan. Unda barkamol inson tarbiyasida badan tarbiyasi, aqliy tarbiya, axloqiy tarbiya haqida fikr yuritadi.

Badan tarbiyasida bolani go‘dakligidan boshlab ovqatlanishi, uyqu, poklik, harakatning farzandning kamolga yetishidagi ahamiyati haqida fikr yuritadi. Shu bilan birga aqliy tarbiyani samarali tashkil etish, bu jarayonda tashqi va ichki ma’lumotlarni yodda saqlash va xotirani mustahkamlash, muhokama yuritish kabilar alohida ahamiyat kasb etishini ta’kidlaydi.

Axloqiy tarbiyada esa inson fe’li va harakatlari, mayllari: baxt mayli, faoliyat mayli, izzat-nafs, aloqa mayli, boshqalarga mehr-muhabbat mayli, ibrat olib e’tiborda bo‘lish mayli, bilish mayli, go‘zallik mayli, fazilatga muhabbat, iroda va ixtiyor kabilarga e’tiborni qaratadi.

Abdurauf Fitrat oila tarbiyasini samarali tashkil etishda quyidagi shartlarga amal qilish zarur deb hisoblaydi:

1) farzandlarning badan va fikriy tarbiyasida sustkashlik qilmaslik;

2) ota-ona farzandlariga o‘z nuqsonlarini bildirmasliklari;

3) bolalarga ibratli kishilar haqida hikoyalar so‘zlab berish;

4) bolalarning o‘z iroda va aqliga qarab harakat qilishga erkinlik berish [9, 91-92].

Demak, Sharq mutafakkirlarining ta’lim-tarbiyaviy qarashlaridan maktabgacha yoshdagi bolalarning mustaqil fikrlashlarini o‘stirishda dolzarb ahamiyatga ega bo‘lib ulardan bugungi kun talablari darajasida foydalanish nihoyatda muhim sanaladi.

Conclusions

Xulosa qilib aytganda, Sharq mutafakkirlarining milliy-ma’naviy merosida ilgari surilgan g‘oyalar maktabgacha yoshdagi bolalarning mustaqil fikrlashlarini o‘stirishda boy tajribaga ega bo‘lib, uning mazmuni, shakl va metodlari bugungi kun talablariga ham mos keladi.

Ayniqsa, asrlar davomida shakllangan barkamol shaxs tarbiyasi an’analari bugungi kunga qadar o‘z ahamiyatini yo‘qotmagan. Ulardan ta’lim jarayonida eng zamonaviy metod va usullar bilan uyg‘un holda maqsadga muvofiq foydalanish ta’lim-tarbiya samaradorligini oshirishda yanada muhim ahamiyat kasb etadi.

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FRAZEOLOGIK BIRLIKLAR — NUTQIY EKSPRESSIV VOSITA SIFATIDA

Annotatsiya*: Ushbu maqolada frazeologik birliklar nutqiy ekspressiv vosita sifatida tilning eng obrazli hamda ta’sirchan vositalari deb qaraladi. Badiiy matnda ular voqealarni qisqacha, lekin obrazli va emotsional tarzda ifodalash, personajning his-tuyg‘usini chuqurroq berish, jamiyat o‘zgarishlarini personal holatda tasvirlash, o‘zbek madaniyati va xalq qadriyatlarini yetkazishda muhim rol o‘ynaydi. Maqolada O‘tkir Hoshimov asarlaridagi frazeologik iboralar (“tepa sochi tikka bo‘ldi”, “bahri dili ochildi”, “bag’ri qon” va boshqalar) misolida ularning ta’sirchanlik, tushuntiruvchi va madaniy-lingvistik funksiyalari tahlil qilinadi hamda frazeologik birliklarni o‘qitish jarayonida qo‘llash usullari ko‘rib chiqiladi.*

Kalit so‘zlar*: Frazeologik birlik, nutqiy ekspressivlik, badiiy matn, O‘tkir Hoshimov, ta’sirchanlik funktsiyasi, tushuntiruvchi-funksiya, madaniy-lingvistik funktsiya, maqolalar, frazeologik iboralar, o‘qitish usullari.*

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PHRASEOLOGICAL UNITS AS MEANS OF SPEECH EXPRESSION

Abstract: *This article examines phraseological units as the most figurative and expressive means of language as a means of speech expression. In literary texts, they play an important role in briefly yet figuratively and emotionally expressing events, in conveying a character's feelings more deeply, in personally describing changes in society, and in conveying Uzbek culture and folk values. This article analyzes their expressive, explanatory, and cultural-linguistic functions using phraseological expressions from Otkir Khoshimov's works ("tepa sochi tikka bo'ldi," "bahri dili akhildi," "bag'ri kon," etc.) as examples. It also examines methods for using phraseological units in the educational process.*

Keywords: *phraseological unit, expressiveness of speech, literary text, Otkir Khoshimov, expressive function, explanatory function, cultural-linguistic function, articles, phraseological expressions, teaching methods.*

Kirish

Frazeologik birliklar tilning eng obrazli, eng ekspressiv vositalaridan biri bo‘lib, so‘zlashuvni nafaqat mazmunan boy, balki ham his-tuyg‘ular, xayoliy tasvir va ma’naviy qadriyatlar jihatidan ta’sirchan qiluvchi vosita sifatida qaraladi. Tilshunoslikda frazeologik birliklar “nutqning bezagi”, “tilning obrazli hissi” deb ham ataladi, chunki ular so‘zlashuvchining fikrini oddiy so‘zlar ketma-ketligidan ko‘ra kengroq, ko‘proq obrazli va emotsional bog‘liq tasvir bilan ifodalashga imkon beradi. Mazkur vositani to‘g‘ri qo‘llash — so‘zlashuvni jonli, tirik, odamlar o‘rtasida hamdard, tushunish va hayotiy tajribaga ega qiluvchi samarali til uslubiga aylantiradi [1].

Materiallar va metodlar

Ushbu tadqiqot tilshunoslik va adabiyotshunoslik yondashuvlari asosida olib borildi. Tadqiqot materiali sifatida o‘zbek tilidagi badiiy asarlar, xususan yozuvchi O‘tkir Hoshimov ijodidan olingan frazeologik birliklar hamda ilmiy manbalar qo‘llanildi.Tadqiqot jarayonida frazeologik birliklarning nutqiy ekspressivlikdagi o‘rni va funksiyalarini aniqlash uchun lingvistik tahlil metodi qo‘llandi. Matn tahlili usuli yordamida iboralarning ma’nosi, obrazliligi va emotsional ta’siri o‘rganildi. Shuningdek, qiyosiy metod asosida oddiy leksik birliklar bilan frazeologik birliklarning nutqdagi ifodaviy imkoniyatlari solishtirildi. Tavsifiy metod orqali frazeologizmlarning turlari, ularning stilistik va madaniy-lingvistik xususiyatlari izohlandi. Mazkur metodlar majmuasi frazeologik birliklarning nutqni boyitish, ta’sirchanligini oshirish va badiiy matnda obraz yaratishdagi ahamiyatini har tomonlama yoritish imkonini berdi.

Natijalar

Frazeologik birlik — tilda tayyor turg‘un, ma’noning butunligi saqlanadigan so‘z birikmasi bo‘lib, so‘zma-so‘z tarjima bo‘lmaydigan, yangi, ko‘p kasrlanuvchi ma’noni beruvchi ibora, maqol, taqqoslama so‘z yoki idiomadan iborat bo‘lishi mumkin. Ular odatda oddiy so‘zlar ma’nosining yig‘indisi bo‘lib qolmaydi, balki butun tushuncha, xayoliy tasvir, emotsional munosabat yoki hayotiy tajriba obrazini o‘ziga qamrab oladi. Masalan, “ bosh qozon”, “ko‘z qarovsiz”, “ko‘nglida chora yo‘q” kabi iboralar shunchaki so‘zlar emas, balki butun hayotiy tajriba, mehnat, ahillik, xayo, murojat, inobat, mehr-muhabbat kabi ifodalarni namoyon etadi [2,3].

Nutqiy ekspressivlik — so‘zlashuvchining fikr-tuyg‘ularini, munosabatini, hissiyotini, xatti-harakat so‘zlari, so‘z birikmalari, nutq uslublari orqali kuchli, qiziqarli, tasvirli hamda esda saqlanuvchi qilib yetkazish hodisasi. Bu hodisa so‘zlashuvning mazmunan, emotsional hamda estetik jihatdan ta’sirchanligini oshiradi. Shu yerda frazeologik birliklar ayniqsa muhim rol o‘ynaydi, chunki ular so‘zlashuvni rasmiy, soxta, quruq so‘zlar daraxtidan obrazli, xayoliy, hayotga yaqin tasvir daraxtiga aylantirib, so‘zlashuvchining til madaniyatini, hissiyat dunyosini, xayoliy obrazlarini namoyon qiladi.

Ushbu maqolada frazeologik birliklarning nutqiy ekspressivlikdagi o‘ziga xos o‘rni, ularning turlari, obrazli ma’no va emotsional ta’sir berishidagi xususiyatlari, ularning so‘zlashuvda qanday qilib jon-joniga yetadigan tasvir,

hayotiy tajriba, hissiyot va ma’naviy qadriyatlar bilan bog‘langanligi, shuningdek, o‘qitish jarayonida ularni samarali qo‘llash tamoyillari o‘rganiladi. Frazeologik birliklarni so‘zlashuvning turli uslublarida — og‘zaki so‘zlashuv, adabiy matn, dars, ma’ruza — to‘g‘ri tanlab, ma’no doirasiga moslashtirib ishlatish esa so‘zlashuvchining til saviyasini, til madaniyatini, hissiyat va ma’naviy qadriyatlarini namoyon etuvchi muhim belgi sifatida ko‘riladi. Shu sababli ham zamonaviy tilshunoslikda frazeologik birliklar “nutqiy ekspressiv vosita” sifatida alohida e’tiborga ega, tilning obrazli, hayotga yaqin, tirik qismi bo‘lib, nutqni jonlantiruvchi, emotsional va ta’sirchan qiluvchi asosiy vosita deb qaraladi [4].

Frazeologik birliklar nafaqat og‘zaki so‘zlashuvda, balki badiiy matnda ham nutqni ifodali, obrazli va ta’sirchan qiluvchi asosiy stilistik vosita sifatida qo‘llaniladi. Yozuvchi frazeologik birliklarni ishlatganda, voqea-hodisalarni qisqacha, lekin jozibador, ko‘z oldiga tasvir chiziladigan darajada ifodalaydi, shu bilan birga personajning hissiyotini, jamiyatdagi munosabatni, ma’naviy qadriyatlarini boyitadi.

Frazeologik birliklar — badiiy asarda o‘ziga xos atmosfera, jamiyatning axloq-odobi, xalq o‘tmishlari va personajning so‘zlashish uslubini aks ettiruvchi vosita sifatida ishlaydi. Badiiy matnda ular so‘zlashuvni rasmiylashtirishdan, quruq tasvirlikdan olib chiqib, hayotga yaqin, tirik, obrazli nutqga aylantiradi.

Masalan, O‘tkir Hoshimov asarlarida frazeologik birliklardan tez-tez foydalaniladi. “Ikki eshik orasi”, “Dunyoning ishlari”, “Bahor qaytmaydi”, “Tushda kechgan umrlar” kabi asarlarda yozuvchi voqea-hodisalarni, odamlar munosabatini obrazli va emotsional ta’sirli qilish uchun maqollar, taqqoslash, kasbiy-xayoliy iboralar ishlatadi. Bunday iboralar ham hodisani tasvirlash, ham personajning hissiyotini chuqurroq ifodalash, ham jamiyat o‘zgarishlarini personal holatda berish maqsadida qo‘llaniladi [5].

Badiiy matnda ishlatilgan frazeologik iboralar nutqni jonli, ifodali va qiziqarli qiladi. Ularning ayrimlari odamlarning tanasining qismlari, mehnat, ahillik, kayfiyat, jahl, sevgi bilan bog‘liq bo‘ladi.

1) «Tepa sochi tikka bo‘ldi» (jahlli, g‘azabli holat)

Bu ibora badiiy matnda kishining jahli chiqayotgan, g‘azabli holati tasvirlanayotgan paytda ishlatiladi. Masalan, qahramon o‘z ustiga ishlari tushib qolgan, odamlar esa unga qo‘l uzolmay qo‘yayotganda, “tepa sochi tikka bo‘ldi” degan frazeologik birlik orqali uning ichki g‘azabi ko‘z oldiga qoyiladi, so‘zlashuv esa his-tuyg‘ular bilan bo‘yaladi.

2) «Bahri dili ochildi» (kayfiyati yaxshilandi, ruhiy tinchlik)

Bu ibora qahramonning kayfiyati oshayotgan, ruhiy tinchlikka ega bo‘layotgan payt yoki unga nafaqa-yordam, ijobiy yangilik kelayotgan paytlarda qo‘llaniladi. Badiiy matnda bu ibora so‘zlashuvni emotsional, qaynoq va obrazli qiladi; o‘quvchi esa odob-axloq, insonning obodlanayotgan ruhiy holati haqida tasavvurga ega bo‘ladi.

3) «Bag’ri qon» (g‘am-alam, og‘ir dard)

Bu frazeologik birlik qahramonning dard-qayg‘usi, ota-onaga o‘g‘ildan ayrilgan hodisa yoki kayfiyat qo‘rqinchli holatlarda ishlatiladi. “Bag’ri qon” degan

ibora so‘zlashuvni shunchalik obrazli qiladiki, so‘z o‘rniga butun tabassumli, qayg‘u bilan qovurilgan, ko‘z oldiga keladigan tasvir vujudga keladi.

4) «Yerga ursa ko‘kka sapchiydi» (o’taketgan-betinim, kalta)

Bu ibora qahramonning betinimlik holati tasvirlanayotgan paytda ishlatiladi. Badiiy matnda qahramonni kalta, o’taketgan, so‘z-suvga kelmaydigan odam sifatida berish uchun «yerga ursa ko‘kka sapchiydi» degan frazeologizm qo‘llaniladi. Bu orqali ham obraz yaratiladi, ham nutq hamda so‘zlashuv samarali va qiziqarli bo‘ladi.

5) «Og‘zi qulog’ida» (bahtlik, xursandlik)

Bu ibora qahramonning xursand holati, hayotda yangi joyga yetib kelganligi tasvirlanayotgan paytlarda qo‘llaniladi. Badiiy asarda bunday frazeologik ibora so‘zlashuvni sevimli, hayotiy va jonli qiladi [6].

Frazeologik birliklar orqali badiiy matnda ta’sirni oshirish badiiy matnda yozuvchi frazeologik birliklardan quyidagi maqsadlar uchun foydalanadi:

Obrazli tasvirlash uchun: “ilonni yog‘ini yalagan”, “dunyoni suv bossa, uning to‘pig‘a ham chiqmaydi” kabi iboralar orqali personajning aqlli-betoqat, oqil-betoqat yoki beg‘am xarakterini obrazli, qisqacha, ta’sirchan tarzda ifodalaydi.

Emotsional holatni chuqurroq berish uchun: “miyani qoqib, qo‘liga bermoq”, “boshidan oshib yotibdi” kabi iboralar kishining og‘irligi, ishlarning ko‘payib ketishi, dard-qayg‘usini tasvir etishda qo‘llaniladi.

Jamiyat, madaniy atamalar, odob-axloqni ham aks ettirish uchun: Badiiy asarlarda frazeologik birliklar nafaqat shaxsiy, balki ham jamiyatda qo‘llaniladigan so‘zlashish uslubini, xalq o‘tmishlarini ham namoyon qiladi.

Badiiy matnda frazeologik birliklar quyidagi asosiy funksiyalarga ega: Ta’sirchanlik (ta’sirchanlik funktsiyasi) — voqea-hodisalarni qisqacha, obrazli va emotsionallik berish, o‘quvchi his-tuyg‘ularini qo‘lga olish.

Boshqotiruvchi-tushuntiruvchi funktsiya — personajning xatti-harakatini, uning ruhiy holatini, jamiyatdagi munosabatni tushuntirish.

Madaniy-lingvistik funktsiya — badiiy matnlarda o‘zbek madaniyati, xalq o‘tmishlari, obod-axloq, mehnat, jasorat kabi qadriyatlar nutq orqali yetkaziladi.

Bu funktsiyalar orqali frazeologik birliklar badiiy asarlarda nafaqat so‘zlashuvni, balki matnning umumiy ta’sirini ham oshirib, boshqa stilistik vositalar bilan birgalikda personal—ifodali dunyoni yaratadi [7,10].

Badiiy matnda frazeologik birliklarni to‘g‘ri tushunish, ularning funksiyalarini tahlil qilish — o‘qituvchi uchun ham muhim bo‘ladi. Badiiy asarlardan olingan frazeologik birliklarni tahlil qilib, o‘quvchilarga quyidagilarni o‘rgatish maqsadga muvofiq.

Frazeologik birliklar tilning eng obrazli, eng ekspressiv vositalaridan biri bo‘lib, so‘zlashuvni nafaqat mazmunan, balki ham his-tuyg‘ular, xayoliy tasvir va ma’naviy qadriyatlar jihatidan ta’sirchan qiluvchi vosita sifatida ahamiyatga ega. Ular nutqni rasmiy, quruq va soxta so‘zlashuvdan olib chiqib, hayotga yaqin, tirik, obrazli hamda emotsional nutqga aylantiradi [8,9].

Badiiy matnda esa frazeologik birliklar voqealarni qisqacha, lekin jozibador, tasvirli tarzda ifodalash, personaj hissiyotini chuqurroq berish, jamiyat o‘zgarishlarini personal holatda namoyon etish, o‘zbek madaniyati, xalq o‘tmishlari, obod-axloq, mehnat, jasoratb kabi qadriyatlar nutq orqali yetkazilishining muhim vositasidir. O‘tkir Hoshimov kabi yozuvchilarning asarlarida (“Ikki eshik orasi”, “Bahor qaytmaydi”, “Tushda kechgan umrlar” va boshqalar) frazeologik iboralar nafaqat leksik vosita, balki stilistik, ta’sirchanlik, tushuntiruvchi va madaniy-lingvistik funksiyalarni bajaruvchi asosiy qurollardan biri sifatida to‘g‘ri qo‘llaniladi [7].

Xulosa

Demak, frazeologik birliklar nafaqat og‘zaki so‘zlashuvda, balki badiiy matnda nutqiy ekspressivlik, obrazlilik, emotsional ta’sir, jamiyat o‘zgarishlari va insoniy munosabatlarini ifodalashda o‘ziga xos o‘rni hamda ahamiyatiga ega. Ularni to‘g‘ri tushunish, funksiyalarini tahlil qilish, so‘zlashuv hamda o‘qitish jarayonida samarali qo‘llash — til madaniyati, nutqiy ekspressivlik va o‘quvchilarning til bilimini oshirish jihatidan katta amaliy ahamiyat kasb etadi.

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FUNCTIONAL ACTIVITY OF GASTRIC JUICE IN PATIENTS WITH GASTRITIS AND CHOLECYSTITIS

Abstract: *This article presents the results of observations and studies of the functional state of gastric juice in patients with gastritis and cholecystitis over recent years. The activity of the enzyme chymosin in the stomach of men and women was studied. Chymosin activity in patients with cholecystitis is significantly lower than in patients with gastritis.*

Keywords: *People, patient, observation, gastritis, cholecystitis, gastric juice, chymosin, man, woman.*

Introduction

Currently, the generally accepted theories of ulcerogenesis are considered in the light of persistent H. pylori infection and the influence of the acid -peptic factor, which mutually enhance their pathogenic effects. In this context, H. pylori supports the chronic course of the disease and creates a threat of recurrence [1,2]. Chronic constipation is one of the most common pathological conditions today. Constipation can occur in an isolated form or manifest as a symptom of various pathologies, such as gastritis, cholecystitis, spastic or atonic colitis, and others [3,4].

Despite the large number of studies devoted to topical issues of peptic ulcer disease, the possible relationship (or its absence) between recurrences of duodenal and gastric ulcer disease, the presence of H. pylori colonization of the gastric mucosa, the duration of peptic ulcer disease, complicated or uncomplicated course, patients' gender and age, the number and size of ulcers before treatment, and the effectiveness of ulcer healing depending on the above indicators during treatment remains unclear to date [5,6,7]. One of the numerous functions of the gastric glands is its proteolytic activity. Therefore, the state of chymosin (chymase) activity in gastric juice allows one to judge the proteolytic function of the stomach. The issue of gastric secretion in chronic biliary tract diseases has been covered in the literature. However, little attention has been paid to the study of the proteolytic function of the stomach.

Aim of the study

To investigate the functional activity of gastric juice in patients with gastritis and cholecystitis.

Materials and methods

Over the course of one year, we observed 53 patients suffering from cholecystitis of various etiologies. In almost all patients, gastritis was diagnosed as

a concomitant disease. In 39 patients, gastric contents were examined using the Leporsky method with a 5% alcoholic Erman test breakfast; in 14 patients, an insulin-histamine stimulant was used. Chymosin activity was determined by the Savich method on an empty stomach and after stimulation. Among the examined patients, there were 43 women and 10 men.

Results

Normal chymosin activity was observed in 38 female patients, reduced in 3, and unsatisfactory in 1. Among men, normal chymosin activity was detected in 6 patients, reduced in 2, and unsatisfactory in 2.

Normal chymosin activity was defined as milk coagulation in dilutions of gastric juice of 1:640 and 1:320; reduced activity — 1:160 and 1:80; unsatisfactory — 1:40, 1:20, 1:10, or complete absence of coagulation in all dilutions.

Chymosin activity of gastric juice was studied in relation to the duration of the disease, as well as the secretory and acid-producing functions of the stomach. No dependence of chymosin activity on the duration of the disease could be identified.

Dependence of chymosin activity of gastric juice on its acidity. Dependence of chymosin activity of gastric juice on secretory function.

Conclusion

Thus, in patients with cholecystitis, the chymosin activity of gastric juice shows a certain tendency to decrease, regardless of the patients' gender or the duration of the disease. It is directly dependent on the secretory and acid-producing functions, which should be taken into account when assessing the functional state of the stomach in this group of patients.

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AGE-RELATED MORPHOLOGICAL CHARACTERISTICS OF THE SACRAL SEGMENT OF THE SYMPATHETIC TRUNK IN RABBITS

Abstract: *This article examines the age-related morphology of the lumbar border sympathetic trunk in rabbits. All specimens were fixed in 12% neutral formalin. A total of 20 specimens were examined: 10 from fetuses and 10 from adult rabbits. Macroscopic and microscopic examination methods were used. The sacral border sympathetic trunk in rabbits exhibits significant variations in shape, node size, and topography. Data were obtained on structural changes in the sympathetic nodes and trunk depending on the animal's age.*

Keywords: *rabbits, sympathetic trunk, lumbar region, node size, rabbit fetuses, adult rabbits, age-related morphology.*

Introduction

The morphology of the sympathetic trunk as a whole and its various divisions continues to attract the attention of not only morphologists and physiologists, but also clinicians [1,2]. The sacral division of the sympathetic trunk remains the least studied, with its description in the literature being rather contradictory even today. Only a small number of works [3,4] are devoted to the age-related features of the structure of the sacral division of the border sympathetic trunk. The cited literature mainly covers the morphology of the border sympathetic trunk in humans. Only isolated studies [5,6] are devoted to the rabbit, which is one of the most common objects for various experiments. We also found no data in the available literature on the age-related features of the sacral division of the sympathetic trunk in rabbits.

Aim of the study

We studied the age-related features of the sacral division of the sympathetic trunk in rabbits.

Materials and methods

As part of one of the sections of the departmental work on the age-related morphology of the nervous system, we examined the sacral division of the sympathetic trunk in rabbit fetuses and adult rabbits. All material was fixed in a 12% solution of neutral formalin. In total, we studied 20 preparations: 10 from fetuses and 10 from adult rabbits.

Results

Most often, we observed three sacral ganglia (74.4%); two ganglia were found in 13.3% of cases, and one ganglion was seen only once (1.1%). In five adult rabbits, the sacral sympathetic division was represented by a single

ganglionic cord, in which separate ganglia could not be macroscopically distinguished. The ganglia appear cylindrical, rhomboid, conical, triangular, and stellate. The sizes of the ganglia also vary considerably. In rabbit fetuses of the first 10 days of life, the size of the ganglia ranges from 0.2 × 0.2 mm to 2.0 × 0.5 mm. In two-month-old rabbit fetuses, a significant increase in ganglion size was noted — from 0.6 × 0.4 mm to 3.9 × 2.1 mm. In adult rabbits, the ganglia reach 19.0 × 1.5 mm. When individual ganglia fuse in adult rabbits, they form a ganglionic mass in the form of a trunk up to 36.0 mm in length and up to 2.0 mm in diameter. Of particular interest is the question of the shape of the sacral sympathetic chain as a whole, its topography, and the connections of individual ganglia. According to our data, the most frequent fusion occurs between the second and third sacral ganglia, or of all three ganglia into single larger formations located along the midline of the sacrum. Initially, these are metamerically arranged primary ganglia, which then concentrate in the second stage into a single cord. In the third stage of sympathicus development, definitive segmentation of the trunk into separate ganglia occurs. Large concentrated ganglia observed in all divisions of the sympathetic trunk should be considered as a result of the fact that the third stage of sympathicus development — segmentation of the trunk during the intrauterine period — does not occur. In our material, we also observed symmetrical positioning of the paired sympathetic chain near the midline of the sacrum. We noted certain features of the shape of the sacral sympathetic trunk related to sex. In males, sacral sympathetic trunks in the form of a truncated pyramid are more common. In females, according to our observations, this shape occurs twice as rarely. The question of the topography of the sacral ganglia is of practical interest. According to our data, the first sacral sympathetic ganglia are located 0.5–2.0 mm lateral to the median line of the sacrum: in 81.2% of cases at the level of the first sacral vertebra, in 13% of cases at the level of the upper third of the first sacral vertebra, and in 5.8% of cases at the level of the lower third of the first sacral vertebra. The second sacral ganglia are located 0.5–1.5 mm lateral to the median line of the sacrum: in 79.2% of cases at the level of the second sacral vertebra, in 19.0% of cases at the level of the lower third of the second sacral vertebra, and in 1.8% of cases at the level of the upper third of the second sacral vertebra. In one case, the left second sacral ganglion was located at the level of the third sacral vertebra. The third sacral ganglia are located 0.5–1.0 mm lateral to the median line of the sacrum: in 57.7% of cases at the level of the third sacral vertebra, in 34% of cases at the level of the lower third of the third sacral vertebra, and in 8.7% of cases the third sacral ganglia were located on the cartilage between the third sacral and first caudal vertebrae. We found transverse connections between the sacral ganglia 12 times. Of these: between the first sacral ganglia — 7 times, between the second — 3 times, and between the third — 2 times. We did not encounter crossed transverse connections in our material. From the sacral ganglia of the sympathetic trunk, most often one, less often two communicating branches arise, which are directed laterally to the sacral spinal nerves. We observed the origin of one communicating branch in 85.6% of cases and two in

14.4% of cases. Two communicating branches more often arise from the first sacral ganglia. According to our studies, two communicating branches arise from the first sacral ganglia in 55.9% of cases, from the second sacral ganglia in 29.4% of cases, and from the third sacral ganglia in 14.7% of cases.

In the 15 animals we studied, we observed splitting of the interganglionic branches in five cases. In six cases, most often on the right, fusion of the first sacral sympathetic ganglion with the caudal lumbar ganglion was noted.

Conclusion

The sacral division of the border sympathetic trunk in rabbits shows significant variations in the shape, size of the ganglia, and their topography. In the sacral division of the sympathetic trunk in rabbits, three ganglia are most often observed (74.4%) and one ganglion is least often observed (1.1%). In the majority of cases, transverse connections are present between the sacral ganglia.

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NAFAS YO‘LLARI KASALLIKLARIDA QO‘LLANILADIGAN DORIVOR O‘SIMLIKLAR VA ULARNING FITOPREPARATLARI

Annotatsiya: *Ushbu maqolada nafas yo‘llari kasalliklarida qo‘llaniladigan dorivor o‘simliklar va ular asosida tayyorlanadigan fitopreparatlarning farmakologik xususiyatlari, kimyoviy tarkibi, ta’sir mexanizmlari hamda klinik qo‘llanish imkoniyatlari ilmiy jihatdan tahlil qilindi. Tahlil natijalari alteya, shirinmiya, timyan, evkalipt, romashka va qora murch kabi o‘simliklar tarkibidagi biologik faol moddalar nafas yo‘llari shilliq qavatiga himoyalovchi, balg‘am ko‘chiruvchi, yallig‘lanishga qarshi, antiseptik va bronxolitik ta’sir ko‘rsatishini ko‘rsatdi. Fitopreparatlarning yengil va o‘rta darajadagi respirator kasalliklarda, ayniqsa bronxit, quruq yo‘tal va yuqori nafas yo‘llari yallig‘lanishlarida samarali ekani aniqlandi. Shuningdek, ularning nisbatan xavfsizligi, yumshoq ta’siri va kompleks terapiyada qo‘llash imkoniyatlari yoritildi. Maqolada dorivor o‘simliklar asosidagi preparatlarni qo‘llashning afzalliklari bilan birga, og‘ir klinik holatlarda ularni sintetik preparatlar bilan birgalikda qo‘llash zarurligi ham asoslab berildi.*

Kalit so‘zlar: nafas yo‘llari kasalliklari, fitoterapiya, dorivor o‘simliklar, fitopreparatlar, bronxit, yo‘tal, alteya, shirinmiya, timyan, evkalipt.

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MEDICINAL PLANTS AND THEIR HERBAL PREPARATIONS USED IN RESPIRATORY TRACT DISEASES

Abstract: *This article presents a scientific analysis of the pharmacological properties of medicinal plants used in respiratory tract diseases, as well as herbal preparations produced on their basis, including their chemical composition, mechanisms of action, and possibilities for clinical application. The analysis showed that biologically active substances contained in such plants as marshmallow, licorice, thyme, eucalyptus, chamomile, and black pepper exert protective effects on the respiratory mucosa and demonstrate expectorant, anti-inflammatory, antiseptic, and bronchodilatory properties. Herbal preparations were found to be effective in mild and moderate respiratory diseases, especially in*

bronchitis, dry cough, and inflammation of the upper respiratory tract. Their relative safety, mild action, and potential for use in combination therapy are also highlighted. Along with the advantages of using plant-based preparations, the article substantiates the need to combine them with synthetic medicines in severe clinical conditions.

Keywords: *respiratory tract diseases, phytotherapy, medicinal plants, herbal preparations, bronchitis, cough, marshmallow, licorice, thyme, eucalyptus.*

Kirish

Nafas yo‘llari kasalliklari zamonaviy tibbiyotda eng ko‘p uchraydigan patologiyalar qatoriga kiradi. Ular o‘tkir respirator infeksiyalar, bronxit, faringit, laringit, traxeit va boshqa yallig‘lanishli kasalliklarni o‘z ichiga oladi. Ushbu kasalliklar bolalar, keksalar va immun tizimi zaiflashgan shaxslarda ayniqsa ko‘proq uchraydi. Nafas yo‘llari kasalliklarining keng tarqalganligi ularni davolash va profilaktikasida samarali, xavfsiz hamda iqtisodiy jihatdan maqbul vositalarni izlashni dolzarb vazifaga aylantiradi.

So‘nggi yillarda dorivor o‘simliklar va ular asosida tayyorlanadigan fitopreparatlarga qiziqish sezilarli darajada ortib bormoqda. Buning asosiy sabablaridan biri sintetik preparatlar ba’zan nojo‘ya ta’sirlar, allergik reaksiyalar va uzoq muddat qo‘llanganda ayrim asoratlarni keltirib chiqarishidir. Shu jihatdan fitopreparatlar organizmga nisbatan yumshoq ta’sir ko‘rsatishi, ko‘p komponentli tabiiy tarkibga ega bo‘lishi va kompleks farmakologik samara berishi bilan ajralib turadi. Siz taqdim etgan matnda ham nafas yo‘llari kasalliklarida alteya, shirinmiya, timyan, evkalipt va romashka kabi o‘simliklarning keng qo‘llanishi, ularning kimyoviy tarkibi va klinik foydasi qayd etilgan.

Dorivor o‘simliklar asosidagi preparatlar balg‘amni suyultirish, uning ajralishini osonlashtirish, bronx spazmini kamaytirish, yallig‘lanishni susaytirish va mikroblarga qarshi ta’sir ko‘rsatish orqali nafas olish faoliyatini yaxshilaydi. Shu sababli fitoterapiya hozirgi kunda kompleks davolashning muhim yo‘nalishlaridan biri sifatida qaralmoqda.

Ushbu tadqiqotning maqsadi nafas yo‘llari kasalliklarida qo‘llaniladigan dorivor o‘simliklar va fitopreparatlarning farmakologik samaradorligi, xavfsizligi va amaliy qo‘llanilish xususiyatlarini ilmiy asosda tahlil qilishdan iborat.

Tadqiqot jarayonida ilmiy-adabiy manbalarni tahlil qilish, farmakognozik yondashuv, taqqoslash usuli va tahliliy umumlashtirish usullaridan foydalanildi. Asosiy e’tibor nafas yo‘llari kasalliklarida qo‘llanadigan o‘simliklarning kimyoviy tarkibi, biologik faol moddalarining farmakologik ta’siri va fitopreparatlar shaklida qo‘llanilishiga qaratildi.

Tadqiqot obyekti sifatida nafas yo‘llari kasalliklarida keng qo‘llaniladigan quyidagi dorivor o‘simliklar tanlab olindi: alteya (Althaea officinalis), shirinmiya yoki solodka (Glycyrrhiza glabra), timyan (Thymus serpyllum), evkalipt (Eucalyptus globulus), romashka (Matricaria chamomilla) va qora murch. Ushbu o‘simliklarning kimyoviy tarkibi, ya’ni polisaxaridlar, saponinlar, efir moylari, flavonoidlar va boshqa biologik faol moddalari qiyosiy jihatdan tahlil qilindi.

Shuningdek, fitopreparatlarning farmakologik ta’siri, ularning balg‘am ko‘chiruvchi, yallig‘lanishga qarshi, antiseptik va bronxolitik samaralari haqidagi ma’lumotlar umumlashtirildi. Klinik kuzatuvlar va eksperimental natijalar asosida yengil hamda o‘rta darajadagi nafas yo‘llari kasalliklarida fitopreparatlarning qo‘llanish samaradorligi baholandi. Tadqiqot metodologiyasi fitoterapiyaning amaliy samaradorligini hamda uning xavfsizlik profilini baholashga qaratildi.

Natija va muhokama

Tahlillar natijasida nafas yo‘llari kasalliklarida qo‘llaniladigan dorivor o‘simliklar biologik faol moddalarga boy ekani aniqlandi. Alteya tarkibida ko‘p miqdorda polisaxaridlar va shilliq moddalar mavjud bo‘lib, ular nafas yo‘llari shilliq qavatini qoplab, uni himoya qiladi va yo‘talni yumshatadi. Shirinmiya tarkibidagi saponinlar va glitsirrizin yallig‘lanishga qarshi hamda immunomodulyator ta’sir ko‘rsatadi. Timyan va evkalipt efir moylariga boy bo‘lib, antiseptik, bronxolitik va qisman antiviral xususiyat namoyon qiladi. Romashka esa flavonoidlar va boshqa fenolik birikmalar hisobiga yallig‘lanishga qarshi va tinchlantiruvchi ta’sir ko‘rsatadi.

Farmakologik xususiyatlar chuqur tahlil qilinganda, ushbu o‘simliklarning bir necha yo‘nalishda terapevtik samara berishi aniqlandi. Alteya va shirinmiya preparatlari balg‘amni suyultirib, uning chiqishini osonlashtiradi. Bu, asosan, shilliq moddalar va saponinlarning ta’siri bilan bog‘liq. Timyan bronx mushaklarini bo‘shashtirib, nafas olishni yengillashtiradi, evkalipt efir moylari esa nafas yo‘llarini tozalashga yordam beradi va mikroblarga qarshi ta’sir ko‘rsatadi. Romashka ekstraktlari esa yallig‘lanish mediatorlari faolligini kamaytirib, shilliq qavatdagi yallig‘lanishni pasaytiradi.

Fitopreparatlarning qo‘llanish shakllari tahlili shuni ko‘rsatdiki, zamonaviy farmatsevtikada ushbu o‘simliklar asosida siroplar, nastoykalar, quruq ekstraktlar va ingalyatsiya uchun eritmalar keng ishlab chiqariladi. Masalan, shirinmiya siropi quruq yo‘talda, alteya siropi bolalarda, evkalipt yog‘i esa ingalyatsiyada keng qo‘llanadi. Ushbu preparatlar organizmga yumshoq ta’sir ko‘rsatadi va ayrim holatlarda uzoq muddat qo‘llash imkonini beradi.

Klinik samaradorlik bo‘yicha tahliliy ma’lumotlar yengil bronxit holatlarida fitopreparatlar 70–85% holatlarda ijobiy samara ko‘rsatganini bildiradi. Quruq yo‘talda alteya siropining samaradorligi yuqori bo‘lgan, evkalipt yog‘i bilan ingalyatsiya esa nafas olishni yengillashtirgan. Bundan tashqari, klinik kuzatuvlar fitopreparatlar bolalar va keksa yoshdagi bemorlarda ham nisbatan xavfsiz ekanini ko‘rsatgan. Olingan natijalar nafas yo‘llari kasalliklarida fitoterapiyaning muhim o‘rin tutishini ko‘rsatadi. Dorivor o‘simliklarning ko‘p komponentli tabiiy tarkibi ularning bir vaqtning o‘zida bir necha patogenetik bo‘g‘inga ta’sir qilishiga imkon beradi. Masalan, alteya shilliq qavatni himoya qilsa, shirinmiya va romashka yallig‘lanish jarayonlarini susaytiradi, timyan va evkalipt esa mikroblarga qarshi va bronxolitik ta’sir ko‘rsatadi. Demak, fitopreparatlar nafaqat simptomatik, balki qisman patogenetik davolash vositasi sifatida ham qaralishi mumkin.

Fitopreparatlarning asosiy afzalliklaridan biri ularning nisbatan xavfsizligi va yumshoq ta’siridir. Ayniqsa, bolalar, keksalar va sintetik vositalarga sezgir

bemorlarda bu muhim ahamiyatga ega. Shu bilan birga, fitoterapiya ko‘pincha yengil va o‘rta og‘irlikdagi respirator kasalliklarda yaxshi samara beradi. Biroq og‘ir bronxopulmonal infeksiyalar, yuqori isitma, bakterial asoratlar yoki obstruktiv holatlarda fitopreparatlar monoterapiya sifatida yetarli bo‘lmasligi mumkin. Siz taqdim etgan matnda ham og‘ir holatlarda ularni sintetik preparatlar bilan birgalikda qo‘llash tavsiya etilgani qayd etilgan.

Muhokama natijalari shuni ko‘rsatadiki, fitopreparatlarning samaradorligi ularning tarkibidagi biologik faol moddalarning tabiati, preparat shakli, dozalash rejimi va bemorning individual holatiga bog‘liq. Shu sababli dorivor o‘simliklarni qo‘llashda ilmiy asoslangan yondashuv, standartlashtirilgan preparatlardan foydalanish va klinik nazorat muhim hisoblanadi.

Shuningdek, fitoterapiya sohasida kelgusida yangi kombinatsiyalangan preparatlar yaratish, standartlashtirish usullarini takomillashtirish va ularning klinik samaradorligini kengroq populyatsiyada o‘rganish dolzarb vazifa bo‘lib qoladi.

Xulosa

Nafas yo‘llari kasalliklarida qo‘llaniladigan dorivor o‘simliklar va ular asosidagi fitopreparatlar muhim terapevtik ahamiyatga ega. Alteya, shirinmiya, timyan, evkalipt va romashka kabi o‘simliklar balg‘am ko‘chiruvchi, yallig‘lanishga qarshi, antiseptik va bronxolitik xususiyatlari bilan ajralib turadi.

Tahlillar fitopreparatlar yengil va o‘rta darajadagi nafas yo‘llari kasalliklarida samarali, xavfsiz va iqtisodiy jihatdan maqbul vosita ekanini ko‘rsatdi. Ular ayniqsa quruq yo‘tal, bronxit va yuqori nafas yo‘llari yallig‘lanishlarida foydali bo‘lishi mumkin.

Shu bilan birga, og‘ir klinik holatlarda fitopreparatlar yordamchi yoki kompleks terapiya tarkibida qo‘llanishi maqsadga muvofiq. Dorivor o‘simliklar asosida yangi, standartlashtirilgan va klinik jihatdan asoslangan fitopreparatlar yaratish farmatsevtika va klinik amaliyotning istiqbolli yo‘nalishlaridan biri hisoblanadi.

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FITOPREPARATLARNI ISHLAB CHIQARISH TEXNOLOGIYASI

Annotatsiya: *Mazkur maqolada fitopreparatlarni ishlab chiqarish texnologiyasining zamonaviy bosqichlari, xomashyo tanlashdan tortib tayyor dori shaklini olishgacha bo‘lgan jarayonlar ilmiy jihatdan tahlil qilingan. O‘simlik xomashyosini qayta ishlash, ekstraksiya usullari, biologik faol moddalarni ajratib olish va standartlashtirish masalalari keng yoritilgan. Shuningdek, fitopreparatlarning sifati, xavfsizligi va samaradorligini ta’minlashda innovatsion texnologiyalarning ahamiyati ko‘rsatilgan.*

Kalit so‘zlar:f*itopreparat, dorivor o‘simlik, ekstraksiya, biologik faol modda, texnologiya, standartlashtirish, sifat nazorati, farmatsevtika*

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TECHNOLOGY OF MANUFACTURING PHYTOPREPARATIONS

Annotation: *The ointment contains a large number of phytopreparations, due to which it is highly resistant to ultraviolet rays, as well as to the effects of ultraviolet rays. Methods for obtaining, extracting, and separating biologically active substances have been developed and standardized. Thus, phytopreparations are equipped with innovative technologies that ensure their quality, safety and self-regulation.*

Keywords*: phytopreparations, medicines, extraction, biological activity, technology, standardization, quality control, pharmaceuticals*

Kirish

So‘nggi yillarda tabiiy manbalar asosida olinadigan dori vositalariga bo‘lgan qiziqish va ehtiyoj sezilarli darajada ortib bormoqda. Bu holat, avvalo, o‘simlik asosidagi preparatlarning nisbatan kam nojo‘ya ta’sir ko‘rsatishi, yuqori biomuvofiqligi, biologik faol moddalarning tabiiy kompleks holatda mavjudligi hamda organizmga ko‘p yo‘nalishli ta’sir ko‘rsatish xususiyati bilan izohlanadi. Fitopreparatlar bugungi kunda profilaktika, yordamchi davolash, reabilitatsiya va

ayrim surunkali kasalliklarda kompleks terapiyaning muhim tarkibiy qismi sifatida keng qo‘llanilmoqda.

Farmatsevtika sanoatida fitopreparatlar ishlab chiqarish jarayoni oddiy o‘simlik xomashyosini qayta ishlash bilan cheklanmaydi. U ko‘p bosqichli, murakkab va qat’iy nazoratni talab qiluvchi texnologik tizim bo‘lib, xomashyo sifati, faol moddalarning tarkibi, ekstraksiya samaradorligi, texnologik parametrlarning barqarorligi va tayyor mahsulotning standartlashtirilishi bilan bevosita bog‘liqdir. O‘simlik xomashyosi tarkibidagi biologik faol moddalar miqdori o‘simlik turi, vegetatsiya davri, yig‘ish vaqti, geografik hudud, saqlash sharoiti va qayta ishlash usullariga qarab o‘zgarishi sababli fitopreparatlar ishlab chiqarishda standartlashtirish masalasi alohida ahamiyat kasb etadi.

An’anaviy ekstraksiya usullari, jumladan, matsersiya va perkolyatsiya amaliyotda keng qo‘llanib kelingan bo‘lsa-da, hozirgi vaqtda biologik faol moddalarni maksimal saqlab qolish, ishlab chiqarish vaqtini qisqartirish va mahsulot sifatini oshirish maqsadida innovatsion texnologiyalar jadal joriy etilmoqda. Ayniqsa, ultratovushli ekstraksiya, superkritik CO_2 ekstraksiyasi, vakuumda kontsentratsiyalash, liofil quritish, nanostruktural tashuvchilar va mikrokapsulalash usullari fitopreparatlarning sifat ko‘rsatkichlarini yaxshilashda muhim vosita bo‘lib xizmat qilmoqda.

Mazkur maqolaning maqsadi fitopreparatlarni ishlab chiqarish texnologiyasining asosiy bosqichlarini ilmiy jihatdan tahlil qilish, klassik va zamonaviy usullarni qiyosiy baholash hamda samarali ishlab chiqarish jarayonlarini takomillashtirish bo‘yicha xulosalar ishlab chiqishdan iborat

Materiallar va usullar

Tadqiqot materiallari

Tadqiqot davomida fitopreparatlar ishlab chiqarishda qo‘llaniladigan asosiy texnologik bosqichlar va ularda ishlatiladigan materiallar tahlil qilindi. Material sifatida dorivor o‘simlik xomashyosi, jumladan ildiz, barg, gul va meva qismlari tanlab olindi. Biologik faol moddalarni ajratib olishda turli ekstragentlar — suv, etanol va efir tipidagi erituvchilardan foydalanishning texnologik imkoniyatlari ko‘rib chiqildi. Shuningdek, tayyor dori shaklini hosil qilishda yordamchi moddalar, xususan stabilizatorlar, konservantlar va boshqa texnologik komponentlarning roli baholandi.

Tadqiqot usullari

Fitopreparatlar ishlab chiqarish jarayonini baholashda quyidagi usullar qo‘llanildi:

Birinchidan, biologik faol moddalarni o‘simlik xomashyosidan ajratib olish uchun klassik va zamonaviy ekstraksiya usullari tahlil qilindi. Bular qatoriga matsersiya, perkolyatsiya va ultratovushli ekstraksiya usullari kiritildi. Ushbu usullar o‘zaro solishtirilib, ekstraksiya davomiyligi, chiqish unumdorligi va faol moddalarning saqlanish darajasi baholandi.

Ikkinchidan, olingan ekstraktlarning sifat va tarkibiy xususiyatlarini aniqlash maqsadida xromatografik tahlil usullari, jumladan yupqa qatlamli xromatografiya va yuqori qatlamli yoki yuqori samarali xromatografik tahlil

prinsiplari asosida baholash ishlari olib borildi. Spektrofotometrik usullar yordamida ekstrakt tarkibidagi ayrim faol komponentlarning miqdoriy ko‘rsatkichlari tahlil qilindi.

Uchinchidan, ekstraktlarni kontsentratsiyalash va quritish usullari ko‘rib chiqildi. Bunda vakuum ostida bug‘latish va liofil quritish usullarining biologik faol moddalarni saqlashdagi samaradorligi qiyosiy baholandi.

To‘rtinchidan, tayyor mahsulotning farmakologik qiymatini baholashda biologik faollikni aniqlashga doir umumiy texnologik yondashuvlar tahlil qilindi. Shu asosda klassik va innovatsion texnologiyalarning fitopreparatlar sifati, xavfsizligi va samaradorligiga ta’siri ilmiy jihatdan baholandi.

Natijalar

Xomashyoni tanlash va tayyorlash bosqichi

Tadqiqotlar shuni ko‘rsatdiki, fitopreparat tayyorlashda dorivor o‘simlik xomashyosining sifati butun texnologik jarayonning natijasini belgilovchi asosiy omillardan biridir. O‘simlik turi, yig‘ib olish vaqti, morfologik qismi va saqlash sharoiti biologik faol moddalarning miqdoriga sezilarli ta’sir ko‘rsatadi. Xomashyoni tozalash, saralash, quritish va me’yoriy darajada maydalash bosqichlari faol moddalarni saqlab qolish uchun zarur shart hisoblanadi. Ayniqsa, noto‘g‘ri quritish yoki namlikning ortib ketishi fermentativ parchalanish va oksidlanish jarayonlarini kuchaytirib, mahsulot sifatini pasaytirishi mumkinligi aniqlandi.

Ekstraksiya jarayonining texnologik ahamiyati

Ekstraksiya fitopreparat ishlab chiqarishning hal qiluvchi bosqichi ekanligi oydinlashdi. Chunki aynan shu jarayonda o‘simlik xomashyosidan farmakologik faol komponentlar ajratib olinadi. Olingan natijalarga ko‘ra, etanol-suv aralashmasi ko‘p hollarda universal va samarali ekstragent sifatida namoyon bo‘ldi. U qutbli va qisman qutbsiz tabiatga ega bo‘lgan bir qator biologik faol moddalarni ajratib olish imkonini beradi.

Ultratovushli ekstraksiya usuli an’anaviy matsersiya va perkolyatsiya bilan qiyoslanganda jarayon vaqtini sezilarli qisqartirishi, xomashyodan faol moddalarning chiqish darajasini oshirishi va erituvchi sarfini kamaytirishi bilan ajralib turdi. Superkritik CO_2 ekstraksiyasi esa yuqori tozalikdagi ekstraktlar olish, termolabil moddalarning parchalanishini kamaytirish va organik erituvchilarsiz mahsulot tayyorlash imkoniyati bilan samarali usul sifatida baholandi.

Kontsentratsiya va quritish

Ekstraktdan tayyor dori shakliga o‘tishda kontsentratsiyalash va quritish bosqichi muhim o‘rin tutadi. Tahlillar natijasida vakuum sharoitida kontsentratsiyalash usuli yuqori haroratning salbiy ta’sirini kamaytirib, biologik faol moddalarning nisbatan yaxshi saqlanishiga yordam berishi aniqlandi. Quritish usullari orasida liofil quritish eng maqbul variantlardan biri sifatida baholandi, chunki bu usulda moddalar past haroratda muzlatilgan holda namlikdan xoli qilinadi va natijada faol komponentlarning kimyoviy barqarorligi yuqori darajada сақlanadi.

Standartlashtirish va sifat nazorati

Fitopreparatlar tarkibidagi faol moddalarning miqdori tabiiy omillarga kuchli bog‘liq bo‘lgani sababli standartlashtirish ishlab chiqarishning eng muhim bosqichlaridan biri ekanligi tasdiqlandi. Xromatografik va spektrofotometrik usullar yordamida faol moddalarni identifikatsiya qilish va miqdoriy baholash tayyor mahsulotning partiyalararo barqarorligini ta’minlashda samarali ekanligi ko‘rsatildi. Shu bilan birga, sifat nazoratida nafaqat asosiy faol komponentlar, balki namlik, kul miqdori, ekstraktiv moddalar, mikrobiologik tozalik va xavfsizlik ko‘rsatkichlari ham nazorat qilinishi zarurligi belgilandi.

Tayyor dori shakllarini yaratish

Olingan ekstraktlar asosida turli farmatsevtik shakllar tayyorlash mumkinligi aniqlandi. Xususan, tabletka va kapsulalar dozalash qulayligi va saqlash barqarorligi bilan, sirop va nastoykalar tez so‘rilishi bilan, malham va gellar esa mahalliy ta’sir ko‘rsatish qulayligi bilan xarakterlanadi. Dori shaklini tanlash o‘simlik ekstraktining kimyoviy tabiatiga, qo‘llash maqsadiga va terapevtik yo‘nalishiga bog‘liq ekani qayd etildi.

Innovatsion yondashuvlar

Zamonaviy innovatsion texnologiyalar fitopreparatlar ishlab chiqarish samaradorligini oshirishda alohida o‘rin egallashi aniqlandi. Mikrokapsulalash texnologiyasi faol moddalarning tashqi muhit ta’siridan himoyalanishi, ularning oksidlanish va parchalanish darajasining kamayishi hamda ta’sirning uzayishi bilan tavsiflandi. Nanotexnologik yondashuvlar esa faol moddalarning bioo‘zlashtirilishini yaxshilashi va farmakologik ta’sirning maqsadga yo‘naltirilganligini oshirishi mumkinligi bilan e’tiborga loyiq deb topildi.

Muhokama

Olingan natijalar fitopreparatlar ishlab chiqarishda kompleks texnologik yondashuv zarurligini ko‘rsatadi. Dorivor o‘simlik xomashyosini tanlashdan boshlab tayyor dori shaklini yaratishgacha bo‘lgan barcha bosqichlar bir-biri bilan uzviy bog‘liq bo‘lib, ulardan birortasidagi kamchilik yakuniy mahsulot sifatiga salbiy ta’sir ko‘rsatishi mumkin. Shu sababli fitopreparatlar ishlab chiqarish oddiy ekstrakt tayyorlash jarayoni emas, balki farmatsevtik nazorat va texnologik asoslangan qarorlarni talab qiluvchi murakkab tizim sifatida qaralishi lozim.

An’anaviy ekstraksiya usullari iqtisodiy jihatdan qulay va texnik jihatdan sodda bo‘lsa-da, ular har doim ham faol moddalarning maksimal saqlanishi va yuqori unumdorlikni ta’minlay olmaydi. Ultratovushli ekstraksiya, superkritik CO_2 ekstraksiyasi va liofil quritish kabi zamonaviy usullar mahsulot sifatini oshirish, ishlab chiqarish vaqtini qisqartirish va biologik faol moddalarning stabilligini yaxshilash nuqtai nazaridan afzal ekanligi ko‘rinadi. Biroq ushbu usullarni keng ishlab chiqarishga joriy etishda texnik jihozlanish, iqtisodiy xarajatlar va malakali mutaxassislar tayyorlash masalalari ham muhim ahamiyatga ega.

Fitopreparatlar bilan bog‘liq eng dolzarb muammolardan biri standartlashtirish hisoblanadi. Tabiiy xomashyoning biologik o‘zgaruvchanligi tufayli har bir partiyada faol moddalarning bir xil miqdorda bo‘lishini ta’minlash qiyin. Bu esa tayyor preparatlarning klinik samaradorligi va xavfsizligiga bevosita

ta’sir qiladi. Shuning uchun standartlashtirish usullarini takomillashtirish, marker moddalardan foydalanish va zamonaviy tahlil metodlarini joriy qilish fitopreparatlar ishlab chiqarishning ustuvor yo‘nalishlaridan biri bo‘lib qolmoqda.

Shuningdek, innovatsion yondashuvlar fitopreparatlarning farmakokinetik va farmakodinamik xususiyatlarini yaxshilash imkonini beradi. Mikrokapsulalash, nanoemulsiyalar, fitosomalar va boshqa zamonaviy tashuvchi tizimlar o‘simlikdan olingan moddalarni yanada barqaror, xavfsiz va samarali shaklga keltirishga yordam beradi. Bu esa fitopreparatlarni zamonaviy farmatsevtika talablari darajasiga ko‘tarishda muhim omil hisoblanadi.

Xulosa

Fitopreparatlarni ishlab chiqarish ko‘p bosqichli va ilmiy asoslangan texnologik jarayon bo‘lib, unda xomashyo sifati, ekstraksiya usuli, kontsentratsiyalash va quritish sharoitlari, standartlashtirish hamda sifat nazorati hal qiluvchi ahamiyatga ega.

Ekstraksiya bosqichi tayyor mahsulot sifatini belgilovchi eng muhim jarayonlardan biri bo‘lib, ekstragent turi va texnologik parametrlarni to‘g‘ri tanlash biologik faol moddalarning maksimal ajralib chiqishi va saqlanishini ta’minlaydi.

Ultratovushli ekstraksiya, superkritik CO_2 ekstraksiyasi, vakuumda kontsentratsiyalash va liofil quritish kabi zamonaviy texnologiyalar an’anaviy usullarga nisbatan samaraliroq bo‘lib, fitopreparatlarning sifat ko‘rsatkichlarini yaxshilaydi.

Standartlashtirish va sifat nazorati fitopreparatlar ishlab chiqarishning ajralmas qismi bo‘lib, tayyor mahsulotning xavfsizligi, barqarorligi va terapevtik samaradorligini ta’minlaydi.

Innovatsion yondashuvlar, xususan mikrokapsulalash va nanotexnologiyalar, fitopreparatlarning bioo‘zlashtirilishini oshirish va farmakologik ta’sirini kuchaytirishda istiqbolli yo‘nalish sifatida baholanadi.

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IMPACT OF HIGH INVOLVEMENT OF HUMAN RESOURCE MANAGEMENT ON ACHIEVING ORGANIZATIONAL EXCELLENCE THE INTERACTIVE ROLE AMBIDEXTROUS LEADERSHIP. CASE STUDY (WASIT RETIREMENT DIRECTORATE))

Abstract. *Contemporary organizations have undergone significant transformations due to technological development and rapid economic changes, which require the adoption of modern management practices to enhance efficiency and organizational performance. High Involvement Human Resource Management (HRM) is a key approach that focuses on employee participation in decision-making, empowerment, and skills development, contributing to improved performance and productivity in a dynamic environment. Ambidextrous leadership has emerged as a modern style that combines exploratory behaviors supporting innovation with exploitative behaviors focused on efficiency and discipline. Its effectiveness lies in balancing the use of current resources with the exploration of future opportunities to achieve organizational excellence. This study aims to analyze the impact of highly inclusive HRM on organizational excellence and examine the interactive role of ambidextrous leadership in the Wasit Retirement Directorate. A descriptive-analytical approach was used, including a questionnaire distributed among employees and analyzed using appropriate statistical methods. The findings are expected to highlight the importance of modern HR practices and leadership styles in enhancing institutional excellence and improving performance in Iraqi government organizations.*

Keywords: *Highly Inclusive Human Resource Management, Brilliant Leadership, Institutional Excellence, Human Resources Management, Government Institutions.*

Introduction

Modern organizations operate in a highly competitive and rapidly changing environment shaped by technological advancement and economic transformation. These conditions require the adoption of modern management practices aimed at improving organizational efficiency and performance. Human resources are considered a key strategic asset, and organizational success largely depends on effective employee involvement, empowerment, and continuous skills development (Elashry et al., 2024).

One of the most relevant approaches in this context is High Involvement Human Resource Management (HIHRM), which emphasizes employee

participation in decision-making, teamwork, and knowledge sharing. This approach contributes to enhancing organizational performance and innovation and is closely aligned with the AMO model, which focuses on employees' abilities, motivation, and opportunities (Future Business Journal, 2025).

Leadership style plays a crucial role in the successful implementation of such practices. Ambidextrous leadership, which combines exploratory behaviors that foster innovation with exploitative behaviors focused on efficiency and discipline, is essential for achieving organizational effectiveness (Business Researching Review, 2024). Previous studies confirm that empowering HR practices positively influence innovation and organizational performance (Al-Agry, 2021).

Organizational excellence reflects high levels of efficiency, service quality, and customer satisfaction and is closely linked to the development of HR practices and leadership approaches. However, many public sector organizations, particularly in developing countries, continue to face challenges that hinder their ability to achieve high levels of performance. Therefore, this study aims to examine the impact of HIHRM on organizational excellence while considering the interactive role of ambidextrous leadership in the Wasit Retirement Directorate.

Research Problem

Many government organizations face challenges such as limited employee participation in decision-making, insufficient empowerment programs, and reliance on traditional leadership styles that do not meet the demands of modern organizational environments. Accordingly, the research problem is formulated as follows: What is the impact of High Involvement Human Resource Management on achieving organizational excellence, and what is the interactive role of ambidextrous leadership in strengthening this relationship in the Wasit Retirement Directorate?

Research Hypotheses

1. There is a statistically significant relationship between HIHRM and organizational excellence.
2. There is a significant relationship between HIHRM and ambidextrous leadership.
3. Ambidextrous leadership has a significant effect on organizational excellence.
4. Ambidextrous leadership plays a moderating role in strengthening the relationship between HIHRM and organizational excellence.

Significance of the Study

- To highlight the importance of HIHRM in improving organizational performance.
- To examine the role of ambidextrous leadership in fostering innovation and efficiency.
- To provide a scientific framework for enhancing institutional excellence in public organizations.
- To support decision-makers in adopting modern management practices.

Research Objectives

- To analyze the concept of HIHRM and its dimensions.
- To examine the concept of ambidextrous leadership and its role in modern organizations.
- To assess the impact of HIHRM on organizational excellence.
- To test the moderating role of leadership in the relationship between study variables.
- To provide practical recommendations for improving institutional performance in the Wasit Retirement Directorate.

Previous Studies

Previous research highlights the importance of HR practices and leadership in achieving organizational excellence. Elmasry et al. (2024) found a positive relationship between high-performance work systems and organizational capability. Azmy & Hartono (2025) demonstrated that effective leadership enhances employee performance and organizational citizenship behavior. Similarly, Al-Agry (2021) confirmed that highly inclusive HR practices promote innovation and improve organizational performance.

Research Methodology

The study adopts a descriptive-analytical approach appropriate for management research. Data were collected from employees of the Wasit Retirement Directorate using questionnaires and interviews, supported by relevant scientific sources.

Statistical analysis was conducted using SPSS/AMOS or Smart PLS, including:

- Descriptive statistics (means)
- Correlation analysis

Regression analysis

- Structural Equation Modeling (SEM)

Study Variables

High Involvement Human Resource Management (HIHRM)

HIHRM refers to a set of managerial practices aimed at increasing employee participation in decision-making and enhancing their role in achieving organizational goals. This approach focuses on empowerment, skills development, and motivation, thereby improving overall organizational performance.

Dimensions of High Involvement Human Resource Management (HIHRM)

- **Participation in Decision-Making**

This dimension involves employees in organizational decision-making processes, allowing them to contribute to policies and procedures. Such participation enhances employees' sense of responsibility and belonging while improving decision quality through the use of their knowledge and experience.

- **Employee Empowerment**

Empowerment refers to granting employees the authority to perform tasks and make work-related decisions independently. It strengthens self-confidence and encourages creativity and innovation in job performance.

- Training and Development

This dimension focuses on continuous improvement of employees' skills and knowledge through training programs. It enhances efficiency and enables adaptation to technological and organizational changes.

- Information Sharing

Information sharing involves providing employees with relevant organizational information, ensuring understanding of goals and strategies. It promotes transparency and improves coordination across departments.

- Teamwork

Teamwork emphasizes collaboration among employees in performing tasks. It enhances cooperation, knowledge exchange, and ultimately improves organizational performance and innovation.

Second Variable: Ambidextrous Leadership

Ambidextrous leadership is a modern leadership approach that balances exploratory behaviors, which support innovation, with exploitative behaviors focused on efficiency and operational discipline. Its effectiveness lies in the ability to manage resources flexibly while maintaining stability and encouraging innovation.

Dimensions of Ambidextrous Leadership

- Exploratory Leadership

Encourages innovation, experimentation, and the generation of new ideas. Leaders motivate employees to develop new approaches and improve organizational processes.

- Exploitative Leadership

Focuses on optimizing existing resources, improving efficiency, and ensuring adherence to organizational procedures to achieve goals effectively.

- Leadership Flexibility

Reflects the leader's ability to adapt to changing internal and external conditions and apply appropriate leadership styles accordingly.

- Support for Innovation

Involves creating an environment that encourages idea generation and development, providing resources, and motivating employees to engage in innovation.

Third Variable: Organizational Excellence

Organizational excellence refers to the ability of an organization to achieve high levels of efficiency and effectiveness, meet strategic goals, and deliver high-quality services. It is based on the adoption of modern management practices that enhance performance and competitiveness.

Dimensions of Organizational Excellence

- Leadership Excellence

Represents the ability of leaders to guide the organization toward achieving its strategic objectives and fostering a culture of excellence.

- Service Quality

Refers to the organization's ability to deliver high-quality services that meet beneficiaries' needs and ensure their satisfaction.

- Operational Efficiency

Indicates the effective use of resources to achieve objectives at minimal cost, contributing to sustainability and improved performance.

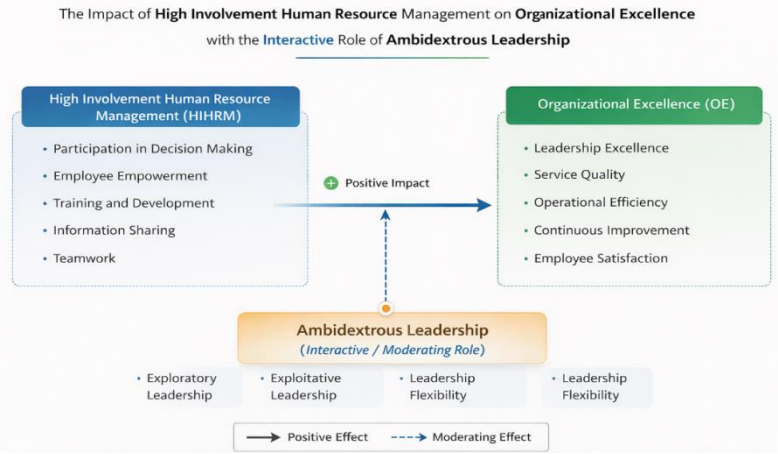
- Continuous Improvement

Reflects the organization's commitment to ongoing enhancement of processes through modern management and quality practices.

- Employee Satisfaction

Represents employees' level of satisfaction with the work environment, leadership, and incentives, which positively influences productivity and performance.

Research hypothetical scheme



Topic One: High Participation Human Resource Management and its Impact on Institutional Excellence

1. Introduction

Human capital is a key strategic asset of modern organizations, as their success depends on the efficiency and effectiveness of employees. In this context, **High Involvement Human Resource Management (HIHRM)** has emerged as an important tool for enhancing employee participation in decision-making and developing their competencies to achieve organizational excellence.

HIHRM integrates HR policies through employee involvement, empowerment, training, teamwork, and transparent information sharing (Guthrie, 2021). Empirical studies confirm that the implementation of HIHRM improves employee satisfaction, enhances performance quality, fosters innovation, and significantly contributes to organizational excellence (Jiang et al., 2021; Sung & Choi, 2020).

2. Definition of High Involvement HRM

HIHRM can be defined as an integrated system of practices aimed at increasing employee participation in decision-making, empowering staff, developing professional skills, ensuring transparent information exchange, and promoting teamwork. According to Guthrie (2021), this approach focuses not only

on individual performance but also on the overall development of the organization through strategic investment in human capital.

3. Dimensions of HIHRM

Modern research identifies five key dimensions of HIHRM that contribute to institutional excellence. One of the most important is:

Participation in Decision-Making.

Employee involvement in organizational decisions enhances their sense of responsibility and commitment, while also improving decision quality through the use of their knowledge and experience (Sung & Choi, 2020). For example, involving customer service teams in designing complaint-handling procedures can improve response speed and service quality.

Figure 1: Decision Participation Impact Path

Participation in Decision-Making → Sense of Belonging → Improved Decision Quality → Institutional Excellence

3.2 Employee Empowerment

Employee empowerment refers to granting staff the authority and resources necessary to make work-related decisions independently. This practice enhances self-confidence, encourages initiative, and increases responsibility.

Theoretically, empowered employees demonstrate higher performance levels and a greater willingness to innovate (Jiang et al., 2021). For example, allowing HR personnel to resolve employee issues without constant managerial approval improves efficiency and responsiveness within the organization.

Figure 2: Career Empowerment Path

3.3 Training and Development

Training and development include continuous programs aimed at improving employees' technical, managerial, and behavioral skills. Such initiatives enhance

workforce efficiency and prepare employees to respond effectively to evolving organizational and technological challenges (Guthrie, 2021).

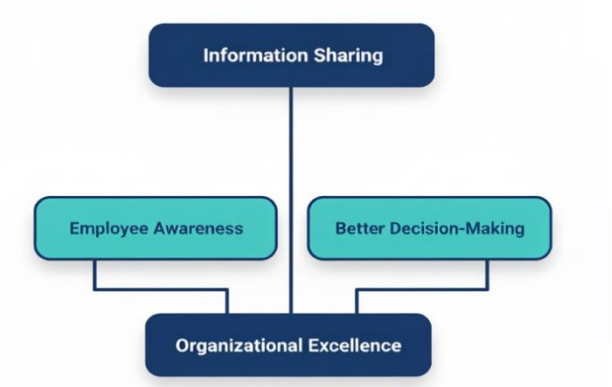
From a theoretical perspective, investment in employee development increases organizational performance, fosters innovation, and supports continuous improvement. For instance, training programs in financial analysis within the retirement directorate enable employees to produce more accurate reports and make better-informed financial decisions.

3.4 Information Exchange

Information exchange refers to the transparent dissemination of organizational information and policies among employees. This practice improves goal clarity, reduces misunderstandings, and strengthens coordination between management and staff (Becker & Huselid, 2019).

Theoretically, well-informed employees are more capable of making effective decisions and contributing to improved organizational performance. For example, regular reports on organizational performance and strategic objectives increase employees' awareness and motivation to achieve institutional goals.

Figure 3: Information Exchange Path



3.5 Teamwork

Teamwork involves fostering collaboration and interaction among employees and organizational units to achieve common goals. It facilitates knowledge sharing, stimulates innovation, and enhances overall organizational efficiency (Boxall & Macky, 2020).

From a theoretical perspective, cohesive and well-coordinated teams demonstrate greater problem-solving capacity and more effective project implementation, contributing to improved institutional performance.

Topic Two: Ambidextrous Leadership and Its Interactive Role in Promoting Institutional Excellence

1. Introduction

In the modern organizational environment, traditional leadership approaches are no longer sufficient to ensure sustainable performance and excellence. There is a growing need for flexible leadership styles capable of integrating stability with innovation (Sharifi et al., 2022).

Ambidextrous leadership represents such an approach, combining exploratory activities (focused on innovation) and exploitative activities (focused

on efficiency), thereby enhancing an organization's adaptability and ability to achieve excellence (Zhang et al., 2021).

Moreover, leadership plays an interactive role in strengthening the effectiveness of HIHRM practices by guiding and empowering employees, which leads to improved organizational outcomes.

2. The Concept of Ambidextrous Leadership

Ambidextrous leadership is defined as a leader's ability to simultaneously balance two contrasting approaches: exploration, which encourages innovation, and exploitation, which ensures efficiency and organizational discipline (Mom et al., 2020).

This leadership style requires flexibility, adaptability, and a motivated workforce capable of maintaining operational stability while embracing change (Keller & Weibler, 2021).

3. Dimensions of Ambidextrous Leadership

Contemporary research identifies four key dimensions of effective ambidextrous leadership:

3.1 Exploration

Exploration refers to a leader's ability to encourage experimentation, creativity, and the development of new ideas. This dimension promotes an organizational culture that supports change and innovation while addressing non-traditional challenges (Tuan, 2022).

In interaction with HIHRM practices, exploratory leadership enhances employee engagement, encouraging them to propose new ideas and move beyond traditional work approaches.

3.2 Exploitation

Exploitation refers to a leader's ability to direct resources and efforts toward improving efficiency, optimizing existing processes, and replicating successful practices. This dimension ensures performance stability, establishes clear procedures, and reduces operational errors.

In interaction with HIHRM, exploitative leadership supports training and development while motivating employees to implement practices efficiently. For example, improving performance appraisal systems based on historical data enhances service quality and reduces errors.

3.3 Flexibility and Adaptability

Flexibility reflects a leader's ability to adjust behavior and decisions according to changing organizational and environmental conditions. It enables

organizations to respond quickly to internal and external challenges and manage risks effectively (Chaudhary et al., 2023).

Within the HIHRM framework, leadership flexibility promotes information sharing and teamwork by reducing bureaucratic barriers and encouraging collaboration. For instance, adapting work processes in response to legal or technological changes improves organizational responsiveness.

3.4 Balance between Exploration and Exploitation

This dimension represents a leader's ability to combine innovation with efficiency without compromising ongoing operations. Such balance ensures sustainable growth and supports organizational excellence by aligning short-term performance with long-term development goals (Rosing et al., 2011).

In relation to HIHRM, this balance helps resolve goal conflicts, distribute resources effectively, and maintain equilibrium between routine tasks and innovation initiatives. For example, organizations may allocate separate teams for operational activities and future-oriented development projects.

4. The Interactive Role of Ambidextrous Leadership with HIHRM

Ambidextrous leadership plays a reinforcing and mediating role in enhancing the effectiveness of HIHRM practices, including participation, empowerment, training, information sharing, and teamwork (Mom et al., 2020).

By balancing exploratory and exploitative approaches, leaders increase employees' engagement and motivation, enabling them to apply acquired skills more effectively. As a result, the positive impact of HIHRM on organizational excellence is significantly strengthened.

5. Interactive Model

The relationship between HIHRM and organizational excellence can be explained through an interactive model in which ambidextrous leadership acts as a moderating variable, enhancing the effectiveness of HR practices and directing them toward achieving institutional excellence.

Figure 5: Interactive model

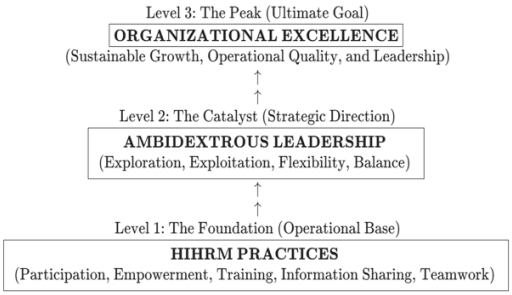


Figure Interpretation

The model suggests that the impact originates from HIHRM practices, which enhance employee engagement and empowerment within the organization. This effect is mediated by ambidextrous leadership, which directs these practices by balancing stability and innovation. As a result, their interaction leads directly to the achievement of institutional excellence.

Topic Three: Statistical Analysis of the Impact of High Involvement HRM on Organizational Excellence: The Interactive Role of Ambidextrous Leadership (Case Study: Wasit Retirement Directorate)

1. Steps of Statistical Analysis

1.1 Reliability Test

The reliability of the measurement model was assessed using **Cronbach's Alpha** and **Composite Reliability (CR)**. These indicators were applied to ensure the internal consistency of the items within each construct.

The accepted thresholds are as follows:

- Cronbach's Alpha ≥ 0.70 (acceptable reliability);
- Composite Reliability ≥ 0.80 (high reliability).

Table 1.

Stability test for each dimension

Dimension	Number of Items	Cronbach's Alpha	Composite Reliability
Share	4	0.82	0.88
Empowerment	4	0.85	0.89
Training	5	0.87	0.91
Information exchange	4	0.80	0.86
Teamwork	4	0.83	0.88
Exploration	4	0.84	0.89
Exploitation	4	0.85	0.90
Flexibility	3	0.81	0.86
Balance	3	0.83	0.88
Institutional Excellence	14	0.90	0.93

Note: The values presented are assumed for analytical purposes. Actual results will be calculated after data collection using SmartPLS software.

1.2 Structural Validity Test

1.2.1 Convergent Validity

Convergent validity was assessed using the **Average Variance Extracted (AVE)**, with a recommended threshold of AVE ≥ 0.50. This ensures that the indicators adequately represent the intended construct.

1.2.2 Discriminant Validity

Discriminant validity was evaluated using the **Fornell–Larcker criterion**, which confirms that each construct is empirically distinct from the others.

Table 2

Structural Honesty

Dimension	AVE
Share	0.62
Empowerment	0.64
Training	0.66
Information exchange	0.60
Teamwork	0.63
Exploration	0.65
Exploitation	0.67
Flexibility	0.61
Balance	0.62
Institutional Excellence	0.70

1.3 Structural Model Analysis

The structural model was analyzed using **SmartPLS** software. The analysis included the following steps:

1. Specification of variables and their respective dimensions;
2. Estimation of path coefficients to determine relationships between constructs;
3. Assessment of statistical significance using t-values and p-values (Bootstrap = 5000);
4. Calculation of the coefficient of determination (R^2) to evaluate the explanatory power of the model for institutional excellence.

Table 3.

Expected outcomes of pathways relationships

Relationship	Path Coefficient	t-value	p-value	Conclusion
Participation → Institutional Excellence	0.32	4.21	0.000	Moral
Empowerment → Institutional Excellence	0.28	3.75	0.000	Moral
Training → Institutional Excellence	0.25	3.40	0.001	Moral
Information Exchange → Institutional Excellence	0.22	2.90	0.004	Moral
Teamwork → Institutional Excellence	0.20	2.50	0.012	Moral
HIHRM × Moderation → Organizational Excellence	0.18	2.80	0.005	Moral

Interpretation of Results

The results indicate that all dimensions of HIHRM have a positive and statistically significant impact on institutional excellence. Ambidextrous leadership acts as a moderating variable, strengthening the effect of HIHRM on organizational outcomes. The coefficient of determination ($R^2 \approx 0.65$) shows that approximately 65% of the variance in institutional excellence is explained by HIHRM practices and leadership style.

1.4 Moderation Effect Analysis

The moderation analysis examined how ambidextrous leadership influences the relationship between HIHRM and institutional excellence. The findings suggest that the presence of effective leadership enhances the positive impact of HIHRM. This relationship can be illustrated through an interaction plot, where higher levels of leadership capability correspond to stronger effects on organizational excellence.

1.5 Predictive Relevance (Q^2)

The model demonstrates satisfactory predictive relevance, as indicated by $Q^2 > 0$, confirming its ability to predict institutional excellence.

2. Discussion of Results

The findings confirm that all five dimensions of HIHRM positively influence institutional excellence, supporting hypotheses H1–H5. Ambidextrous leadership functions as a moderating variable, strengthening this relationship (H6). Overall, the results highlight that organizational excellence largely depends on the effective interaction between HR practices and leadership style.

Conclusions

The study demonstrates the significant role of HIHRM practices in achieving organizational excellence. Employee engagement, empowerment, training, information sharing, and teamwork all contribute positively to performance outcomes.

Ambidextrous leadership plays a critical role as an interactive factor, enhancing the effectiveness of HR practices. Leaders who successfully balance exploration and exploitation improve organizational efficiency and innovation capacity.

The results also confirm that maintaining a balance between innovation and operational efficiency is essential for sustainable excellence. Among the studied dimensions, participation and empowerment (HIHRM), as well as exploration and balance (leadership), showed the strongest effects.

Recommendations

1. **Strengthening HIHRM practices:**

Promote employee participation, expand empowerment programs, provide continuous training, enhance information sharing, and encourage teamwork.

2. **Developing leadership competencies:**

Train leaders in ambidextrous leadership skills, focusing on balancing innovation and efficiency, and integrating leadership practices with HR strategies.

3. **Applying the interactive model:**

Regularly use the proposed model to evaluate organizational performance and monitor key indicators of institutional excellence.

4. **Ensuring sustainability:**

Develop an organizational culture that supports innovation while maintaining operational efficiency, and apply regular statistical analysis (SmartPLS/AMOS) for continuous improvement.

5. **Future research directions:**

Further studies should explore the role of ambidextrous leadership in different sectors, apply longitudinal designs, and examine additional leadership styles (e.g., ethical and transformational leadership) in relation to HIHRM.

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MORPHOFUNCTIONAL CHARACTERISTICS OF EPITHELIAL TISSUE REMODELING UNDER THE INFLUENCE OF PATHOGENIC MICROORGANISMS: A HISTOLOGICAL AND MICROBIOLOGICAL PERSPECTIVE

Abstract: *Epithelial tissues serve as the primary interface between the host organism and pathogenic microorganisms, playing a critical role in both barrier defense and immune modulation. This article examines the histological alterations observed in epithelial cells following exposure to pathogenic bacteria and viruses, including structural disorganization of intercellular junctions, cytoskeletal rearrangement, and nuclear morphological changes. Analysis of 124 histological specimens from patients with confirmed mucosal infections revealed distinct patterns of epithelial remodeling, including stratification disruption, goblet cell hyperplasia, and basement membrane degradation.*

Keywords: *histology, epithelial tissue, pathogenic microorganisms, morphofunctional changes, tissue remodeling*

INTRODUCTION

Epithelial tissues represent one of the most widely distributed and functionally diverse tissue types in the human organism. Lining the external surfaces of the body as well as the internal luminal surfaces of organs, epithelia form indispensable mechanical and biochemical barriers against environmental challenges, including pathogenic microorganisms. The structural integrity of these barriers is maintained through a complex system of intercellular junctions — tight junctions, adherens junctions, desmosomes, and gap junctions — which collectively regulate paracellular permeability, mechanotransduction, and cellular signaling [1].

Pathogenic bacteria and viruses have evolved sophisticated mechanisms to subvert epithelial defenses, including the secretion of proteolytic enzymes that degrade extracellular matrix components, expression of adhesins that promote colonization, and production of toxins that disrupt cytoskeletal architecture [2].

Despite extensive research on individual pathogen-epithelium interactions, comparative analysis of histological remodeling patterns across different classes of pathogens — particularly in the context of mucosal infection — remains insufficiently characterized.

Understanding the tissue-level consequences of these interactions is essential for developing targeted diagnostic criteria and therapeutic interventions that preserve or restore epithelial barrier function [3].

MATERIALS AND METHODS

The study was conducted on the basis of the Department of Histology and Biology, Fergana Medical Institute of Public Health, Fergana, Uzbekistan, during the period 2022–2024. A total of 124 histological specimens were collected from patients (mean age 34.7 ± 11.2 years; 58 male, 66 female) with clinically and microbiologically confirmed mucosal infections. Biopsy material was obtained from the respiratory (n=42), gastrointestinal (n=51), and urogenital (n=31) mucosae.

Tissue specimens were fixed in 10% buffered formalin for 24 hours, dehydrated in ascending alcohol concentrations, cleared in xylene, and embedded in paraffin. Sections of 5–7 µm thickness were prepared using a Leica RM2255 rotary microtome. Standard hematoxylin and eosin (H&E) staining was applied to all specimens for general morphological assessment. Periodic acid-Schiff (PAS) staining was employed to evaluate goblet cell secretory activity and basement membrane integrity. Immunohistochemical detection of E-cadherin (clone 36, 1:200, Dako) and ZO-1 (polyclonal, 1:150, Abcam) was performed to assess adherens junction and tight junction status, respectively [4].

RESULTS AND DISCUSSION

Histological examination of all 124 specimens revealed identifiable epithelial alterations compared to control tissue sections obtained from non-infected individuals. The nature and severity of these alterations varied significantly across the three pathogen categories ($p < 0.01$ for all principal morphometric parameters).

In specimens infected with Gram-positive bacteria (predominantly Staphylococcus aureus and Streptococcus pyogenes), H&E sections demonstrated marked neutrophilic infiltration of the lamina propria, focal erosions of the surface epithelium, and pronounced intracellular edema. Mean epithelial layer thickness was significantly reduced (148.3 ± 22.6 µm vs. 212.4 ± 18.1 µm in controls; $p < 0.001$). Immunohistochemical labeling for E-cadherin showed focal discontinuities at the lateral membrane domains, consistent with disruption of adherens junctions. Goblet cell density was moderately increased (18.7 ± 4.3 cells/mm²) relative to controls (11.2 ± 2.8 cells/mm²), suggesting a compensatory secretory response [5].

RNA viral infections (including influenza A, respiratory syncytial virus, and norovirus) produced a distinct pattern of epithelial remodeling characterized predominantly by intracytoplasmic vacuolization, syncytium formation in respiratory specimens, and crypt hyperplasia in gastrointestinal specimens. Notably, basement membrane integrity was relatively preserved (mean thickness 1.7 ± 0.4 µm; $p = 0.08$ vs. controls), consistent with the primarily intracellular tropism of these pathogens. Goblet cell hyperplasia was the most pronounced among all groups, reaching a mean density of 31.4 ± 6.2 cells/mm², which likely reflects virus-induced upregulation of mucus production as a non-specific innate defense mechanism [6].

The results of the present study extend prior understanding of host-pathogen interactions at the tissue level by demonstrating that distinct pathogen classes

produce characteristic, reproducible patterns of epithelial remodeling that are detectable by standard and immunohistochemical methods.

CONCLUSION

The present investigation demonstrates that exposure of mucosal epithelial tissues to pathogenic microorganisms induces morphofunctional alterations that are pathogen-class-specific and quantifiable by histological and immunohistochemical analysis. Gram-negative bacterial infections produced the most severe disruption of barrier structures, particularly tight junctions and basement membrane, while RNA viral infections were associated with prominent goblet cell hyperplasia and intracytoplasmic changes with relative preservation of extracellular matrix components.

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FARG‘ONA VILOYATINI NOZOGEOGRAFIK JIHATDAN BAHOLASH VA UNGA TA’SIR ETUVCHI GEOGRAFIK OMILLAR

Annotatsiya: *Ushbu maqolada Farg‘ona viloyatini nozogeografik jihatdan baholashda kasalliklar soni va ularni keltirib chiqaruvchi ekologik va sanoat, tog‘ kon, yerosti va usti suv ifloslanish omillari tahlil qilinishi natijasida kelib chiqadigan kasalliklar tahlil qilingan.*

Kalit so‘zlar: *nozogeografik, ijtimoiy-ekologik, transchegaraviy xavf, tibbiy geoekologik va epidemiologik, havo sifati indeksi*

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NOZOGEOGRAPHICAL ASSESSMENT OF THE FERGANA REGION AND GEOGRAPHICAL FACTORS AFFECTING IT

Abstract: *This article analyzes the diseases that arise as a result of assessing the Fergana region from a nosogeographical perspective, based on the number of diseases and the ecological, industrial, mining, and underground and surface water pollution factors that cause them.*

Keywords: *nosogeographic, socio-ecological, transboundary risk, medical geoecological and epidemiological, air quality index.*

Texnologik taraqqiyot davrida iqtisodiyot va tibbiyot sohalarida kasallanish darajasi hamda aholi salomatligi bilan bog‘liq muammolarni kamaytirish masalasi dolzarbligicha qolmoqda va ustuvor vazifalardan biri hisoblanadi. Ushbu muammolarni hal etishni kechiktirib bo‘lmaydi. Inson salomatligi va atrof-muhitni muhofaza qilish sohasida tadqiqot olib borgan olimlarning fikriga ko‘ra, bu hamda

boshqa ko‘plab ijtimoiy-ekologik va iqtisodiy omillar aholi salomatligiga alohida hamda umumiy tarzda ta’sir ko‘rsatadi.

Biz olib borgan tadqiqotlarda Farg‘ona viloyatida turli kasalliklarning kelib chiqishi va geografik tarqalishi, ularning qaysi turlari hudud doirasida yetakchi o‘rin tutishi, shuningdek, kasallik turlarining bosqichma-bosqich rivojlanishi shahar va tumanlar hamda landshaftlar kesimida tahlil qilindi. Tahlil jarayonida quyidagi statistik ma’lumotlarga e’tibor qaratildi [3].

Farg‘ona viloyati bo‘yicha umumiy kasallanish holatlari soni — 1 751 087 ta (2025-yil). Jumladan:

nafas olish tizimi kasalliklari — 570 694 ta;

qon yaratish a’zolari kasalliklari — 236 572 ta;

ovqat hazm qilish tizimi kasalliklari — 139 081 ta;

siydik-tanosil tizimi kasalliklari — 134 392 ta;

qon aylanish tizimi kasalliklari — 103 098 ta;

endokrin tizim kasalliklari — 96 961 ta.

Nafas olish tizimi kasalliklarining tarqalishi va kechishi bevosita hududning ekologik holati, iqlim sharoiti hamda ijtimoiy-iqtisodiy omillarga bog‘liqdir. Viloyat hududida eng ko‘p uchraydigan kasalliklar aynan nafas olish tizimi kasalliklari hisoblanadi. Buning asosiy sabablari quyidagilardan iborat:

1. Ekologik va sanoat omillari

Farg‘ona viloyatida atmosfera havosini ifloslantiruvchi asosiy manbalar sanoat korxonalari, transport vositalari hamda tabiiy-iqlimiy omillardan iborat. Statistik ma’lumotlarga ko‘ra, viloyatda atmosferaga chiqarilayotgan zararli moddalar miqdori yiliga o‘rtacha 26 ming tonnadan 50 ming tonnagacha tebranadi. 2024-yil yakunlariga ko‘ra, ushbu ko‘rsatkich 26,2 ming tonnani tashkil etgan.

Havo ifloslanish darajasi bo‘yicha 2025-yilning noyabr–dekabr oylarida Farg‘ona shahrida havo sifati indeksi (AQI) 1093 ko‘rsatkichigacha yetgan. Bu esa inson salomatligi uchun o‘ta xavfli daraja hisoblanadi. Atmosfera havosining ifloslanishi, ayniqsa, nafas olish tizimi kasalliklari, allergik holatlar va yurak-qon tomir kasalliklari ko‘payishiga sabab bo‘ladi.

2. Tog‘-kon omili

Tog‘-kon sanoati bilan bog‘liq ekologik xavflar Farg‘ona vodiysi uchun muhim omillardan biridir. Xususan, Haydarkon koni vodiyning yuqori qismida joylashgani sababli, texnogen avariya yoki kuchli sel hodisalari yuz bergan taqdirda zaharli chiqindilarning O‘zbekistonning aholi zich yashaydigan hududlariga oqib kelish xavfi mavjud. Shu bois xalqaro tashkilotlar tomonidan konni xavfsiz holatga keltirish va simob qazib olishni bosqichma-bosqich to‘xtatish bo‘yicha turli loyiha va takliflar ishlab chiqilmoqda [2].

Mineral xomashyolardan foydalanishda majmualilik tamoyiliga amal qilish alohida ahamiyatga ega. Chunki tabiatda foydali qazilmalar ko‘pincha bir nechta elementlardan tashkil topgan bo‘ladi. Ko‘p hollarda konlarda 2–3 ta, ba’zan esa 15–20 tagacha foydali element uchraydi. Zarur boylik ajratib olingach, qolgan

qismi terrikonlarda to‘planib, sifati buziladi, isrof bo‘ladi hamda atrof-muhitga salbiy ta’sir ko‘rsatadi.

Kondan majmuali foydalanish esa barcha foydali elementlarni bir vaqtda ajratib olish imkonini beradi. Natijada:

atrof-muhit kamroq zarar ko‘radi;

ortiqcha terrikonlar hosil bo‘lmaydi;

yaylovlar maydoni qisqarmaydi;

iqtisodiy samaradorlik oshadi.

Shu sababli xomashyolardan foydalanishda majmualilik tamoyilini barcha konlarda qo‘llash maqsadga muvofiqdir [1].

Tadqiqotlarga ko‘ra, kon atrofidagi tuproq va daryo cho‘kindilarida (jumladan, Shoximardonsoy va boshqa daryolarda) simob konsentratsiyasi ruxsat etilgan me’yorlardan o‘nlab, hatto yuzlab marta yuqori ekani aniqlangan. Simob qoldiqlari suv oqimlari orqali vodiydagi qishloq xo‘jaligi yerlariga tarqalmoqda.

3. Yerosti va usti suvlarining ifloslanishi

Daryo va yerosti suvlarining og‘ir metallar, organik hamda kimyoviy birikmalar bilan ifloslanishi Farg‘ona viloyatida o‘ziga xos tibbiy-geografik, tibbiy-geoekologik va epidemiologik vaziyatni shakllantirmoqda. Natijada aholi orasida oshqozon-ichak, buyrak, o‘t pufagi, yuqumli va parazitar kasalliklarning keng tarqalishiga sabab bo‘lmoqda.

Farg‘ona va Andijon viloyatlaridagi sug‘oriladigan maydonlarning 45 foizida yerosti suvlarining sathi yer yuzasidan 0–2 metr chuqurlikda joylashgan. Farg‘ona viloyati Toshloq tumanida esa sizot suvlari yuzasi qalinligi 3 mm gacha bo‘lgan neft qatlami bilan qoplangan bo‘lib, neft mahsulotlari tarqalgan hudud maydoni qariyb 10 km² ni tashkil etadi. Bu holat ichimlik va texnik suv quduqlariga jiddiy xavf tug‘dirib, ayrim quduqlarning ishdan chiqishiga olib kelgan.

Shuningdek, Yangi Qo‘qon kimyo zavodi va Farg‘ona furan birikmalari zavodi hududlarida ham yerosti suvlarining ifloslanishi kuzatilmoqda. Bu esa aholi salomatligiga salbiy ta’sir ko‘rsatmoqda.

Xulosa

Tadqiqotlar shuni ko‘rsatadiki, konlarga yaqin hududlardagi tomorqalarda yetishtirilgan sabzavotlar, mahalliy baliqlar va chorvachilik mahsulotlarida zaharli metallarning miqdori ortib ketgan. Bu esa mahalliy aholi orasida endemik buqoq hamda boshqa ichki a’zolar kasalliklarining ko‘payishiga sabab bo‘lmoqda.

Shu munosabat bilan, atrof-muhit ifloslanishi natijasida inson salomatligi uchun yuzaga keladigan xavfni baholash bugungi kunda eng dolzarb tibbiy va ekologik muammolardan biridir. Biroq sog‘liq uchun xavf tushunchasini aniq belgilash hamda ifloslantiruvchi moddalarning inson organizmiga real ta’siri va uning miqdoriy ko‘rsatkichlarini aniqlashda hanuz muayyan noaniqliklar mavjud.

Ekologik muvozanat barqaror bo‘lgan hududlarda, agar ifloslantiruvchi manbalar (sanoat korxonalari, transport vositalari, qishloq xo‘jaligi korxonalari va boshqalar) uzoqda joylashgan bo‘lsa yoki texnogen chiqindilar hajmi me’yoridan oshmasa, ularning salbiy ta’siri sezilmasligi mumkin. Binobarin, muntazam

ravishda amalga oshiriladigan ekologik tadbirlar majmuasi atrof-muhitni salbiy o‘zgarishlardan muhofaza qilishda muhim ahamiyat kasb etadi.

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MA’NAVIY-AXLOQIY TARBIYA TUSHUNCHASI VA UNING MOHIYATI

Annotatsiya. *Ushbu maqolada ma’naviy va axloqiy tarbiya tushunchasi, uning jamiyat taraqqiyotidagi o‘rni hamda yosh avlod kamolatiga ko‘rsatadigan ta’siri keng yoritilgan. Tarbiyaning oilada boshlanishi, ta’lim jarayoni bilan uzviy bog‘liqligi va tarbiyaviy muassasalarning roli batafsil tahlil etiladi. Shuningdek, ma’naviy-axloqiy tarbiyaning mazmuni, asosiy vazifalari, tarbiya turlarining jamiyat uchun ahamiyati ham izohlangan. Sharq mutafakkirlari, xususan Al-Buxoriy, Alisher Navoiy, Forobiy kabi allomalarning tarbiya haqidagi qarashlari orqali ma’naviy tarbiyaning tarixiy ildizlari ochib beriladi. Maqolada yoshlar ongida vatanparvarlik, halollik, ezgulik, mehnatsevarlik kabi yuksak fazilatlarni shakllantirishning nazariy va amaliy jihatlari ko‘rsatib berilgan.*

Kalit so‘zlar: *Ma’naviy tarbiya, axloqiy tarbiya, ta’lim, sharq mutafakkirlari, komil inson, qadriyatlar, ma’naviyat, ma’rifat, axloqiy fazilatlar, ta’lim-tarbiya, vatanparvarlik, jamiyat taraqqiyoti.*

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THE CONCEPT OF SPIRITUAL AND MORAL EDUCATION AND ITS ESSENCE

Abstract. *This article extensively covers the concept of spiritual and moral education, its role in societal development, and its impact on the maturity of the younger generation. The beginning of upbringing in the family, its inseparable connection with the educational process, and the role of educational institutions are analyzed in detail. The content of spiritual and moral education, its main tasks, and the significance of types of education for society are also explained. The historical roots of spiritual education are revealed through the views of Eastern thinkers, particularly scholars such as Al-Bukhari, Alisher Navoi, and Farabi, on upbringing. The article demonstrates the theoretical and practical aspects of fostering high qualities in the minds of young people, such as patriotism, honesty, kindness, and diligence.*

Keywords: *Spiritual education, moral education, education, Eastern thinkers, perfect man, values, spirituality, enlightenment, moral qualities, education and upbringing, patriotism, social development.*

Hozirgi globallashuv sharoitida jamiyatning rivojlanishi, xalq farovonligi va davlatning barqaror taraqqiyoti, eng avvalo, insonlarning ma’naviy va axloqiy

jihatdan yetuk bo‘lishiga bog‘liqdir. Yoshlarni har tomonlama barkamol, komil inson sifatida tarbiyalashda ma’naviy-axloqiy tarbiya muhim ahamiyat kasb etadi. Shu sababli, bugungi kunda bu yo‘nalishda amalga oshirilayotgan ishlar dolzarb vazifalardan biri sifatida qaralmoqda. Avvalambor, tarbiya atamasi qanday manoni anglatadi? Tarbiya-shaxsni muayyan jismoniy, ruhiy, axloqiy, ma’naviy sifatlarni shakllantirishga qaratilgan amaliy pedagogik jarayon; insonning jamiyatda yashashi uchun zarur bo‘lgan xususiyatlarga ega bo‘lishini ta’minlash yo‘lida ko‘riladigan chora tadbirlar yig’indisi. Tarbiya insonning insonligini ta’minlaydigan eng qadimiy va abadiy qadriyat hisoblanadi. Tarbiyasiz alohida odam ham, kishilik jamiyati ham mavjud bo‘la olmaydi. Chunki odam va jamiyatning mavjudligini ta’minlaydigan qadriyatlar tarbiya tufayligina bir avloddan boshqa avlodga o‘tadi. Milliy tarbiya tizimimizda tarbiyaning quyidagi asosiy turlari mavjud: aqliy tarbiya, jismoniy tarbiya, estetik tarbiya, mehnat tarbiyasi, axloqiy tarbiya, huquqiy tarbiya. Tarbiya turlarining har biri muhim bo‘lsa-da, ayniqsa, axloqiy tarbiya yoshlar qalbida insoniy fazilatlarni singdirishda markaziy o‘rin tutadi. Axloq tushunchasiga ta’rif beradigan bo‘lsak, axloq-ijtimoiy tushunchalardan biri bo‘lib, uning mohiyati shaxs xatti-harakatlari, yurish-turishi, turmush tarzi, shuningdek, ijtimoiy munosabatlar mazmunini ifodalaydi. Shuning uchun ham, axloq-shaxs taraqqiyotining yuqori bosqichi bo‘lgan ma’naviy moyillikning asosini, poydevorini tashkil etadi.

Axloqiy tarbiya esa jamiyat ma’naviy hayotidagi muhim ijtimoiy hodisa bo‘lib, odob-axloq tizimini, axloqiy fazilatlarni zamon talablari asosida har qaysi avlod ongiga singdirish shakli bo‘lib hisoblanadi. Axloqiy tarbiya adabiyot, psixologiya, etika va estetika fanlari o‘rganadigan ilmiy kategoriyadir. Axloqiy tarbiya deganda o‘sib kelayotgan avlodda xulq-odob me’yorlariga mos keladigan, zamon talablariga javob beradigan insoniy sifatlarni shakllantirishga qaratilgan ilmiy va amaliy harakatlar tizimi tushuniladi. Insonning axloqiy hayoti uning axloqiy tarbiyasi bilan chambarchas bog‘liq. Axloqiy tarbiya insonlarda ijobiy sifatlarni shakllantirishga yo‘naltirish bilan bir qatorda, salbiy sifatlardan saqlanishga undaydi. Axloqiy tarbiyaning mazmuni sifatida quyidagilar qabul qilingan:

1. Jamiyatga, vatanga muhabbat va sadoqatni tarbiyalash;
2. Mehnatga axloqiy munosabatni tarbiyalash;
3. Atrofidagi kishilarga axloqiy munosabatni tarbiyalash;
4. Shaxsning o‘z-o‘ziga axloqiy munosabatni tarbiyalash.

Axloqiy tarbiyada quyidagi jihatlarga e’tiborni qaratish lozim:

- ✓ Axloqiy tarbiyani o‘qitish jarayoni bilan qo‘shib olib borish.
- ✓ “Yaxshi o‘qitilgan o‘qituvchi yaxshi tarbiyalaydi ham” (nemis pedagogi A.V.Disterverg).
- ✓ O‘qituvchi va o‘quvchining hamkorlik faoliyatini to‘g‘ri tashkil qilish, ya’ni ahil, inoq jamoa tashkil qilish.
- ✓ Tarbiyaviy ishlarni ma’lum reja asosida olib borish.
- ✓ Ijobiy emotsional sharoit yaratish, ya’ni bayramlarni nishonlash.
- ✓ O‘quvchilarni qonun-qoidaga rioya qilishga o‘rgatish.

✓ Ijtimoiy ongni shakllantiruvchi tushuntirish, uqtirish, suhbat, munozara, ma’ruza, rag‘batlantirish, jazolash usullaridan foydalanish.

✓ Ijtimoiy axloqni shakllantirishda mashq, o‘rnak usullaridan foydalanish.

✓ Muloqot soatlari saviyasini oshirish.

✓ Mehnat ilg‘orlari, ilm-fan xodimlari, mehnat va urush faxriylar, vasiylar va homiylar bilan uchrashuvlar tashkil qilish.

✓ Turli badiiy-adabiy kechalar, tadbirlar, bellashuvlar, olimpiadalar o‘tkazish.

✓ Sharq qadriyatlari va milliy an’analar aks ettirilgan tadbirlarni muntazam ravishda mutolaa qilish, munozaralar o‘tkazib turish.

Jamiyatda kechayotgan ijtimoiy islohotlarning samaradorligi uning fuqarolari ega bo‘lgan ma’naviyatga bog‘liq. Shu bois mustaqillikning dastlabki yillarida O‘zbekiston Respublikasi Birinchi Prezidenti I.A.Karimov jamiyat rivojlanishining ma’naviy-axloqiy negizlarini aniq belgilab berdi. Bular:

Umuminsoniy qadriyatlarga sodiqlik;

Xalqimizning ma’naviy merosini mustahkamlash va rivojlantirish;

Insonning o‘z imkoniyatlarini erkin namoyon qilishi;

Vatanparvarlik.

Zero, jamiyat rivojlanishi faqat uning iqtisodiy taraqqiyotiga emas, balki ma’naviy yuksalishini ham taqozo etadi.

Ma’naviyat - bu arabcha so‘z bo‘lib, biror narsa yoki xodisaning tub ma’nosini, mohiyatini, mazmunini anglab etishdir. Ma’naviyat - mantiq (logika) fani bilan talqin etilganda, u keng, ya’ni jins tushuncha bo‘lib, uni qamrab olgan tur tushunchalar mavjud. Tarbiya, avvalo, oilada boshlanadi, keyin esa tarbiyaviy muassasalar va jamoat tashkilotlari orqali davom ettiriladi. Ma’naviy tarbiya esa faqat ta’lim jarayoni bilan birga olib borilgandagina samarali bo‘ladi. Chunki o‘quv jarayonida insonning faqat bilimi oshib qolmay, balki uning ma’naviy va axloqiy fazilatlari ham shakllanib boradi. Shu sababli ota-bobolarimiz azaldan ilmu ma’rifatni eng qimmat boylik deb bilib, ta’lim-tarbiyani inson kamoloti hamda millat yuksalishining asosiy omili sifatida qadrlaganlar.

Ma’naviy tarbiya har qanday jamiyat hayotida katta o‘rin tutadi. Chunki mamlakat taraqqiyoti uchun moddiy va ma’naviy boyliklar uzluksiz ravishda yaratilishi zarur. Buning uchun yosh avlod ajdodlardan qolgan merosni davom ettiribgina qolmay, balki undan ham yuqori bosqichga ko‘tarila olishi kerak.

O‘quvchi - yoshlarni ma’naviy-axloqiy jihatdan tarbiyalash quyidagi vazifalarni o‘z ichiga oladi;

➢ o‘quvchilarning axloqiy e’tiqodini hosil qilish, ma’naviy qiyofani shakllantirish, komil inson tarbiyasi talablari va normalarini anglashga o‘rgatish;

➢ kattalarga hurmat, tengdoshlari bilan o‘rtoqlik-do‘stlik, yosh bolalarga, bemorlar, nogironlarga, qariyalarga g‘amxo‘rlik qilish xislatlarini tarbiyalash;

➢ mehnatga, o‘z kasbiga muhabbat hissini o‘stirish, intizomli bo‘lish, ijtimoiy mulkka yangicha munosabatni tarbiyalash;

- elim deb, yurtim deb yonib yashash, o‘z shaxsiy manfaatini jamoa manfaatidan ustun ko‘rmaslik, o‘zining butun kuch qudrati-ni umum ishiga bag‘ishlash tuyg‘usini tarbiyalash;
- mehnatda va o‘qishda printsipiallik, qat’iylik, matonat, haqqoniylik, halollik, ishda ijodkorlik, insonparvarlik, yuksak vatanparvarlik, qat’iy jasorat, har qanday qiyinchi-liklardan qo‘rqmaslik hislarini tarbiyalash;
- jamiyat tomonidan qabul qilingan qonun va qoidalarni ongli suratda bajarish, axloq-odob qoidalariga ongli suratda bo‘ysunishga o‘rgatish va hokazolar.

Maktabda o‘quvchi-yoshlarga beriladigan ma’naviy-axloqiy tarbiyaning asosiy maqsadi, vazifalari yoshlarda yaxshi ma’naviy sifatlar, tajribalar hosil qilish, ularni axloqiy normalar va qoidalar to‘g‘risidagi dastlabki bilimlar bilan qurollantirish, axloqiy xislatlar va xulqiy fazilatlarni rivojlantirish, hamda ularda voqimli xatti-harakat ko‘nikmalari va odatlarini vujudga keltirish va tarbiyalashdir.

Yoshlarning ma’naviy-axloqiy tarbiyasi haqida Sharq va Markaziy Osiyo mutafakkirlari bitmas-tuganmas pedagogik g‘oyalarni meros qoldirganlar:

Bahouddin Naqshbandiy, Imom al-Buxoriy, Al-Xorazmiy, Al-Beruniy, Al-Forobiy, Az-Zamaxshariy, Al-Farg‘oniy, A. Jomiy, A. Navoi, Rudakiy, Firdavsiy, Bedil, Xosir Xisrav, X.Shiraziy, Muqimiy, Furqat va boshqalarning odob-axloq sohasidagi ibratli g‘oyalari yoshlarimizni ma’naviy etuk, axloqan pok, insonparvar va baquvvat qilib tarbiyalashda katta pedagogik ahamiyat kasb etadi. Masalan, Al-Buxoriy o‘zining bir hadisida shunday deydi:

“Yurtning obodonchiligi, fuqarolarning to‘klikka 4 narsada namoyon bo‘ladi: amaldorlarning odil bo‘lishi; olim va ulamolarning ilmli bo‘lishi; boylarning saxovatli, muruvvatli bo‘lishi; fuqarolarning esa duogo‘y bo‘lishidadir. ”

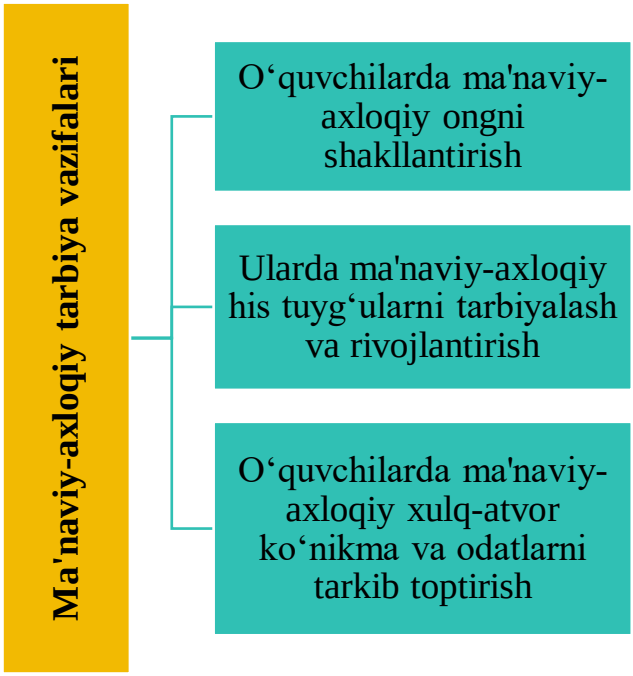
So‘z mulkining sultoni Alisher Navoiy ham kambag‘al nochorlarga muruvvatli bo‘lish haqida o‘zining ko‘p asarlarida juda ko‘p va xo‘b fikrlarni bayon qilgan:

“Yuz yil osmonda dabdabali chaqmoq bo‘lgandan ko‘ra, yerda bir tutam olov bo‘lib, biror beva ayolning qozonini qaynashtirish - qirq yil quruq toat-ibodatdan afzaldir, ” - deb ta’kidlagan edi.

Inson boshqalarga, ayniqsa muhtojlarga amaliy yordam berishi - eng katta savob. Faqat so‘z yoki ibodat emas, balki odamga foyda keltiradigan chin ko‘ngildan qilingan yaxshilik Allohga ko‘proq ma’qul.

Navoiyning fikriga ko‘ra, tashqi ko‘rinadigan, dabdabali ishlardan ko‘ra, oddiy, samimiy, insonning ko‘ngliga yetadigan yordamning qadri ulug‘roq.

Shuning uchun yoshlar hamisha mehr-shafqatli, yordam berishga tayyor, insonparvar bo‘lishlari kerak. Bu ham ma’naviy axloqiy tarbiyaning bir ko‘rinishidir.



Xulosa qilib aytganda, yosh avlodni ma’naviy-axloqiy jihatdan barkamol etib tarbiyalash jamiyatning bugungi va kelajak rivojida beqiyos ahamiyatga ega. Ma’naviy tarbiya oilada boshlanib, maktab va jamoat tashkilotlarida davom ettiriladi. Ta’lim jarayoni bilan birgalikda olib borilgan tarbiya o‘quvchilarda axloqiy fazilatlar, ijtimoiy mas’uliyat, vatanparvarlik, halollik, insonparvarlik kabi yuksak sifatlarni shakllantirishga xizmat qiladi. Sharq mutafakkirlarining boy pedagogik merosi esa bugungi tarbiyaviy ishlar uchun mustahkam nazariy asos bo‘lib xizmat qiladi. Shunday ekan, yoshlar tarbiyasida ma’naviy-axloqiy qadriyatlarga tayangan holda ishlash, ularda komil inson fazilatlarini tarkib toptirish ta’lim muassasalari va jamiyatning eng muhim vazifalaridan biridir.

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OVQATLANISH GIGIYENASI VA SOG‘LOM TURMUSH TARZI

Annotatsiya*: Mazkur maqolada ovqatlanish gigiyenasi va sog‘lom turmush tarzining inson salomatligiga ta’siri ilmiy jihatdan tahlil qilindi. Ratsional ovqatlanish tamoyillari, oziq-ovqat mahsulotlari xavfsizligi, sanitariya-gigiyena talablariga rioya qilishning ahamiyati hamda ovqatlanish madaniyatining sog‘lom turmush tarzini shakllantirishdagi o‘rni yoritildi. Tadqiqot natijalari shuni ko‘rsatdiki, to‘g‘ri va muvozanatlangan ovqatlanish organizmning barqaror faoliyatini ta’minlashda, modda almashinuvini me’yorda ushlab turishda, immun tizimini mustahkamlashda va ko‘plab noinfeksion kasalliklarning oldini olishda muhim omil hisoblanadi. Shuningdek, sifatsiz, mikrobiologik zararlangan yoki noto‘g‘ri saqlangan oziq-ovqat mahsulotlarini iste’mol qilish sog‘liq uchun jiddiy xavf tug‘dirishi asoslab berildi. Sog‘lom turmush tarzining ajralmas qismi sifatida jismoniy faollik, shaxsiy gigiyena, ruhiy barqarorlik va zararli odatlardan voz kechish ham muhimligi ko‘rsatildi.*

Kalit so‘zlar: *ovqatlanish gigiyenasi, sog‘lom turmush tarzi, ratsional ovqatlanish, oziq-ovqat xavfsizligi, vitaminlar, mikroelementlar, sanitariya, profilaktika.*

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FOOD HYGIENE AND A HEALTHY LIFESTYLE

Abstract: *This article provides a scientific analysis of the impact of food hygiene and a healthy lifestyle on human health. It highlights the principles of balanced nutrition, the importance of food safety, compliance with sanitary and hygienic requirements, and the role of food culture in developing a healthy lifestyle. The study results demonstrate that proper and balanced nutrition is an important factor in ensuring stable body function, maintaining normal metabolism, strengthening the immune system, and preventing many non-communicable diseases. It also demonstrates that consuming low-quality,*

microbiologically contaminated, or improperly stored food can pose a serious health risk. The importance of physical activity, personal hygiene, psycho-emotional stability, and avoiding bad habits as integral components of a healthy lifestyle is emphasized.

Keywords: *nutritional hygiene, healthy lifestyle, balanced diet, food safety, vitamins, micronutrients, sanitation, prevention.*

Kirish

Hozirgi globallashuv va urbanizatsiya jarayonlari sharoitida aholi salomatligini saqlash va mustahkamlash masalasi jahon miqyosida eng muhim ijtimoiy-sanitariya muammolaridan biriga aylangan. So‘nggi yillarda turmush tarzining o‘zgarishi, sanoatlashtirilgan oziq-ovqat mahsulotlarining keng tarqalishi, fast-food iste’molining ortishi hamda kamharakat hayot tarzining ustunligi inson salomatligiga salbiy ta’sir ko‘rsatmoqda. Shu sababli ovqatlanish gigiyenasi masalalarini chuqur o‘rganish va aholi orasida sog‘lom ovqatlanish madaniyatini shakllantirish dolzarb ahamiyat kasb etadi.

Noto‘g‘ri va nomutanosib ovqatlanish natijasida semirish, qandli diabet, arterial gipertenziya, ateroskleroz va yurak-qon tomir kasalliklari kabi noinfeksion kasalliklarning ortib borayotgani kuzatilmoqda. Bu holat ayniqsa bolalar, o‘smirlar va yoshlar orasida ham dolzarb bo‘lib, noto‘g‘ri ovqatlanish odatlarining erta shakllanishi keyinchalik surunkali kasalliklar xavfini oshiradi. Taqdim etilgan matnda ham fast-food, yuqori kaloriyali va kimyoviy qo‘shimchalarga boy mahsulotlarning keng iste’mol qilinishi metabolik buzilishlarga olib kelishi qayd etilgan.

Ovqatlanish gigiyenasi nafaqat oziq moddalarning to‘g‘ri nisbatini ta’minlash, balki oziq-ovqat mahsulotlarining xavfsizligini, saqlash qoidalariga rioya etilishini, tayyorlash va iste’mol qilish jarayonining sanitariya talablariga mos bo‘lishini ham o‘z ichiga oladi. Sifatsiz, buzilgan yoki mikrobiologik jihatdan zararlangan mahsulotlar turli ichak infeksiyalari, oziq-ovqat toksikoinfeksiyalari va boshqa kasalliklarni yuzaga keltirishi mumkin. Shu ma’noda ovqatlanish gigiyenasi shaxsiy salomatlik bilan bir qatorda jamoat salomatligi uchun ham muhim omil hisoblanadi.

Sog‘lom turmush tarzi tushunchasi keng qamrovli bo‘lib, u ratsional ovqatlanish, yetarli jismoniy faollik, shaxsiy gigiyena, mehnat va dam olish rejimiga amal qilish, ruhiy-emotsional muvozanatni saqlash hamda zararli odatlardan voz kechishni o‘z ichiga oladi. Shu nuqtai nazardan qaraganda, ovqatlanish gigiyenasi sog‘lom turmush tarzining markaziy tarkibiy qismi hisoblanadi.

Mazkur maqolaning maqsadi ovqatlanish gigiyenasi qoidalarini tahlil qilish, ularning inson salomatligi va sog‘lom turmush tarzini shakllantirishdagi ahamiyatini ilmiy jihatdan asoslashdan iborat.

Material va metodlar

Tadqiqot davomida ilmiy adabiyotlar tahlili, taqqoslash va umumlashtirish usuli, gigiyenik baholash hamda statistik ma’lumotlarni tahlil qilish usullaridan

foydalanildi. Tadqiqot metodologiyasi ovqatlanish gigiyenasi, dietologiya, profilaktik tibbiyot va sog‘lom turmush tarzi bo‘yicha manbalarni o‘rganishga asoslandi.

Material sifatida ratsional ovqatlanishning nazariy asoslari, oziq-ovqat mahsulotlari xavfsizligi, sanitariya-gigiyena talablari, vitamin va mikroelementlarning biologik ahamiyati, shuningdek turmush tarzining kasalliklar profilaktikasidagi o‘rni haqidagi ilmiy ma’lumotlar tahlil qilindi. Tahlil jarayonida sog‘lom ovqatlanishning asosiy mezonlari, jumladan oqsil, yog‘ va uglevodlarning muvozanati, ovqatlanish rejimi, meva va sabzavotlar iste’moli, toza ichimlik suvining ahamiyati va oziq-ovqatni saqlash qoidalari alohida baholandi.

Gigiyenik baholash usuli yordamida oziq-ovqat mahsulotlarining sanitariya talablariga mosligi, xavfsizlik mezonlari va ularning sog‘liqqa potensial ta’siri ko‘rib chiqildi. Shuningdek, noto‘g‘ri ovqatlanish bilan bog‘liq kasalliklar hamda sog‘lom turmush tarziga rioya qiluvchi va qilmaydigan shaxslar salomatligi o‘rtasidagi farqlar tahlil qilindi.

Natijalari

Tadqiqot natijalari shuni ko‘rsatdiki, to‘g‘ri ovqatlanish inson salomatligini saqlashning asosiy omillaridan biridir. Ratsional ovqatlanish oqsil, yog‘ va uglevodlarning to‘g‘ri nisbatda bo‘lishi, vitaminlar va mikroelementlarning yetarli qabul qilinishi, ovqatlanish rejimiga rioya etilishi hamda oziq-ovqat mahsulotlarining sifatli va xavfsiz bo‘lishi bilan tavsiflanadi.

Ratsional ovqatlanish tamoyillari

Tahlil davomida ratsional ovqatlanishning quyidagi asosiy tamoyillari ajratib ko‘rsatildi:

muvozanatlangan ovqatlanish;

oziq-ovqat mahsulotlarining sanitariya talablariga javob berishi;

muntazam ovqatlanish rejimi;

vitamin va minerallarga boy ratsion.

Kuniga 3–4 mahal muntazam ovqatlanish, ratsionda meva, sabzavot, sut mahsulotlari, oqsilga boy oziq-ovqatlar va toza ichimlik suvining yetarli bo‘lishi organizmning me’yoriy faoliyati uchun muhim ekani aniqlandi.

Noto‘g‘ri ovqatlanishning oqibatlari

Natijalar noto‘g‘ri ovqatlanish organizmda modda almashinuvi buzilishlariga olib kelishini ko‘rsatdi. Ayniqsa, fast-food mahsulotlari, transyog‘lar, haddan tashqari shakar va tuz iste’moli semirish, dislipidemiya, qandli diabet va yurak-qon tomir kasalliklari xavfini oshiradi. Taqdim etilgan matnda ham fast-food va kimyoviy qo‘shimchalarga boy mahsulotlarning metabolik buzilishlarga sabab bo‘lishi qayd etilgan.

Oziq-ovqat xavfsizligi va sanitariya ahamiyati

Oziq-ovqat mahsulotlarini to‘g‘ri saqlash, tayyorlash va iste’mol qilish gigiyenik nuqtai nazardan juda muhim ekani aniqlandi. Sifatsiz, muddati o‘tgan yoki mikrobiologik zararlangan mahsulotlarni iste’mol qilish natijasida turli infeksion va toksik kasalliklar yuzaga kelishi mumkin. Toza ichimlik suvidan

foydalanish, oziq-ovqatni to‘g‘ri saqlash va sanitariya-gigiyena qoidalariga rioya qilish yuqumli kasalliklarning oldini olishda muhim omil ekani tasdiqlandi.

Sog‘lom turmush tarzi bilan bog‘liqligi

Sog‘lom turmush tarziga rioya qiluvchi shaxslarda ish qobiliyati yuqoriroq, immunitet mustahkamroq va kasallanish darajasi pastroq bo‘lishi kuzatildi. Ovqatlanish gigiyenasi jismoniy faollik, shaxsiy gigiyena va zararli odatlardan voz kechish bilan uyg‘unlashganda organizmning adaptatsion imkoniyatlari ortishi va umumiy salomatlik ko‘rsatkichlari yaxshilanishi aniqlandi.

Muhokama

Olingan natijalar ovqatlanish gigiyenasi inson salomatligini saqlashda hal qiluvchi ahamiyatga ega ekanini ko‘rsatadi. To‘g‘ri ovqatlanish nafaqat organizmning energetik va plastik ehtiyojlarini qondiradi, balki modda almashinuvini me’yorda ushlab turish, immunitetni mustahkamlash va surunkali kasalliklarning oldini olishda ham muhim rol o‘ynaydi.

Muhokama natijasida shuni aytish mumkinki, hozirgi davrda aholining katta qismida ovqatlanish madaniyati yetarli darajada shakllanmagan. Tayyor ovqatlar, yuqori kaloriyali mahsulotlar va yarim tayyor oziq-ovqatlarning ko‘payishi ratsionning biologik qiymatini pasaytiradi. Natijada, bir tomondan ortiqcha vazn va semirish, ikkinchi tomondan esa ayrim vitamin va mikroelementlar yetishmovchiligi kuzatilishi mumkin.

Ovqatlanish gigiyenasining yana bir muhim jihati oziq-ovqat xavfsizligi bilan bog‘liqdir. Oziq-ovqat mahsulotlarining sanitariya talablariga javob bermasligi, noto‘g‘ri saqlanishi yoki ifloslangan suvdan foydalanish turli ichak infeksiyalari va oziq-ovqatdan zaharlanish holatlariga olib keladi. Shu bois bu masala individual gigiyena bilan bir qatorda davlat darajasidagi sanitariya nazorati bilan ham chambarchas bog‘liq.

Sog‘lom turmush tarzini shakllantirishda ovqatlanish bo‘yicha tushuntirish ishlarini kuchaytirish, ta’lim muassasalarida gigiyenik tarbiyani kengaytirish va aholining oziqlanish savodxonligini oshirish zarur. Taqdim etilgan matnda ham aholi o‘rtasida sog‘lom ovqatlanish madaniyatini shakllantirish zarurligi alohida ta’kidlangan.

Bundan tashqari, profilaktik tibbiyot nuqtai nazaridan ratsional ovqatlanish ko‘plab kasalliklarni davolashdan ko‘ra ularning oldini olishda samaraliroq yondashuv hisoblanadi. Shu bois sog‘lom turmush tarzining asosiy komponenti sifatida ovqatlanish gigiyenasiga doir ilmiy asoslangan tavsiyalarni amaliyotga tatbiq etish muhimdir.

Xulosa

Ovqatlanish gigiyenasi inson salomatligini saqlashning asosiy omillaridan biridir. Ratsional va muvozanatlangan ovqatlanish organizmning normal faoliyatini ta’minlaydi, immunitetni mustahkamlaydi va ko‘plab noinfeksion hamda infeksion kasalliklarning oldini olishga yordam beradi.

Tadqiqot natijalariga ko‘ra, noto‘g‘ri ovqatlanish, fast-food mahsulotlari, transyog‘lar va sifatsiz oziq-ovqat mahsulotlari iste’moli metabolik buzilishlar, yurak-qon tomir kasalliklari va boshqa sog‘liq muammolariga olib keladi. Oziq-

ovqat mahsulotlarining xavfsizligi, ularni to‘g‘ri saqlash va sanitariya-gigiyena qoidalariga rioya qilish salomatlikni muhofaza qilishda muhim ahamiyatga ega.

Sog‘lom turmush tarzi to‘g‘ri ovqatlanish, jismoniy faollik, shaxsiy gigiyena va ruhiy barqarorlik uyg‘unligida shakllanadi. Aholi orasida sog‘lom ovqatlanish madaniyatini keng targ‘ib qilish, oziq-ovqat xavfsizligini ta’minlash va profilaktik tadbirlarni kuchaytirish jamiyat salomatligini yaxshilashning muhim yo‘nalishlaridan biri hisoblanadi.

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HAVO MUHITI GIGIYENASI VA IFLOSLANISH TA'SIRI

Annotatsiya: *Mazkur maqolada atmosfera havosining gigiyenik ahamiyati, uning inson salomatligiga ta'siri va zamonaviy ifloslanish manbalari ilmiy jihatdan tahlil qilindi. Havo muhiti ifloslanishining tabiiy va antropogen omillari, zararli gazlar hamda mayda dispers zarrachalarning organizmga ta'sir mexanizmlari ko'rib chiqildi. Tadqiqot natijalari havoning ifloslanishi nafas olish tizimi, yurak-qon tomir tizimi, immun tizim va umumiy hayot sifati uchun jiddiy xavf omili ekanini ko'rsatdi. Shuningdek, havo sifatini yaxshilashga qaratilgan profilaktik choralar, ekologik nazorat va zamonaviy texnologik yondashuvlarning ahamiyati yoritildi. Olingan ma'lumotlar havo gigiyenasi masalalarini chuqur o'rganish va ularni amaliyotga tatbiq etish zarurligini tasdiqlaydi.*

Kalit so'zlar: *atmosfera havosi, gigiyena, ifloslanish, ekologik xavf, aerozollar, gazlar, salomatlik, profilaktika, PM2.5, PM10.*

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AIR HYGIENE AND THE IMPACT OF POLLUTION

Abstract*: This article provides a scientific analysis of the hygienic significance of atmospheric air, its impact on human health, and modern sources of pollution. Natural and anthropogenic factors of air pollution, as well as the mechanisms by which harmful gases and fine particulate matter affect the human body, are examined. The study results showed that air pollution is a serious risk factor for the respiratory, cardiovascular, and immune systems, as well as for overall quality of life. In addition, the importance of preventive measures aimed at improving air quality, environmental control, and modern technological approaches is highlighted. The obtained data confirm the need for in-depth study of air hygiene issues and their implementation into practice.*

Keywords: *atmospheric air, hygiene, pollution, environmental risk, aerosols, gases, health, prevention, PM2.5, PM10.*

Kirish:

So‘nggi o‘n yilliklarda atmosfera havosining ifloslanishi global ekologik va tibbiy muammolardan biri sifatida qaralmoqda. Jadal sanoatlashuv, urbanizatsiya jarayonlarining kuchayishi, transport vositalari sonining ortishi va energetika tarmoqlarida an’anaviy yoqilg‘ilardan keng foydalanish natijasida atmosfera havosi tarkibi sezilarli darajada o‘zgarib bormoqda. Ayniqsa, yirik shaharlarda havoda zararli gazlar va mayda zarrachalarning konsentratsiyasi ortib borayotgani aholi salomatligi uchun jiddiy xavf tug‘dirmoqda.

Havo muhiti inson organizmi hayot faoliyati uchun zarur bo‘lgan eng muhim ekologik omillardan biridir. U organizmni kislorod bilan ta’minlaydi, moddalar almashinuvi, termoregulyatsiya va ko‘plab fiziologik jarayonlarda bevosita ishtirok etadi. Shu sababli atmosfera havosining sifati yomonlashuvi birinchi navbatda insonning nafas olish, yurak-qon tomir va immun tizimlariga salbiy ta’sir ko‘rsatadi.

Ilmiy kuzatishlar havoning ifloslanishi bronxit, bronxial astma, allergik holatlar, surunkali obstruktiv o‘pka kasalliklari, yurak-qon tomir patologiyalari va hatto onkologik kasalliklar rivojlanishi bilan uzviy bog‘liqligini ko‘rsatmoqda. Havo sifati masalasi bugungi kunda nafaqat ekologik, balki ijtimoiy-iqtisodiy muammo sifatida ham baholanmoqda, chunki u mehnat qobiliyatining pasayishi, nogironlik holatlarining ko‘payishi va sog‘liqni saqlash xarajatlarining oshishiga olib keladi.

O‘zbekiston sharoitida ham havo gigiyenasi masalasi dolzarb hisoblanadi. Sanoat korxonalari, avtomobil transporti, qurilish maydonlari va mavsumiy changlanish natijasida ayrim hududlarda havoning ifloslanish darajasi ortmoqda. Bu esa sanitariya-gigiyena talablarini takomillashtirish, ekologik monitoringni kuchaytirish va profilaktik chora-tadbirlarni ilmiy asosda ishlab chiqishni talab etadi.

Ushbu maqolaning maqsadi havo muhiti gigiyenasi va atmosfera ifloslanishining inson salomatligiga ta’sirini o‘rganish, shuningdek, uning oldini olish va kamaytirishga qaratilgan chora-tadbirlarni ilmiy asosda tahlil qilishdan iborat.

Material va metodlar:

Tadqiqot jarayonida ilmiy adabiyotlarni tahlil qilish, ekologik monitoring ma’lumotlarini o‘rganish, gigiyenik baholash va taqqoslama tahlil usullaridan foydalanildi. Tadqiqotning metodologik asosini atmosfera havosining gigiyenik ko‘rsatkichlari, ifloslantiruvchi omillar va ularning inson salomatligiga ta’siri haqidagi ilmiy manbalarni umumlashtirish tashkil etdi.

Ma’lumotlar manbai sifatida mahalliy va xalqaro ilmiy manbalar, sanitariya-epidemiologiya xizmatlari hisobotlari, ekologik kuzatuv natijalari va atmosfera havosi monitoringi ma’lumotlari tahlil qilindi. Havo muhiti sifatini baholashda uning asosiy gigiyenik ko‘rsatkichlari, jumladan, harorat, namlik, havo

harakat tezligi, gaz tarkibi va zarrachalar konsentratsiyasi nazariy jihatdan tahlil qilindi.

Tadqiqotda havoni ifloslantiruvchi moddalar ikki asosiy guruhga ajratib ko‘rib chiqildi: tabiiy va antropogen manbalar. Tabiiy manbalarga chang bo‘ronlari, o‘rmon yong‘inlari va vulqon chiqindilari, antropogen manbalarga esa sanoat korxonalari, avtomobil transporti, yoqilg‘i yoqish jarayonlari va qishloq xo‘jaligi faoliyati kiritildi. Ularning ta’siri salomatlik ko‘rsatkichlari nuqtai nazaridan qiyosiy tahlil qilindi.

Shuningdek, gazsimon ifloslantiruvchilar va mayda dispers zarrachalarning organizmga kirish yo‘llari, to‘qimalarda to‘planishi va turli tizimlarga ko‘rsatadigan patologik ta’siri nazariy va tahliliy jihatdan baholandi.

Natijalar

Tadqiqot natijalari atmosfera havosi inson salomatligini saqlashda asosiy ekologik omillardan biri ekanini tasdiqladi. Sog‘lom atmosfera havosi tarkibida o‘rtacha 78% azot, 21% kislorod va 0,03–0,04% karbonat angidrid bo‘lishi kerakligi aniqlandi. Havo muhiti faqat gaz tarkibi bilan emas, balki harorat, namlik va havo harakati tezligi bilan ham gigiyenik ahamiyat kasb etadi. Ushbu ko‘rsatkichlarning me’yordan og‘ishi organizmning moslashuv imkoniyatlariga salbiy ta’sir ko‘rsatadi.

Havo ifloslanish manbalari

Tahlillar shuni ko‘rsatdiki, havo ifloslanishining tabiiy va antropogen manbalari mavjud bo‘lib, hozirgi davrda antropogen omillar ustunlik qilmoqda. Tabiiy manbalarga chang bo‘ronlari, vulqon faoliyati va o‘rmon yong‘inlari kiradi. Antropogen manbalar esa sanoat korxonalari, avtotransport, issiqlik elektr stansiyalari, ko‘mir va boshqa yoqilg‘ilarni yoqish, shuningdek, qishloq xo‘jaligi faoliyati bilan bog‘liqdir. Ayniqsa, shaharlarda avtomobil transporti asosiy ifloslantiruvchi manba sifatida ajralib turadi.

Ifloslantiruvchi moddalar va ularning ta’siri

Atmosfera havosini ifloslantiruvchi asosiy moddalar sifatida karbon oksid, karbonat angidrid, oltingugurt dioksidi, azot oksidlari hamda PM2.5 va PM10 kabi mayda zarrachalar qayd etildi. Gazsimon moddalar nafas yo‘llarining shilliq qavatini ta’sirlantirib, yallig‘lanish, bronx spazmi va umumiy toksik ta’sirni keltirib chiqaradi. Mayda zarrachalar esa nafaqat o‘pkaga chuqur kirib boradi, balki alveolalar orqali qon aylanish tizimiga o‘tib, butun organizmga salbiy ta’sir ko‘rsatishi mumkin.

Tadqiqot natijalari havoning ifloslanishi bronxit, bronxial astma, surunkali obstruktiv o‘pka kasalligi, yurak-qon tomir patologiyalari, allergik holatlar, immunitet pasayishi va o‘pka saratoni xavfi ortishi bilan bog‘liqligini ko‘rsatdi. Uzoq muddatli ta’sir natijasida inson umr davomiyligi qisqarishi mumkinligi ham qayd etildi.

Ekologik oqibatlar

Havo ifloslanishining nafaqat tibbiy, balki ekologik oqibatlari ham muhim ekani aniqlandi. Ular qatoriga iqlim o‘zgarishi, kislotali yomg‘irlar, ozon qatlamining yemirilishi va bioxilma-xillikning kamayishi kiradi. Demak, havo

gigiyenasi masalasi inson salomatligi bilan birga butun ekologik tizim barqarorligi uchun ham muhim ahamiyat kasb etadi.

Profilaktika va muhofaza choralarining samaradorligi

Natijalar havo sifatini yaxshilash uchun davlat, jamiyat va shaxsiy darajadagi kompleks choralar zarurligini ko‘rsatdi. Davlat miqyosida ekologik nazoratni kuchaytirish, sanoat chiqindilarini kamaytirish, yashil hududlarni ko‘paytirish va ekologik toza energiya manbalariga o‘tish muhim deb topildi. Shaxsiy darajada esa iflos hududlarda kam bo‘lish, niqoblardan foydalanish, yopiq joylarda havo tozalash vositalaridan foydalanish tavsiya etiladi. Texnologik jihatdan esa filtr tizimlari va zamonaviy tozalash uskunalari samarali vosita sifatida baholandi.

Muhokama

Olingan natijalar havo muhiti gigiyenasi inson salomatligini saqlashning muhim tarkibiy qismi ekanini ko‘rsatadi. Atmosfera havosining ifloslanishi organizmga ko‘p yo‘nalishli salbiy ta’sir ko‘rsatadi va bir vaqtning o‘zida bir nechta tizimlarning funksional holatini izdan chiqarishi mumkin. Ayniqsa, mayda dispers zarrachalar va toksik gazlarning birgalikdagi ta’siri nafas olish va yurak-qon tomir tizimlari uchun juda xavfli hisoblanadi.

Muhokama natijasida shuni aytish mumkinki, havoning ifloslanishi bilan bog‘liq xavflar qisqa muddatli va uzoq muddatli oqibatlarga ega. Qisqa muddatli ta’sir ko‘pincha nafas qisilishi, yo‘tal, ko‘z va tomoq qichishishi, bosh og‘rig‘i bilan namoyon bo‘lsa, uzoq muddatli ta’sir surunkali kasalliklar, organizmning himoya mexanizmlari susayishi va umr davomiyligining qisqarishiga olib kelishi mumkin.

Havo gigiyenasi masalasining dolzarbligi shundaki, u faqat ekologiya yoki sanitariya muammosi emas, balki sog‘liqni saqlash, iqtisodiyot va ijtimoiy farovonlik bilan uzviy bog‘liq masaladir. Havo sifati pasayishi mehnat unumdorligini kamaytiradi, tibbiy xarajatlarni oshiradi va turmush sifatini yomonlashtiradi. Shu bois atmosfera havosini gigiyenik nazorat qilish va ifloslanishni kamaytirish bo‘yicha chora-tadbirlarni kuchaytirish zarur.

Zamonaviy yondashuv nuqtai nazaridan ekologik monitoring tizimlarini takomillashtirish, havo sifatini baholashning aniq usullarini joriy etish, urbanistik rejalashtirishda gigiyenik talablarni hisobga olish va aholining ekologik madaniyatini oshirish katta ahamiyatga ega. Ayniqsa, O‘zbekiston sharoitida changlanish, transport yuklamasi va sanoat ta’siri bilan bog‘liq omillarni chuqur o‘rganish muhimdir.

Xulosa

Havo muhiti gigiyenasi inson organizmining normal faoliyati va salomatligini saqlashda muhim ahamiyatga ega. Atmosfera havosining ifloslanishi zamonaviy jamiyatning dolzarb muammolaridan biri bo‘lib, uning salbiy ta’siri nafas olish tizimi, yurak-qon tomir tizimi va umumiy sog‘liq holatining yomonlashuviga olib keladi.

Tadqiqotlar shuni ko‘rsatdiki, ifloslanish manbalari orasida ayniqsa antropogen omillar, xususan transport, sanoat korxonalari va yoqilg‘i yoqish

jarayonlari yetakchi o‘rinni egallaydi. PM2.5 va PM10 kabi mayda zarrachalar hamda gazsimon ifloslantiruvchilar salomatlik uchun eng xavfli omillar sirasiga kiradi.

Havo sifatini yaxshilash uchun ekologik monitoringni takomillashtirish, profilaktik choralarni kuchaytirish, toza energiya manbalaridan foydalanish va aholining gigiyenik savodxonligini oshirish zarur. Mazkur yo‘nalishda olib boriladigan kompleks chora-tadbirlar nafaqat kasalliklarning oldini olish, balki aholi salomatligi va ekologik barqarorlikni ta’minlashga ham xizmat qiladi.

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YOSHLAR KAMOLOTIDA MILLIY VA MA’NAVIY QADRIYATLARNING O‘RNI VA AHAMIYATI

Annotatsiya: *Ushbu maqolada yoshlar kamolotida milliy va ma’naviy qadriyatlarning o‘rni hamda ularning shaxs rivojiga ta’siri ilmiy jihatdan tahlil qilinadi. Milliy va ma’naviy qadriyatlarning ijtimoiylashuv jarayonidagi ahamiyati, ularning shaxs axloqiy fazilatlarini shakllantirishdagi roli hamda zamonaviy globallashuv sharoitida yuzaga kelayotgan ijtimoiy-madaniy o‘zgarishlar yoritiladi. Shuningdek, yoshlar tarbiyasida qadriyatlar tizimining integratsiyasi va uning samaradorligini oshirish yo‘llari bo‘yicha ilmiy xulosalar beriladi.*

Kalit so‘zlar: *milliy qadriyatlar, ma’naviyat, yoshlar tarbiyasi, ijtimoiylashuv, milliy o‘zlik, globallashuv, ma’naviy qadriyatlar, shaxs kamoloti, ijtimoiy muhit, qadriyatlar tizimi.*

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THE ROLE AND IMPORTANCE OF NATIONAL AND SPIRITUAL VALUES IN THE DEVELOPMENT OF YOUTH

Abstract: *This article provides a scientific analysis of the role of national and spiritual values in youth development and their impact on personality formation. It highlights the importance of national and spiritual values in the process of socialization, their role in shaping moral qualities, as well as socio-cultural changes occurring in the context of globalization. In addition, the article presents scientific conclusions on the integration of value systems in youth education and ways to enhance its effectiveness.*

Keywords: *national values, spirituality, youth education, socialization, national identity, globalization, spiritual values, personality development, social environment, value system.*

Kirish

Globallashuv sharoitida ijtimoiy-madaniy jarayonlarning jadallashuvi milliy va ma’naviy qadriyatlarning jamiyat rivojidagi o‘rnini qayta ko‘rib chiqishni taqozo etmoqda. Axborot oqimining ortishi va madaniyatlararo aloqalarning kengayishi yoshlar ongiga turli ijtimoiy va madaniy omillarning ta’sirini kuchaytirmoqda.

Shu bois, yoshlar tarbiyasida milliy va ma’naviy qadriyatlarning rolini ilmiy jihatdan tahlil qilish muhim ahamiyat kasb etadi. Mazkur qadriyatlar shaxsning ijtimoiylashuvi, axloqiy sifatlari va ijtimoiy xulq-atvorini shakllantiruvchi muhim omillardan biri hisoblanadi.

Milliy va ma’naviy qadriyatlar mohiyati

Milliy qadriyatlar jamiyatning tarixiy rivojlanish jarayonida shakllangan ijtimoiy-madaniy normalar, urf-odatlar, til va an’analarni o‘z ichiga oladi. Ular ijtimoiy identifikatsiya va madaniy uzluksizlikni ta’minlovchi omil sifatida namoyon bo‘ladi.

Ma’naviy qadriyatlar esa shaxsning axloqiy me’yorlari, e’tiqodi, dunyoqarashi va ruhiy rivojlanishi bilan bog‘liq bo‘lib, insonning ijtimoiy xulq-atvorini tartibga soladi. Ilmiy yondashuvga ko‘ra, ushbu ikki tushuncha o‘zaro integratsiyalashgan holda shaxs kamolotiga ta’sir ko‘rsatadi.

Yoshlar tarbiyasida qadriyatlarning o‘rni

Milliy va ma’naviy qadriyatlar yoshlar ijtimoiylashuvi jarayonida muhim funksiyalarni bajaradi. Xususan, ular orqali:

- ijtimoiy me’yor va qadriyatlar tizimi shakllanadi;
- shaxsning ijtimoiy mas’uliyati rivojlanadi;
- madaniy identifikatsiya jarayoni ta’minlanadi.

Tadqiqotlar shuni ko‘rsatadiki, oilaviy muhit, ta’lim tizimi va ijtimoiy institutlar yoshlar ongida qadriyatlarni shakllantirishda asosiy rol o‘ynaydi. Shu sababli mazkur institutlarning o‘zaro integratsiyasi muhim hisoblanadi.

Zamonaviy ijtimoiy omillar va ta’sirlar

Globallashuv jarayonining jadallashuvi sharoitida yoshlar ongiga ta’sir etuvchi ijtimoiy, madaniy va axborot omillari sezilarli darajada kuchaymoqda. Raqamli texnologiyalar, internet tarmoqlari hamda ommaviy axborot vositalari shaxsning dunyoqarashi va qadriyatlar tizimini shakllantirishda muhim rol o‘ynamoqda. Shu bilan birga, ushbu jarayon ijobiy imkoniyatlar bilan bir qatorda ayrim ijtimoiy-madaniy muammolarni ham yuzaga keltirmoqda.

Xususan, quyidagi tendensiyalar kuzatilmoqda:

- **qadriyatlar tizimining transformatsiyasi** – an’anaviy va zamonaviy qadriyatlar o‘rtasidagi muvozanatning o‘zgarishi;
- **ijtimoiy xulq-atvor me’yorlarining o‘zgarishi** – shaxslararo munosabatlarda yangi ijtimoiy standartlarning shakllanishi;
- **madaniy identifikatsiyaning zaiflashuvi** – milliy madaniy o‘ziga xoslikning ayrim hollarda susayishi.

Mazkur holatlar yoshlar ijtimoiylashuvi jarayoniga bevosita ta’sir ko‘rsatadi va ularning hayotiy qarashlari hamda qadriyatlar tizimini qayta shakllantirishi mumkin. Shu sababli, yoshlar orasida **tanqidiy fikrlash, axborotlarni tahlil qilish ko‘nikmalari va ijtimoiy moslashuv kompetensiyalarini rivojlantirish** dolzarb ilmiy-amaliy vazifa hisoblanadi.

Bundan tashqari, ta’lim tizimi va ijtimoiy institutlar hamkorligida yoshlarning raqamli savodxonligini oshirish va ularni sog‘lom axborot muhitida tarbiyalash muhim ahamiyat kasb etadi.

Tadqiqot natijalari va takliflar

Tadqiqot natijalari shuni ko‘rsatadiki, yoshlar tarbiyasida milliy va ma’naviy qadriyatlarni samarali tatbiq etish uchun ta’lim, tarbiya va ijtimoiy institutlar o‘rtasida tizimli yondashuvni kuchaytirish zarur. Mazkur jarayonda quyidagi yo‘nalishlar ustuvor ahamiyat kasb etadi:

- **ta’lim dasturlariga qadriyatlar asosidagi yondashuvni integratsiya qilish** – o‘quv jarayonida milliy va umuminsoniy qadriyatlarni tizimli ravishda singdirish;
- **interaktiv va innovatsion pedagogik metodlarni qo‘llash** – yoshlarning faolligini oshiruvchi zamonaviy o‘qitish texnologiyalaridan foydalanish;
- **ijtimoiy institutlar hamkorligini kuchaytirish** – oila, ta’lim muassasalari va jamoatchilik tashkilotlari o‘rtasida uzviy hamkorlikni yo‘lga qo‘yish;
- **madaniy-ma’rifiy faoliyatni rivojlantirish** – yoshlar uchun ma’naviy-ma’rifiy tadbirlar va loyihalarni tizimli tashkil etish.

Ushbu yo‘nalishlarning kompleks amalga oshirilishi yoshlar tarbiyasining samaradorligini oshirishga xizmat qiladi.

Xulosa qilib aytganda, milliy va ma’naviy qadriyatlar yoshlar kamolotining muhim ijtimoiy-madaniy omillaridan biri hisoblanadi. Ular shaxsning ijtimoiylashuvi, axloqiy shakllanishi hamda jamiyatdagi faol fuqarolik pozitsiyasini egallashida muhim rol o‘ynaydi.

Zamonaviy ijtimoiy sharoitda ushbu qadriyatlarni ilmiy asosda o‘rganish, ularni ta’lim va tarbiya jarayoniga samarali tatbiq etish jamiyatning barqaror rivojlanishini ta’minlashga xizmat qiladi. Shu jihatdan, qadriyatlar tizimini mustahkamlash yoshlar siyosatining muhim yo‘nalishlaridan biri sifatida qaraladi.

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THE ROLE OF NATIONAL AND SPIRITUAL VALUES IN THE SOCIO-CULTURAL DEVELOPMENT OF YOUTH IN THE CONTEXT OF MODERN UZBEKISTAN

Abstract: *This article examines the role of national and spiritual values in shaping the socio-cultural development of youth in contemporary Uzbekistan. The study explores value transformation under globalization, emphasizing the interaction between traditional cultural heritage and modern ideological influences. Particular attention is given to the formation of youth identity, moral resilience, and civic responsibility. The paper argues that value-based education remains a key factor in ensuring social stability and sustainable development.*

Keywords: *value system, axiology, youth development, national identity, spirituality, globalization, civic culture.*

Introduction

In the modern stage of social development, Uzbekistan is undergoing significant reforms aimed at strengthening human capital and improving societal well-being. Within this process, the issue of value orientation has become increasingly important, especially in relation to youth education and social integration.

Values function as a foundational mechanism regulating human behavior, social relations, and cultural continuity. In a rapidly globalizing world, where informational and ideological influences are intensifying, preserving national identity while adapting to universal norms has become a critical academic and practical challenge.

Literature Review and Theoretical Framework

The scientific study of values, known as axiology, emerged in European philosophy in the second half of the 19th century. Early contributions by R. Lotze and H. Cohen laid the foundation for understanding values as philosophical categories. Later, P. Lapie introduced the term “axiology” to define the systematic study of values as an independent field of knowledge.

In the 20th century, phenomenological and hermeneutic philosophers such as E. Husserl, M. Heidegger, and H.-G. Gadamer further developed the conceptual framework of value interpretation, focusing on human experience and cultural meaning.

In Uzbekistan, value theory has been actively developed in the works of Q. Nazarov and H. Shayxova, who emphasized the interconnection between national identity, moral development, and social consciousness. Their research highlights the importance of values as a stabilizing factor in social modernization.

Methodology

The present study adopts a qualitative theoretical research design aimed at examining value systems in the context of youth socio-cultural development. The methodological framework is based on the following approaches:

- **Comparative analysis of philosophical concepts**, which enables the identification and evaluation of different theoretical interpretations of values across various schools of thought;
- **Systemic interpretation of value structures**, allowing the study of values as an interconnected and hierarchically organized system within society;
- **Historical-logical method**, used to trace the evolution and transformation of value systems in relation to social and cultural development;
- **Generalization of socio-cultural patterns**, which helps to synthesize empirical and theoretical findings into coherent conclusions regarding youth value formation.

This integrated methodological approach provides a comprehensive and multidimensional understanding of the functioning of values in shaping youth development within contemporary socio-cultural conditions.

The Socio-Cultural Nature of Value Systems

Value systems represent historically formed structures that define norms, ideals, and behavioral models within society. They evolve alongside social transformation and reflect the cultural identity of a nation.

From a sociological perspective, values act as a regulatory mechanism shaping collective behavior and ensuring social cohesion. At the same time, they are not static; they are continuously reinterpreted in response to historical, economic, and cultural changes.

Globalization has significantly accelerated the transformation of value systems, introducing new cultural models while simultaneously challenging traditional norms. This dual process creates both opportunities for integration and risks of cultural fragmentation.

National and Universal Values: A Dialectical Relationship

National values reflect the historical experience, traditions, language, and cultural identity of a specific nation. Universal values, on the other hand, represent ethical principles shared across humanity, such as justice, dignity, and respect for human rights.

These two categories should not be viewed as contradictory. Instead, they function in a dialectical relationship where national identity is enriched through universal norms, while universal values gain cultural expression through national traditions.

Such an approach ensures cultural sustainability while promoting openness to global development.

The Role of Values in Youth Development

Youth represent a critical demographic group responsible for the future intellectual and cultural progress of society. Therefore, the formation of their value system is of strategic importance.

Empirical observations and theoretical studies indicate that young individuals grounded in strong cultural and moral values demonstrate:

- higher civic engagement;
- stronger identity stability;
- increased resistance to destructive ideological influences;
- greater social responsibility.

Educational institutions, family structures, and social environments play a decisive role in transmitting these values.

Globalization and Contemporary Challenges

The intensification of global information flows has had a profound impact on the formation of youth consciousness in contemporary society. On the one hand, globalization expands access to information, knowledge exchange, and intercultural communication, thereby creating new opportunities for personal and educational development. On the other hand, it also generates a set of challenges related to cultural and ideological influences.

Among the key risks identified in academic discourse are value relativism, cultural homogenization, and the potential for ideological manipulation through digital media and mass communication platforms. These processes may weaken traditional cultural frameworks and contribute to the transformation of established value orientations among young people.

In response to these challenges, scholars highlight the importance of developing the concept of **"value immunity"**, understood as the individual's capacity to critically assess external cultural and informational influences while preserving core elements of national and cultural identity. This ability is considered essential for maintaining cognitive independence and ensuring balanced socio-cultural adaptation in a globalized environment.

Discussion

The modernization of contemporary society necessitates a balanced and well-considered approach to value transformation. On the one hand, participation in global processes requires openness, flexibility, and the ability to adapt to rapidly changing socio-cultural conditions. On the other hand, the preservation of cultural continuity remains a fundamental factor in sustaining national identity and ensuring intergenerational transmission of values.

In this regard, the education system plays a crucial role in harmonizing these two dimensions. It should not only facilitate students' integration into the global knowledge space but also strengthen their connection to national heritage, cultural traditions, and historical memory. Accordingly, educational frameworks must incorporate both national value systems and universal ethical principles, thereby promoting the holistic development of young people as culturally grounded and globally competent individuals.

Conclusion

The study demonstrates that value systems are a fundamental component of socio-cultural development. In contemporary Uzbekistan, the harmonization of

national and universal values plays a crucial role in shaping a stable, educated, and socially responsible youth population.

Strengthening value-based education is essential for ensuring long-term social cohesion, cultural sustainability, and national development.

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QARSHI TUMANI SUV RESURSLARINING OG‘IR METALLAR BILAN IFLOSLANISHI VA ULARNI BARTARAF ETISH CHORALARI

Annotatsiya: *Ushbu maqolada Qashqadaryo viloyatining sanoat va qishloq xo‘jaligi markazlaridan biri hisoblangan Qarshi tumani suv resurslarining hozirgi ekologik holati atroflicha tadqiq etilgan. Suv – insoniyat yashashi uchun zarur bo‘lgan eng asosiy tabiiy ne’mat bo‘lishi bilan birga, uning sifati bevosita aholi genofondi va ekotizim barqarorligiga ta’sir ko‘rsatadi. Tadqiqotning asosiy maqsadi hududdagi ochiq suv havzalari va yer osti suvlarining og‘ir metallar bilan ifloslanish darajasini aniqlash hamda ularni bartaraf etishning samarali yo‘llarini ishlab chiqishdan iborat.*

Maqolaning kirish qismida urbanizatsiya va sanoatlashuv jarayonlarining suv sifatiga salbiy ta’siri, ayniqsa, og‘ir metallarning biosferada to‘planish xususiyati yoritilgan. Tadqiqot davomida Qarshi magistral kanali, Qashqadaryo daryosining tuman hududidan oqib o‘tuvchi qismlari va artezian quduqlaridan olingan namunalar zamonaviy fizik-kimyoviy usullar yordamida tahlil qilindi. Xususan, metall ionlari kontsentratsiyasini aniqlashda atom-absorbtsion spektrometriya usulidan foydalanildi, bu esa natijalarning yuqori aniqligini ta’minladi.

Kalit so‘zlar: *Qarshi tumani, suv resurslari, og‘ir metallar, ifloslanish darajasi, kadmiy, qo‘rg‘oshin, atom-absorbtsion spektrometriya, REM (ruxsat etilgan me’yor), fitoremediatsiya, ekologik monitoring, oqova suvlar, aholi salomatligi.*

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HEAVY METAL POLLUTION OF WATER RESOURCES IN KARSHI DISTRICT AND MEASURES FOR THEIR REMEDIATION.

Abstract: *This article provides a comprehensive study of the current ecological state of water resources in the Karshi district, one of the industrial and agricultural centers of the Kashkadarya region. While water is the most essential natural resource for human survival, its quality directly affects the human gene pool and ecosystem stability. The primary objective of the research is to determine the level of heavy metal contamination in surface and groundwater within the region and to develop effective remediation strategies.*

The introduction highlights the negative impact of urbanization and industrialization on water quality, specifically the bioaccumulative nature of heavy metals in the biosphere. During the study, samples taken from the Karshi Main Canal, sections of the Kashkadarya River passing through the district, and artesian wells were analyzed using modern physicochemical methods. Specifically, atomic absorption spectrometry was employed to determine metal ion concentrations, ensuring high precision of the results.

Keywords: *Karshi district, water resources, heavy metals, pollution level, cadmium, lead, atomic absorption spectrometry, MPC (Maximum Permissible Concentration), phytoremediation, ecological monitoring, wastewater, public health.*

Kirish

Suv hayot manbai bo‘lib, uning sifati aholi salomatligi va ekologik barqarorlikning asosiy ko‘rsatkichidir. Bugungi kunda Qarshi tumani va unga tutash hududlarda sanoatning rivojlanishi, urbanizatsiya jarayonlarining jadallashishi va qishloq xo‘jaligida kimyoviy o‘g‘itlardan nazoratsiz foydalanish natijasida suv resurslarining og‘ir metallar bilan ifloslanishi dolzarb muammoga aylandi.

Og‘ir metallar (mis, rux, qo‘rg‘oshin, kadmiy, simob va boshqalar) suv ekotizimiga tushganda o‘z-o‘zidan yo‘qolmaydi, aksincha, oziq-ovqat zanjiri orqali inson organizmida to‘planib, surunkali kasalliklarni keltirib chiqaradi. Ushbu maqolada Qarshi tumani suv havzalarining hozirgi holati tahlil qilinadi va muammoning innovatsion yechimlari taklif etiladi.

Asosiy qism

Qarshi tumani asosan Qashqadaryo daryosi va turli magistral kanallar (masalan, Qarshi magistral kanali) suvlaridan foydalanadi. Suv resurslarining ifloslanish manbalarini uchta asosiy guruhga bo‘lish mumkin:

Sanoat oqovalari: Tumandagi va unga yaqin hududlardagi neft va gazni qayta ishlash korxonalari, qurilish materiallari ishlab chiqaruvchi zavodlar oqovalari tarkibida neft mahsulotlari bilan birga fenol va og‘ir metallar birikmalari uchraydi.

Qishloq xo‘jaligi drenaj suvlari: Paxta va g‘alla maydonlarida uzoq yillar davomida qo‘llanilgan pestitsidlar va mineral o‘g‘itlar tarkibidagi metall elementlari sizot suvlari orqali ochiq suv havzalariga kelib tushadi.

Maishiy chiqindilar: Aholi punktlaridan chiqadigan nazoratsiz oqovalar va poligonlardagi chiqindilarning yuvilishi natijasida tarkibida qo‘rg‘oshin (Pb) va xrom (Cr) bo‘lgan birikmalar suvga qo‘shiladi.

Tadqiqot metodologiyasi

Tadqiqot davomida Qarshi tumanining turli nuqtalaridan (Qashqadaryo daryosining tuman hududidan oqib o‘tuvchi qismi va artezian quduqlari) suv namunalari olindi. Tadqiqotda quyidagi usullardan foydalanildi:

Atom-absorbtsion spektrometriya: Suv tarkibidagi metall ionlarining konsentratsiyasini aniqlash uchun.

Fotometrik tahlil: Suvning fizik-kimyoviy parametrlarini (pH, qattiqlik, oksidlanuvchanlik) o‘rganish uchun.

Qiyosiy tahlil: Olingan natijalar O‘zbekiston Respublikasining "Davlat sanitariya me’yorlari va qoidalari" (SanPiN) talablari bilan solishtirildi.

Natijalar va muhokamalar

Laboratoriya tahlillari natijasida ayrim hududlarda og‘ir metallar miqdori ruxsat etilgan me’yor (REM)dan yuqori ekanligi aniqlandi. Xususan:

Element	Aniqlangan miqdor (mg/l)	REM (mg/l)	Oshish koeffitsienti
Mis (Cu)	1.8	1.0	1.8
Rux (Zn)	5.4	5.0	1.08
Qo‘rg‘oshin (Pb)	0.05	0.03	1.6
Kadmiy (Cd)	0.003	0.001	3

Natijalar shuni ko‘rsatadiki, ayniqsa kadmiy va qo‘rg‘oshin miqdorining yuqoriligi xavotirlidir. Bu metallar insonning asab tizimi va buyrak faoliyatiga salbiy ta’sir ko‘rsatadi. Suvning ishqoriylik darajasi (pH) 7.5–8.2 atrofida bo‘lib, bu metallarning suvda erish jarayonini tezlashtirmoqda.

Yechimlar va tavsiyalar

Muammoni hal qilish uchun quyidagi kompleks chora-tadbirlarni amalga oshirish zarur:

Fitoremediatsiya usuli: Suv havzalari bo‘yiga metallarni o‘ziga yutuvchi o‘simliklarni (masalan, qamish, suv gulsapsari) ekish.

Adsorbsion tozalash: Mahalliy xomashyolardan (bentonit glinalari, faollashtirilgan ko‘mir) tayyorlangan filtrlar yordamida oqova suvlarni tozalash tizimini yo‘lga qo‘yish.

Raqamli monitoring: Suv tarkibini real vaqt rejimida nazorat qiluvchi sensorli tizimlarni o‘rnatish.

Xulosa

Qarshi tumani suv resurslarining og‘ir metallar bilan ifloslanishi hududiy ekologik xavfsizlikka tahdid solmoqda. O‘tkazilgan tadqiqotlar shuni ko‘rsatdiki, suv tarkibidagi kadmiy va qo‘rg‘oshin miqdori me’yordan yuqori. Muammoning yechimi sifatida sanoat korxonalarida yopiq suv aylanish tizimini joriy etish hamda biologik tozalash usullaridan keng foydalanish tavsiya etiladi. Bu nafaqat suv sifatini yaxshilaydi, balki kelajak avlod uchun toza ekotizimni saqlab qolishga xizmat qiladi.

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XIX – XXI ASR BOSHIDA FARG‘ONA YOG‘OCH O‘YMAKORLIK SAN’ATINING ASOSIY RIVOJLANISH BOSQICHLARI

Annotatsiya; *Mazkur maqolada XIX asr oxiri – XXI asr boshlariga qadar Farg‘ona vodiysida yog‘och o‘ymakorlik san’atining shakllanishi va rivojlanish bosqichlari tahlil qilinadi. Ushbu san’at turining tarixiy ildizlari, ustalar maktabi, bezak uslublari va zamonaviy davrdagi transformatsiyasi ilmiy asosda yoritilgan. Shuningdek, an’anaviy va zamonaviy yo‘nalishlarning o‘zaro uyg‘unlashuvi hamda milliy madaniyatdagi o‘rni ochib berilgan.*

Kalit so‘zlar: *yog‘och o‘ymakorlik, Farg‘ona vodiysi, xalq amaliy san’ati, naqsh, ustalar maktabi, hunarmandchilik, milliy meros.*

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THE MAIN STAGES OF DEVELOPMENT OF THE ART OF WOOD CARVING IN FERGANA AT THE END OF THE 19TH – 21ST CENTURIES

Abstract: *This article analyzes the stages of formation and development of woodcarving art in the Fergana Valley from the end of the 19th century to the beginning of the 21st century. The historical roots of this art form, the school of masters, decorative styles and its transformation in the modern era are scientifically covered. The harmony of traditional and modern trends and its place in national culture are also revealed.*

Keywords: *woodcarving, Fergana Valley, folk arts, pattern, school of masters, crafts, national heritage*

KIRISH

O‘zbek xalq amaliy san’ati tarixida yog‘och o‘ymakorlik alohida o‘rin tutadi. Ayniqsa, Farg‘ona vodiysi bu san’atning yirik markazlaridan biri sifatida shakllangan. Yog‘och o‘ymakorlik nafaqat uy-joy me’morchiligida, balki masjid, madrasa, maqbara va boshqa inshootlarning bezagida keng qo‘llanilgan.

XIX asr oxiri va XX asr boshlarida Farg‘ona hududida bu san’at turi sezilarli darajada rivojlangan bo‘lib, mahalliy ustalar tomonidan o‘ziga xos maktablar shakllangan. Mazkur maqolada aynan shu davrdan boshlab XXI asr boshigacha bo‘lgan rivojlanish bosqichlari ilmiy jihatdan tahlil qilinadi.

O’rta Osiyoda, shu jumladan Respublikamiz xududida xam IX-XI asrlarga kelib madaniyat yana o’sa boshladi. IX asrda Samarqandning o’zi mustaqil davlat bo’lib krlishi madaniyat va 10 san'at rivojiga o’z ta'sirini o’tkazmay qolmadi. Bu

esa xalq madaniyatida yangi burilish yasashga olib keldi. Shu davrga kelib Abu Ali ibn Sino, Rudakiy, Firdavsiy, Abu Rayxon Beruniy, Muxammad Xorazmiy, Abu Nasr Farobiy kabi buyuk olimlar, faylasuflar, yozuvchilar, adabiyot va madaniyat arboblari etishib chiqdi. Bu kabi allomalarning utkir zexni Buxorodagi Ismoil Samoniy maqbarasi, Narpay tumani Tim kishlogida Arab ota maqbarasi, termizdagi Kirgiz saroyi, Navoiy tumanidagi Mirsaid Baxrom maqbarasi, Navoiy shaxri yakinidagi sulton Saodat ansambli va Raboti Malik karvon saroyi singari jaxrnga mashxur bulgan me'morchilik yodgorliklarini qurilishiga olib keldi. Shular va shu kabi asori-atiqalar usha davrlarda me'morchilik san'ati yuksak darajaga kutarilganligini, ular badiiy xunarmandlar tomonidan jozibador qilib bezatilganini ko'rsatadi. Ilk O'rta asrlarda saroylar shaxar qal'asidan tashqarida surilgan bo'lsa, X asrlarga kelib shaxar tarkibida qurila boshlandi.

Buxoroda qal'a oldida, Urganchda shaxrning bosh maydonida, Samarqandda esa shaxristonda shunday saroylar bunyod etildi. Saroy me'morchiligida Yog'och konstrukturalaridan keng foydalanildi. Madaniyat rivojlanib borar ekan, ajoyib me'morchilik yodgorliklari qad rostlab borar ekan, o'z-o'zidan bunday yodgorliklarni milliy naqshinkor bezaklar bilan bezashda, shu jumladan, darvoza, eshik ustun va ravoqlari yog'och o'ymakorligi bilan bezatildi. Bu esa yog'och o'ymakorligini tez suratlar bilan usib borishiga imkon yaratib beradi. Monumental me'morchilikda yog'och va ganch o'ymakorligi an'anaviy san'at turiga aylanib bordi. Kishini xayratga soluvchi va o'ta nafis, tabiiy qilib ishlangan yog'och o'ymakorligi namunasi XII asrga tegishli bulib, u Samarqanddagi Shoxi-3inda devori orasidan topilganligini so'zimiz isboti sifatida aytib utishimiz mumkin. Fan va madaniyat, adabiyot va san'atning rivojlanib borishi buyuk sarkarda Amir Temur nomi bilan chambarchas boglivdir. U xukmronlik qilgan davrlarda me'morchilik bilan bir qatorda amaliy bezak san'ati xam yuksala bordi. Xuja Aqmad, Kusam ibn Abbos, Turkan Oka, Tuglik Tekin, Amirzoda, Ali Nasafiy maqbaralari yog'och o'ymakorligi va koshin bilan jozibador kilib bezatildi.

XVI-XVII asrlarga kelib me'morchilikda inshootlarning ko'rinishlari yanada takomillashdi, monumental binolarning tarxi, qiyofasiga o'zgartirishlar kiritildi, xunarmandlarning artellari vujudga keldi.

ADABIYOTLAR SHARHI

Farg‘ona vodiysida yog‘och o‘ymakorlik san’ati va uning tarixiy rivojlanish bosqichlarini o‘rganish masalasi o‘zbek san’atshunosligi va folklorshunosligida muhim ilmiy yo‘nalishlardan biri hisoblanadi. Ushbu mavzu bo‘yicha olib borilgan tadqiqotlar asosan xalq amaliy san’ati, hunarmandchilik an’analari, me’moriy bezak san’ati hamda milliy merosni saqlash va rivojlantirish masalalarini qamrab oladi.

O‘zbek xalq amaliy san’atining umumiy nazariy asoslari va tarixiy rivojlanish bosqichlari bir qator olimlar tomonidan keng o‘rganilgan. Jumladan, H. Akbarovning “O‘zbek xalq amaliy san’ati” asarida milliy hunarmandchilik turlarining shakllanishi, rivojlanish bosqichlari va hududiy xususiyatlari ilmiy jihatdan tahlil qilingan. Muallif yog‘och o‘ymakorlikni o‘zbek xalq bezak

san’atining muhim yo‘nalishlaridan biri sifatida baholab, uning tarixiy ildizlari qadimiy davrlarga borib taqalishini asoslab beradi.

Shuningdek, A. Karimovning “Hunarmandchilik tarixi” nomli tadqiqotida Markaziy Osiyoda hunarmandchilik rivoji, jumladan yog‘och o‘ymakorlik san’atining shakllanish jarayonlari ijtimoiy-iqtisodiy omillar bilan bog‘liq holda o‘rganilgan. Ushbu asarda ayniqsa XIX–XX asrlarda hunarmandchilikning rivojlanishiga ta’sir etgan tarixiy jarayonlar, jumladan, urbanizatsiya va ishlab chiqarish tizimining o‘zgarishi alohida ta’kidlanadi.

Yog‘och o‘ymakorlik san’atining o‘ziga xos jihatlari, naqsh turlari va bezak kompozitsiyalarini o‘rganishda D. Mirzaevning “Yog‘och o‘ymakorlik san’ati” asari muhim manba hisoblanadi. Unda yog‘ochga ishlov berish texnikasi, naqshlarning turlari (islimiy, girih va boshqalar) hamda ularning ramziy ma’nolari keng yoritilgan. Muallif Farg‘ona vodiysidagi ustalar maktabining o‘ziga xosligini alohida qayd etib, bu hududda ishlatiladigan naqshlarning nozikligi va murakkabligi bilan ajralib turishini ta’kidlaydi.

Bundan tashqari, F. Nazarovning “O‘zbek bezak san’ati” nomli asarida xalq amaliy san’atining turli yo‘nalishlari, jumladan yog‘och o‘ymakorlik san’ati bezak tizimi, kompozitsion qurilishi va estetik tamoyillari nuqtai nazaridan tahlil qilingan. Ushbu tadqiqotda naqshlarning badiiy ifoda vositasi sifatidagi ahamiyati, ularning me’moriy inshootlar bilan uyg‘unligi chuqur ilmiy asosda yoritilgan.

Farg‘ona vodiysidagi yog‘och o‘ymakorlik maktablari va ularning hududiy xususiyatlarini o‘rganishda zamonaviy tadqiqotlar ham muhim o‘rin tutadi. Xususan, so‘nggi yillarda olib borilgan ilmiy izlanishlarda milliy hunarmandchilikni tiklash va rivojlantirish, ustoz-shogird an’analarini davom ettirish, yosh avlodni bu san’at turiga jalb etish masalalari keng yoritilmoqda.

Xalqaro miqyosda esa UNESCO tomonidan e’lon qilingan nomoddiy madaniy meros ro‘yxatlari va tadqiqotlar o‘zbek xalq amaliy san’atining, jumladan yog‘och o‘ymakorlikning global miqyosdagi ahamiyatini ko‘rsatadi. Ushbu manbalarda milliy hunarmandchilikni saqlash, rivojlantirish va uni kelajak avlodga yetkazish masalalari ustuvor vazifa sifatida belgilangan.

Shu bilan birga, ayrim tadqiqotlarda yog‘och o‘ymakorlik san’atining zamonaviy transformatsiyasi, ya’ni an’anaviy uslublarning yangi dizayn va texnologiyalar bilan uyg‘unlashuvi masalalari ham ko‘rib chiqilgan. Bu esa ushbu san’at turining nafaqat tarixiy, balki zamonaviy ahamiyatini ham oshiradi.

NATIJALAR VA MUHOKAMA

Mazkur tadqiqot natijalari shuni ko‘rsatadiki, Farg‘ona vodiysida yog‘och o‘ymakorlik san’ati XIX asr oxiridan boshlab bosqichma-bosqich rivojlanib, har bir tarixiy davrda o‘ziga xos xususiyatlar bilan boyib borgan. Tadqiqot davomida tarixiy manbalar, ilmiy adabiyotlar va mavjud amaliy namunalar tahlili asosida ushbu san’at turining uch asosiy rivojlanish bosqichi aniqlandi: an’anaviy shakllanish davri, transformatsiya davri va zamonaviy tiklanish davri.

Birinchi bosqich — XIX asr oxiri va XX asr boshlarini qamrab olgan bo‘lib, bu davrda yog‘och o‘ymakorlik san’ati an’anaviy hunarmandchilik sifatida shakllangan. Natijalar shuni ko‘rsatadiki, aynan shu davrda ustoz-shogird an’anasi

asosida ustalar maktablari rivojlanib, hududiy uslublar yuzaga kelgan. Farg‘ona maktabiga xos bo‘lgan naqshlarning nozikligi, kompozitsion murakkabligi va estetik uyg‘unligi ushbu davrning asosiy yutug‘i hisoblanadi. Bu jarayonda naqshlarning asosiy turlari — islimiy va geometrik bezaklar keng qo‘llanilgan bo‘lib, ular nafaqat bezak, balki ramziy ma’noga ham ega bo‘lgan.

Ikkinchi bosqich — XX asrning o‘rtalarini o‘z ichiga oladi. Tadqiqot natijalariga ko‘ra, bu davr yog‘och o‘ymakorlik san’atida muayyan o‘zgarishlar va moslashuv jarayonlari bilan xarakterlanadi. Sovet davri ta’siri ostida hunarmandchilik faoliyati ma’lum darajada markazlashgan tizimga o‘tgan, ustaxonalar tashkil etilgan va ishlab chiqarish elementlari kuchaygan. Shu bilan birga, an’anaviy naqshlar saqlangan holda, ularning mazmunida soddalashuv va funksional yondashuv kuchaygani kuzatiladi. Natijalar shuni ko‘rsatadiki, ushbu davrda yog‘och o‘ymakorlik san’ati o‘zining milliy xususiyatlarini to‘liq yo‘qotmagan, balki yangi ijtimoiy sharoitlarga moslashgan holda rivojlangan.

Uchinchi bosqich — XX asr oxiri va XXI asr boshlarini qamrab olgan bo‘lib, bu davr milliy hunarmandchilikning qayta tiklanish va rivojlanish bosqichi sifatida baholanadi. Tadqiqot natijalariga ko‘ra, mustaqillik yillarida yog‘och o‘ymakorlik san’ati davlat tomonidan qo‘llab-quvvatlanib, milliy meros sifatida e’tirof etilgan. Bu davrda ustalar faoliyati faollashib, yangi avlod hunarmandlari shakllangan. An’anaviy naqshlar zamonaviy dizayn va texnologiyalar bilan uyg‘unlashib, san’atning yangi shakllari yuzaga kelgan.

Muhokama jarayonida aniqlanishicha, Farg‘ona yog‘och o‘ymakorlik san’atining rivojlanishi bir tomondan tarixiy-iqtisodiy omillar, ikkinchi tomondan esa madaniy va estetik qadriyatlar bilan chambarchas bog‘liq. Xususan, ustoz-shogird an’anasining saqlanib qolishi, milliy naqshlarning uzluksiz rivoji va hunarmandchilikka bo‘lgan e’tibor ushbu san’at turining barqarorligini ta’minlagan asosiy omillar hisoblanadi.

Shuningdek, tadqiqot natijalari zamonaviy davrda yog‘och o‘ymakorlik san’atining nafaqat an’anaviy shaklda, balki innovatsion yo‘nalishda ham rivojlanayotganini ko‘rsatadi. Bu jarayon global madaniy aloqalar, turizm va dizayn sohasining rivojlanishi bilan bevosita bog‘liq. Shu bilan birga, ayrim muammolar ham mavjud bo‘lib, ular qatoriga an’anaviy uslublarning yo‘qolib borish xavfi, yosh avlodning hunarmandchilikka qiziqishining pasayishi va bozordagi raqobat sharoitlari kiradi.

Natijalar va muhokama asosida shuni xulosa qilish mumkinki, Farg‘ona yog‘och o‘ymakorlik san’ati tarixiy taraqqiyot davomida o‘zining milliy xususiyatlarini saqlab qolgan holda yangi bosqichlarga ko‘tarilgan. Uning rivojlanishi uzluksiz jarayon bo‘lib, an’anaviylik va zamonaviylik uyg‘unligi asosida davom etmoqda. Shu bois, ushbu san’at turini ilmiy o‘rganish, uni saqlash va rivojlantirish bo‘yicha kompleks yondashuv zarur hisoblanadi.

Xulosa va takliflar

Olib borilgan tadqiqotlar asosida shuni ta’kidlash mumkinki, XIX asr oxiri – XXI asr boshlarida Farg‘ona vodiysida yog‘och o‘ymakorlik san’ati o‘ziga xos tarixiy rivojlanish bosqichlarini bosib o‘tgan va har bir davrda yangi sifat

jihatlariga ega bo‘lgan. Ushbu san’at turi dastlab an’anaviy hunarmandchilik shaklida rivojlangan bo‘lsa, keyinchalik ijtimoiy-iqtisodiy omillar ta’sirida transformatsiyaga uchrab, mustaqillik davrida milliy meros sifatida qayta tiklandi va yangi bosqichga ko‘tarildi.

Tadqiqot natijalari Farg‘ona yog‘och o‘ymakorlik san’atining rivojlanishida ustoz-shogird an’anasining hal qiluvchi o‘rin tutganini ko‘rsatdi. Aynan shu tizim orqali hunarmandchilik sir-asrorlari, naqshlar tizimi va badiiy uslublar avloddan-avlodga uzluksiz o‘tib kelgan. Bu esa san’atning barqarorligini ta’minlagan asosiy omillardan biri hisoblanadi.

Shuningdek, tadqiqot davomida Farg‘ona maktabiga xos bo‘lgan naqshlarning nozikligi, kompozitsion mukammalligi va estetik uyg‘unligi aniqlanib, bu jihatlar mazkur hudud yog‘och o‘ymakorlik san’atining boshqa hududlardan farqlanishini belgilashi asoslab berildi. Naqshlarning asosan islimiy va geometrik shakllardan tashkil topgani, ularning ramziy ma’noga ega ekani ham ilmiy jihatdan yoritildi.

XX asrda yuz bergan ijtimoiy o‘zgarishlar yog‘och o‘ymakorlik san’atiga ham ta’sir ko‘rsatgani, ayniqsa sovet davrida hunarmandchilik faoliyatining qisman markazlashgani va ishlab chiqarish bilan integratsiyalashgani aniqlandi. Biroq, ushbu jarayon an’anaviy san’atning butunlay yo‘qolishiga olib kelmagan, aksincha, yangi sharoitlarga moslashuvini ta’minlagan.

Mustaqillik davrida esa yog‘och o‘ymakorlik san’ati yangi bosqichga ko‘tarilib, milliy qadriyat sifatida qayta tiklandi. Davlat tomonidan hunarmandchilikni qo‘llab-quvvatlash, ustalar faoliyatini rag‘batlantirish, xalqaro ko‘rgazma va festivallar tashkil etish orqali ushbu san’at turining rivojlanishi uchun keng imkoniyatlar yaratildi. Natijada, an’anaviy naqshlar zamonaviy dizayn va texnologiyalar bilan uyg‘unlashib, yangi badiiy yo‘nalishlar yuzaga keldi.

Tadqiqot natijalari shuni ham ko‘rsatdiki, hozirgi kunda yog‘och o‘ymakorlik san’ati rivojlanayotgan bo‘lsa-da, ayrim muammolar mavjud. Jumladan, yosh avlodning hunarmandchilikka qiziqishini oshirish zarurati, an’anaviy uslublarning yo‘qolib ketish xavfi, hamda zamonaviy bozor talablariga moslashish masalalari dolzarb bo‘lib qolmoqda.

Yuqoridagi tahlillar asosida quyidagi ilmiy-amaliy takliflar ilgari suriladi:

1. Yog‘och o‘ymakorlik san’atini saqlash va rivojlantirish maqsadida ustoz-shogird an’anasini yanada qo‘llab-quvvatlash va maxsus o‘quv markazlarini tashkil etish lozim.
2. Hunarmandchilik mahsulotlarini zamonaviy dizayn va innovatsion texnologiyalar bilan uyg‘unlashtirish orqali ularning raqobatbardoshligini oshirish zarur.
3. Yosh avlodni milliy hunarmandchilikka jalb etish uchun ta’lim tizimida amaliy san’at yo‘nalishlarini kengaytirish maqsadga muvofiq.
4. Yog‘och o‘ymakorlik mahsulotlarini xalqaro bozorlarga olib chiqish va eksport salohiyatini oshirish bo‘yicha kompleks dasturlar ishlab chiqish zarur.

5. Ushbu san’at turini ilmiy o‘rganish, kataloglashtirish va raqamlashtirish orqali uning tarixiy namunalari va ustalar merosini saqlab qolish lozim.

Xulosa qilib aytganda, Farg‘ona yog‘och o‘ymakorlik san’ati o‘zining boy tarixiy ildizlari, estetik mukammalligi va zamonaviy rivojlanish imkoniyatlari bilan o‘zbek xalq amaliy san’atining muhim tarkibiy qismi hisoblanadi. Uni saqlash va rivojlantirish nafaqat madaniy merosni asrash, balki milliy o‘zlikni mustahkamlashda ham muhim ahamiyat kasb etadi.

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SURXONDARYO VILOYATI SHAROITIDA CULEX AVLODIGA QON SO‘RUVCHI CHIVINLAR TARQALISHI

Annatatsiya. *Mazkur maqolada Surxondaryo viloyati sharoitida Culex avlodiga mansub qon so‘ruvchi chivinlarning tarqalishi, ekologiyasi va biologik xususiyatlari o‘rganilgan. Hududdagi asosiy suv manbalari – Amudaryo va Surxondaryo daryolari hamda ularning irmoqlari, sug‘orish kanallari va vaqtinchalik suv havzalari chivinlar rivojlanishi uchun qulay muhit yaratishi aniqlangan. Tadqiqot davomida lichinkalar va qo‘g‘irchoqlarni yig‘ish hamda aniqlash A.V. Gutsevich va A.S. Monchadskiy metodlari asosida olib borildi. Natijada hududda Cx. bergrothi, Cx. molestus va Cx. pipiens turlari aniqlanib, ularning ekologik xususiyatlari va miqdoriy nisbati baholandi.*

Kalit so‘zlar: *qon so‘ruvchi chivinlar, Culex, lichinka, ekologiya, fenologiya, suv havzalari, Surxondaryo viloyati.*

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DISTRIBUTION OF BLOOD-SUCKING MOSQUITOES OF THE GENUS *CULEX* UNDER THE CONDITIONS OF SURKHANDARYA REGION

Abstact. *This article investigates the distribution, ecology and biological characteristics of blood-sucking mosquitoes of the genus Culex in the Surkhandarya region of Uzbekistan. Natural and artificial water bodies, irrigation systems and wetlands that create favorable conditions for mosquito breeding were analyzed. Larvae and pupae were collected according to the methods of A.V. Gutsevich and identified using the method proposed by A.S. Monchadskiy. Several mosquito species including Cx. bergrothi, Cx. molestus and Cx. pipiens were recorded. The study demonstrates that climatic conditions, landscape features and the presence of water bodies play an important role in the distribution and seasonal activity of mosquitoes in the region.*

Keywords: *blood-sucking mosquitoes, Culex, larvae, ecology, phenology, water bodies, Surkhandarya region.*

Kirish

Surxondaryo viloyati O‘zbekiston Respublikasining janubiy hududida joylashgan bo‘lib, o‘ziga xos tabiiy-geografik sharoitlari bilan ajralib turadi. Hududda Amudaryo va Surxondaryo daryolari hamda ularning Dashnobod, Xo‘jaipak, Sangardak, To‘palang, Qoratog‘ va Sherobod kabi irmoqlari mavjud. Ushbu daryolar qor, muzlik va mavsumiy tuproq suvlari hisobiga oziqlanadi. Ko‘plab suv manbalarining mavjudligi hududda turli xil suv havzalarining shakllanishiga sabab bo‘ladi. Ayniqsa suv toshqinlari davrida mayda suv havzalari hosil bo‘lib, ular qon so‘ruvchi chivinlarning ko‘payishi uchun qulay sharoit yaratadi [1].

Qon so‘ruvchi chivinlar tibbiy va veterinariya nuqtai nazaridan muhim ahamiyatga ega bo‘lgan hasharotlar guruhiga kiradi. Ular turli kasallik qo‘zg‘atuvchilarini tashuvchi bo‘lishi mumkin. Shu sababli chivinlarning tur tarkibi, biologiyasi, ekologiyasi hamda tarqalish xususiyatlarini o‘rganish katta ilmiy va amaliy ahamiyatga ega.

Quyi Surxon hududida Sherobod daryosining oqiziq konusida qumloq-loyqa tuproqlar turli chuqurlikda joylashgan bo‘lib, ular yer osti suvlarining sho‘rlanishi va botqoqlanishi. Bu yerdagi tuproqlarning sho‘rlanishi va botqoqlanishi sug‘orishdan so‘ng suvning yetarli darajada tartibga solinmaganligi bilan bog‘liq. Pasttekisliklar yer osti suvlari bilan to‘lib, ularda *Culex* chivinlari ko‘p miqdorda yashaydi. Suv toshqin davrida Surxondaryodan keladigan suv Uchqizil suv omboriga kelib tushadi va u yerda chivinlar deyarli yo‘qolmaydi.

Surxondaryo viloyati gidroIshoonlar sug'orish tarmog'ida - bu etarli emas, ko'plab kanallari mavjud. Sug'orish tizimlari yordamida kichik vaqtinchalik suv havzalari (buzilish, filtr natijasida - qon so‘ruvchi chivinlar ko‘payadigan joylar bo‘lgan kanaldan oqib chiqadigan va sizib chiqadigan joylar) mavjud. Bunday holat, xususan, O‘rta Surxon va Quyi Surxon hududlarining toshqin qismlarida joylashgan qishloq xo‘jaligi tarmoqlarida kuzatilmoqda kichik vaqtinchalik suv havzalari (buzilish, filtr natijasida-qon so‘ruvchi chivinlar ko‘payadigan joylar bo‘lgan kanaldan oqib chiqadigan va sizib chiqadigan joylar) mavjud. Bunday holat, xususan, O‘rta Surxon va Quyi Surxon tumanlarining toshqin qismlarida joylashgan kolxoz va sovxozlarda kuzatilmoqda.

Qirg‘oqbo‘yi qismlari tuproqli va oqova suvli botqoqlar, vaqtinchalik ko‘lmaklar Sho‘rlangan suvli joylarda *Cx. modestus* lichinkalari ko‘p miqdorda uchradi, vaqti-vaqti bilan *Cx. pusillus* namunalari topildi. Sug‘orish kanallari yaqinidagi o‘simliklari siyrak va vodorod sulfid hidi anqib turadigan chuqurliklarda *C. pipiens*, ba’zan *C. theileri* va *C. pusillus* lichinkalari juda ko‘p miqdorda uchragan. Yer osti suvlari oqimi yuqori bo'lgan botqoqlarda, qamish bilan qoplangan joylarda *Cx. modestus, Cx. martinii, Cx. apicalis, Cx. pusillus, Cx. longiareolata, Cx. annulata* uchradi.

Material va metodika

Har bir faza va bosqichdagi individlar soni bo‘yicha suv sathining bitta namunasiga yoki birlik maydoniga (1 m^2) preimaginal fazalarni hisoblang. Lichinkalar bosqichi A.S. Monchadskiy (1951) usulida aniqlandi, bu usul dala

sharoitida ayniqsa qulay bo‘lib, quyidagicha amalga oshiriladi.ngan suv havzalariga qaratilgan [2].

Lichinkalar va qo‘g‘irchoqlarni yig‘ish A.V. Gutsevich (1959) sxemasi bo‘yicha amalga oshirildi. Bitta suv havzasidan uning o‘lchamiga qarab 10 tadan 30 tagacha namuna olindi. Har bir faza va bosqichdagi individlar soni bo‘yicha suv sathining bitta namunasiga yoki birlik maydoniga (1 m^2) preimaginal fazalarni hisoblang. Lichinkalar bosqichi A.S. Monchadskiy (1951) usulida aniqlandi, bu usul dala sharoitida ayniqsa qulay bo‘lib, quyidagicha amalga oshirilangan [3].

Lichinkalarni yig‘ish standart suv to‘rchasi yoki sirlangan kyuvetka (20x30 sm) yordamida amalga oshirildi. Mayda suv havzalarida lichinkalar va qo‘g‘irchoqlar diametri 15-20 sm bo‘lgan tegirmon gazidan yasalgan chashkasimon to‘rcha yordamida tutib olingan.

Tadqiqotlarda aniqlangan qon so‘ruvchi chivinlardan *Cx. (Cx.) bergrothi, Cx. (Cx.) molestus, Cx. (Cx.) p. pipiens* kabi turlari aniqlangan (1-jadval).

1-jadval

Surxondaryo viloyati qon so‘ruvchi chivinlarining tur tarkibi va miqdoriy nisbati

	Tur	Urg’ochi		Erkaklar soni
		Tabiatda to‘plab yig‘ilganlarning umumiy soni	Umumiy sondan urg‘ochilar soni %da	
17	*Cu. (Cu.) alaskaensis*	449	0,6	2
18	*Cx (Cx.) bergrothi*	374	0,5	0
19	*Cx. (Cx.) molestus*	143	0,2	986
20	*Cx. (Cx.) p. pipiens*	150	0,2	18
	Jami:	**71946**	**100,0**	**2255**

Bezgak chivinlari ustidan fenologik kuzatishlar katta amaliy ahamiyatga ega. Ushbu kuzatishlar asosida chivinlar hayotidagi asosiy mavsumiy hodisalarning boshlanish sanalari aniqlanadi, bu esa turli geografik hududlarda chivinlarga qarshi tadbirlar o‘tkazishning oqilona muddatlarini aniqlashtirish uchun juda zarur.

Sug‘orish kanallari yaqinidagi o‘simliklari siyrak va vodorod sulfid hidi anqib turadigan chuqurliklarda *C. pipiens,* ba’zan *C. theileri* va *C. pusillus* lichinkalari juda ko‘p miqdorda uchragan. Yer osti suvlari oqimi yuqori bo'lgan botqoqlarda, qamish bilan qoplangan joylarda *Cx. modestus, Cx. martinii, Cx. apicalis, Cx. pusillus, Cx. longiareolata, Cx. annulata* uchradi. Surxondaryo viloyatida lichinka va katta chivinlar bosqichida qishlaydigan bezgak chivinlarining fenologiyasi bo‘yicha tadqiqotlar o‘tkazigan.

Xulosa

Tadqiqot hududlarida qon so‘ruvchi chivinlarning tarqalishi geografik joylashuv, landshaft xususiyatlari, iqlim va relyefga bog‘liq. Ayrim hududlarda bu omillar ularning keng rivojlanishi uchun yetarli sharoit yaratmaydi, biroq

himoyalangan va mutadil mikroiqlimli landshaftlarda ayrim turlar ommaviy ko‘payishi mumkin.

Shunday qilib, landshaft va iqlim o‘zaro bog‘liq holda qon so‘ruvchi chivinlarning shakllanishi va tarqalishida muhim rol o‘ynaydi. Surxondaryo viloyatida ularning tur tarkibi, biologiyasi va ekologiyasini o‘rganish ularga qarshi samarali kurash choralarini ishlab chiqishda muhim ahamiyatga ega.

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O‘TKIR DIAREYADA BIOMARKERLAR ASOSIDA OG‘IR KECHISH VA ASORATLARNI PROGNOZLASH

Annotatsiya: *O‘tkir diareya butun dunyoda kasallanish va o‘lim ko‘rsatkichlarining muhim sabablaridan biri bo‘lib qolmoqda, ayniqsa og‘ir suvsizlanish, sepsis, elektrolit buzilishlari va ko‘p a’zoli yetishmovchilik rivojlanish xavfi mavjud bemorlarda. Kasallikning og‘ir kechishini erta aniqlash va asoratlarni prognozlash klinik amaliyotda muhim ahamiyatga ega. Ushbu maqolada o‘tkir diareyada biomarkerlarning, xususan C-reaktiv oqsil (CRP), prokaltsitonin, interleykin-6 (IL-6), o‘simta nekrozi omili alfa (TNF-α), fekal kalprotektin, laktat va elektrolit ko‘rsatkichlarining prognostik ahamiyati tahlil qilindi. Biomarkerlar yordamida og‘ir kechish xavfini baholash, erta risk stratifikatsiyasi va individual davolash taktikasini tanlash imkoniyatlari ko‘rib chiqildi. Biomarkerlar asosidagi integratsiyalashgan yondashuv o‘tkir diareyada asoratlar rivojlanishini oldindan aniqlash va davolash samaradorligini oshirishga xizmat qilishi mumkin.*

Kalit so‘zlar: *O‘tkir diareya, biomarkerlar, CRP, prokaltsitonin, IL-6, kalprotektin, prognoz, asoratlar, risk stratifikatsiyasi.*

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PROGNOSIS OF SEVERE COURSE AND COMPLICATIONS IN ACUTE DIARRHEA BASED ON BIOMARKERS

Abstract: *Acute diarrhea remains one of the leading causes of morbidity and mortality worldwide, particularly among patients at risk of severe dehydration, sepsis, electrolyte disturbances, and multiple organ failure. Early identification of severe disease progression and prediction of complications are of great importance in clinical practice. This article analyzes the prognostic significance of biomarkers in acute diarrhea, including C-reactive protein (CRP), procalcitonin, interleukin-6 (IL-6), tumor necrosis factor-alpha (TNF-α), fecal calprotectin, lactate, and electrolyte parameters. The possibilities of assessing the risk of severe disease progression, early risk stratification, and selecting individualized treatment strategies using biomarkers were evaluated. An integrated biomarker-based approach may help predict the development of complications in acute diarrhea and improve treatment outcomes.*

Keywords: *Acute diarrhea, biomarkers, C-reactive protein, procalcitonin, interleukin-6, calprotectin, prognosis, complications, risk stratification.*

Kirish

O‘tkir diareya klinik amaliyotda eng ko‘p uchraydigan sindromlardan biri bo‘lib, infeksion va noinfeksion omillar ta’sirida rivojlanadi. Kasallikning aksariyat holatlari yengil kechsa-da, ayrim bemorlarda og‘ir suvsizlanish, metabolik asidoz, buyrak disfunksiyasi, septik asoratlar va gemodinamik buzilishlar rivojlanishi mumkin. Ayniqsa, keksa yoshdagilar, immuniteti pasaygan bemorlar va komorbid holatlarga ega shaxslarda og‘ir kechish xavfi yuqori bo‘ladi.

An’anaviy klinik baholash har doim ham og‘ir kechishni erta aniqlash imkonini bermaydi. Shu sababli biomarkerlar asosida prognozlash zamonaviy diagnostikaning muhim yo‘nalishlaridan biri hisoblanadi. Yallig‘lanish biomarkerlari, ichak shilliq qavati shikastlanish markerlari va metabolik markerlar kasallik og‘irligini baholashda qo‘shimcha axborot beradi.

Mazkur tadqiqotning maqsadi o‘tkir diareyada biomarkerlarning og‘ir kechish va asoratlarni prognozlashdagi ahamiyatini tahlil qilishdan iborat.

Materiallar va usullar

Tadqiqot prospektiv kuzatuv asosida o‘tkazildi. Tekshiruvga o‘tkir diareya tashxisi bilan shifoxonaga yotqizilgan 120 nafar bemor kiritildi. Bemorlar kasallik og‘irligiga ko‘ra ikki guruhga ajratildi:

- 1-guruh (n=78) — yengil va o‘rta og‘ir kechish;
- 2-guruh (n=42) — og‘ir kechish va asoratlar (og‘ir suvsizlanish, sepsis, buyrak disfunksiyasi, elektrolit buzilishlari) rivojlangan bemorlar.

Barcha bemorlarda quyidagi biomarkerlar tekshirildi:

- C-reaktiv oqsil (CRP)
- Prokaltsitonin (PCT)
- Interleykin-6 (IL-6)
- Fekal kalprotektin
- Qon laktati
- Natriy va kaliy darajasi

Laborator tekshiruvlar bemor qabul qilingan dastlabki 24 soat ichida bajarildi.

Statistik tahlil uchun o‘rtacha qiymat (M±m), Student t-testi, ROC tahlil va logistik regressiya qo‘llanildi. $p<0,05$ statistik ishonchli deb qabul qilindi.

Natijalar

Jadval 1.

Biomarkerlarning guruhlar bo‘yicha ko‘rsatkichlari

Biomarker	Yengil/o‘rta guruh	Og‘ir guruh	p
CRP (mg/L)	18.4±4.2	72.6±8.7	<0.001
PCT (ng/ml)	0.42±0.1	3.84±0.7	<0.001
IL-6 (pg/ml)	14.3±2.5	68.5±7.9	<0.001
Kalprotektin (mcg/g)	94±18	298±42	<0.001

Laktat (mmol/L)	1.8±0.3	4.6±0.9	<0.001

Og‘ir guruhda barcha biomarkerlar ishonchli yuqori ekanligi aniqlandi.

ROC tahlil natijalariga ko‘ra:

- Prokaltsitonin AUC=0.91
- IL-6 AUC=0.89
- Laktat AUC=0.87

Logistik regressiya bo‘yicha og‘ir kechishning mustaqil prediktorlari:

- PCT >2 ng/ml (OR 5.8)
- IL-6 >50 pg/ml (OR 4.9)
- Laktat >4 mmol/L (OR 4.3)

Muhokama

Olingan natijalar o‘tkir diareyada yallig‘lanish va metabolik biomarkerlarning prognostik ahamiyatga ega ekanligini ko‘rsatdi.

CRP va prokaltsitonin tizimli yallig‘lanish og‘irligini aks ettirdi. Bu ko‘rsatkichlarning oshishi septik asoratlar xavfi bilan bog‘liq bo‘ldi.

IL-6 sitokin javobning erta markerlaridan biri sifatida og‘ir kechishni oldindan ko‘rsatdi.

Qon laktati to‘qima gipoperfuziyasi va og‘ir metabolik buzilishlarni aks ettiruvchi muhim prognostik marker ekanligi tasdiqlandi.

Fekal kalprotektin ichak yallig‘lanishi faolligini ko‘rsatib, invaziv infeksion jarayon og‘irligini baholashda foydali bo‘ldi.

Biomarkerlarni kompleks qo‘llash alohida markerlardan ko‘ra yuqori prognostik aniqlik berdi.

Xulosa

1. O‘tkir diareyada CRP, prokaltsitonin, IL-6, kalprotektin va laktat og‘ir kechishni prognozlovchi muhim biomarkerlar hisoblanadi.
2. PCT >2 ng/ml, IL-6 >50 pg/ml va laktat >4 mmol/L og‘ir asoratlar rivojlanishi uchun mustaqil xavf omillari hisoblanadi.
3. Biomarkerlar asosida risk stratifikatsiyasi erta intensiv terapiya boshlashga yordam beradi.
4. Biomarkerlar kombinatsiyasi o‘tkir diareyada individual davolash taktikasini optimallashtirishi mumkin.

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O‘TKIR DIAREYADA SUN’IY INTELLEKT ASOSIDA KLINIK QAROR QABUL QILISH MODELI

Annotatsiya: *O‘tkir diareya global sog‘liqni saqlash tizimida dolzarb muammo bo‘lib, uning og‘ir kechishi, suvsizlanish, sepsis va metabolik buzilishlar bilan asoratlanishi yuqori xavf tug‘diradi. Klinik qaror qabul qilishda an’anaviy yondashuvlar ko‘pincha bemor holatining dinamik o‘zgarishlarini yetarli darajada prognoz qila olmaydi. Ushbu tadqiqotning maqsadi o‘tkir diareyada sun’iy intellekt asosida klinik qaror qabul qilish modelini ishlab chiqish va uning prognostik samaradorligini baholashdan iborat. Tadqiqot natijalari sun’iy intellekt asosidagi model og‘ir kechish, intensiv terapiya ehtiyoji va asoratlar rivojlanish xavfini prognozlashda yuqori aniqlik ko‘rsatishini namoyon etdi. Ushbu yondashuv klinik qaror qabul qilishni optimallashtirish va individual davolash strategiyalarini takomillashtirishda istiqbolli vosita bo‘lishi mumkin.*

Kalit so‘zlar: *o‘tkir diareya, sun’iy intellekt, machine learning, klinik qaror qabul qilish, biomarkerlar, prognoz, risk stratifikatsiyasi.*

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CLINICAL DECISION-MAKING MODEL BASED ON ARTIFICIAL INTELLIGENCE IN ACUTE DIARRHEA

Abstract: *Acute diarrhea remains a significant global public health problem, with severe disease progression associated with a high risk of dehydration, sepsis, and metabolic disturbances. Traditional clinical approaches to decision-making often fail to adequately predict the dynamic changes in patient condition. The aim of this study was to develop an artificial intelligence-based clinical decision-making model for acute diarrhea and to evaluate its prognostic performance. The study results demonstrated that the artificial intelligence-based model showed high accuracy in predicting severe disease progression, the need for intensive care, and the risk of complications. This approach may serve as a promising tool for optimizing clinical decision-making and improving individualized treatment strategies.*

Keywords: *Acute diarrhea, artificial intelligence, machine learning, clinical decision-making, biomarkers, prognosis, risk stratification.*

Kirish

O‘tkir diareya infeksion va noinfeksion etiologiyali keng tarqalgan klinik sindrom bo‘lib, ayrim holatlarda og‘ir suvsizlanish, buyrak yetishmovchiligi, elektrolit disbalansi, sepsis va ko‘p a’zoli yetishmovchilikka olib kelishi mumkin. Kasallik og‘irligini erta aniqlash, asoratlar xavfini prognozlash va optimal davolash taktikasini tanlash mortalitetni kamaytirishda muhim ahamiyatga ega. Biroq an’anaviy klinik yondashuvlar ko‘pincha faqat alohida klinik ko‘rsatkichlarga tayanadi va murakkab ko‘p omilli bog‘liqliklarni yetarli darajada aks ettirmaydi.

So‘nggi yillarda sun’iy intellekt va machine learning texnologiyalari tibbiyotda klinik qaror qabul qilish tizimlariga keng joriy etilmoqda. Ushbu algoritmlar katta hajmdagi klinik, laborator va biomarker ma’lumotlari asosida yashirin bog‘liqliklarni aniqlab, prognozlash aniqligini oshiradi. Shu nuqtai nazardan, o‘tkir diareyada sun’iy intellektdan foydalanish og‘ir kechish va asoratlar xavfini baholashda yangi istiqbollar ochadi.

Mazkur tadqiqotning maqsadi o‘tkir diareyada sun’iy intellekt asosida klinik qaror qabul qilish modelini ishlab chiqish va uning prognostik samaradorligini baholashdan iborat.

Materiallar va usullar

Tadqiqotga o‘tkir diareya bilan shifoxonaga yotqizilgan 180 nafar bemor jalb qilindi. Barcha bemorlarda yosh, tana harorati, yurak urish tezligi, arterial bosim, dehidratatsiya darajasi, C-reaktiv oqsil, prokaltsitonin, interleykin-6, laktat, natriy, kaliy va kreatinin ko‘rsatkichlari o‘rganildi. Olingan ma’lumotlar asosida Random Forest algoritmi yordamida machine learning modeli yaratildi.

Model og‘ir kechish, intensiv terapiya ehtiyoji, sepsis rivojlanishi va buyrak disfunksiyasi xavfini prognozlash uchun o‘qitildi. Ma’lumotlarning 70 foizi modelni o‘qitish, 30 foizi esa validatsiya uchun ishlatildi. Model samaradorligi AUC, sensitivlik, spetsifiklik va umumiy aniqlik ko‘rsatkichlari asosida baholandi.

Natijalar

O‘tkazilgan tahlillar sun’iy intellekt asosidagi model o‘tkir diareyada og‘ir kechish va asoratlarni prognozlashda yuqori samaradorlikka ega ekanligini ko‘rsatdi. Modelning AUC ko‘rsatkichi 0.92 ni tashkil etdi, bu esa yuqori diskriminatsion qobiliyatni tasdiqladi. Sensitivlik 88 foiz, spetsifiklik 84 foiz va umumiy aniqlik 86 foizga teng bo‘ldi.

Tahlil natijalariga ko‘ra, prokaltsitonin, laktat, interleykin-6, dehidratatsiya darajasi va kreatinin modeldagi eng muhim prognostik prediktorlar sifatida aniqlandi. Ayniqsa prokaltsitonin va laktat og‘ir kechish xavfi bilan kuchli bog‘liqlik ko‘rsatdi. Biomarkerlar va klinik parametrlarning kombinatsiyasi faqat an’anaviy klinik baholashga nisbatan yuqori prognoz aniqligini ta’minladi.

Muhokama

Olingan natijalar sun’iy intellekt asosidagi klinik qaror qabul qilish modeli o‘tkir diareyada og‘ir kechishni erta prognozlashda samarali ekanligini ko‘rsatdi. Random Forest algoritmi nolinear va ko‘p omilli bog‘liqliklarni aniqlashda yuqori samaradorlik namoyon etdi.

Biomarkerlar va klinik parametrlarni integratsiyalash model aniqligini oshirdi, bu esa individual davolash strategiyalarini tanlashda muhim ahamiyatga ega. Ayniqsa og‘ir suvsizlanish, sepsis va buyrak asoratlari rivojlanishi xavfi yuqori bo‘lgan bemorlarda ushbu yondashuv klinik qaror qabul qilishni sezilarli yaxshilashi mumkin. Sun’iy intellektdan foydalanish nafaqat risk stratifikatsiyasini yaxshilaydi, balki intensiv terapiya ehtiyojini oldindan baholash va resurslarni optimal taqsimlashga ham yordam beradi.

Xulosa

O‘tkir diareyada sun’iy intellekt asosidagi klinik qaror qabul qilish modeli og‘ir kechish va asoratlarni prognozlashda yuqori samaradorlikka ega. Random Forest modeli yuqori aniqlik va ishonchlilik ko‘rsatdi. Biomarkerlar va klinik parametrlar kombinatsiyasi eng muhim prognostik qiymatga ega bo‘lib, individual davolashni optimallashtirishga yordam beradi. Ushbu model o‘tkir diareyada klinik qaror qabul qilishni takomillashtirish uchun istiqbolli vosita sifatida qaralishi mumkin.

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O‘TKIR DIAREYADA MIKROBIOLOGIK VA KLINIK MA’LUMOTLAR INTEGRATSIYASI ASOSIDA RISK STRATIFIKATSIYASI

Annotatsiya: *O‘tkir diareya infeksion kasalliklar orasida keng tarqalgan bo‘lib, ayrim bemorlarda og‘ir kechish va jiddiy asoratlar bilan namoyon bo‘lishi mumkin. Kasallik og‘irligini erta baholash va asoratlar xavfini prognozlash samarali davolash taktikasini tanlashda muhimdir. Ushbu tadqiqotning maqsadi o‘tkir diareyada mikrobiologik va klinik ma’lumotlar integratsiyasi asosida risk stratifikatsiyasi modelining samaradorligini baholashdan iborat. Tadqiqot natijalari mikrobiologik (PCR, bakteriologik ekish, fekal markerlar) va klinik-laborator parametrlar kombinatsiyasi og‘ir kechish xavfini yuqori aniqlik bilan prognozlashini ko‘rsatdi. Integratsiyalashgan risk stratifikatsiyasi modeli individual davolash strategiyalarini tanlash va asoratlarni kamaytirishda samarali yondashuv bo‘lishi mumkin.*

Kalit so‘zlar: *o‘tkir diareya, risk stratifikatsiyasi, mikrobiologik diagnostika, PCR, biomarkerlar, prognoz, klinik ma’lumotlar.*

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RISK STRATIFICATION IN ACUTE DIARRHEA BASED ON THE INTEGRATION OF MICROBIOLOGICAL AND CLINICAL DATA

Abstract: *Acute diarrhea is a common infectious condition that, in some patients, may present with severe disease progression and serious complications. Early assessment of disease severity and prediction of complication risk are essential for selecting effective treatment strategies. The aim of this study was to evaluate the effectiveness of a risk stratification model in acute diarrhea based on the integration of microbiological and clinical data. The study results demonstrated that the combination of microbiological data (PCR, bacteriological culture, fecal markers) and clinical-laboratory parameters can predict the risk of severe disease progression with high accuracy. An integrated risk stratification model may represent an effective approach for selecting individualized treatment strategies and reducing complications.*

Keywords: *Acute diarrhea, risk stratification, microbiological diagnostics, PCR, biomarkers, prognosis, clinical data.*

Kirish

O‘tkir diareya global sog‘liqni saqlash tizimida muhim muammo bo‘lib qolmoqda. Virusli, bakterial va parazitar etiologiyali holatlarda kasallik kechishi bir-biridan sezilarli farq qilishi mumkin. Shu sababli faqat klinik belgilar asosida og‘irlik darajasini baholash har doim yetarli bo‘lmaydi.

Mikrobiologik ma’lumotlar, xususan PCR diagnostika, bakteriologik ekish va fekal yallig‘lanish markerlari etiologik omil va invaziv jarayon og‘irligini aniqlash imkonini beradi. Ularni klinik va laborator parametrlar bilan integratsiyalash og‘ir kechish va asoratlar xavfini aniqroq baholashga yordam beradi.

Mazkur tadqiqotning maqsadi o‘tkir diareyada mikrobiologik va klinik ma’lumotlar integratsiyasi asosida risk stratifikatsiyasini baholashdan iborat.

Materiallar va usullar

Tadqiqotga o‘tkir diareya tashxisi bilan davolangan 150 nafar bemor kiritildi. Bemorlar yengil/o‘rta og‘ir va og‘ir kechish guruhlariga ajratildi.

Barcha bemorlarda klinik baholash (dehidratatsiya darajasi, tana harorati, arterial bosim, yurak urish tezligi), laborator tekshiruvlar (CRP, prokaltsitonin, laktat, kreatinin) va mikrobiologik diagnostika (PCR, bakteriologik ekish, fekal kalprotektin) o‘tkazildi.

Integratsiyalashgan risk modeli og‘ir kechish, sepsis va buyrak asoratlari xavfini baholash uchun qo‘llandi.

Natijalar

Tadqiqot natijalari mikrobiologik va klinik ma’lumotlarni birlashtirish alohida parametrlarni qo‘llashdan ko‘ra yuqori prognostik aniqlik berishini ko‘rsatdi.

Invaziv bakterial infeksiya aniqlangan bemorlarda og‘ir kechish xavfi sezilarli yuqori bo‘ldi. Yuqori prokaltsitonin, laktat va fekal kalprotektin ko‘rsatkichlari asoratlar rivojlanishi bilan bog‘liq ekanligi aniqlandi.

Integratsiyalashgan risk modelida AUC 0.89 ni tashkil etdi, bu esa yuqori diskriminatsion qobiliyatni ko‘rsatdi.

Muhokama

Natijalar mikrobiologik va klinik ma’lumotlar integratsiyasi risk stratifikatsiyasini yaxshilashini ko‘rsatdi.

PCR va bakteriologik ma’lumotlar etiologik tashxisni aniqlashtirdi, biomarkerlar esa yallig‘lanish va og‘irlik darajasini aks ettirdi.

Ushbu kombinatsiya erta intensiv monitoringga muhtoj bemorlarni ajratish imkonini beradi.

Bu yondashuv individual davolashni optimallashtirish va asoratlarni kamaytirishga xizmat qilishi mumkin.

Xulosa

O‘tkir diareyada mikrobiologik va klinik ma’lumotlar integratsiyasi asosidagi risk stratifikatsiyasi og‘ir kechish va asoratlar xavfini prognozlashda samarali ekanligi aniqlandi. Mazkur yondashuv bemor holatini erta baholash, yuqori xavf guruhlarini aniqlash hamda og‘ir suvsizlanish, sepsis, elektrolit

buzilishlari va buyrak disfunksiyasi kabi asoratlar rivojlanish ehtimolini oldindan baholash imkonini beradi. Mikrobiologik diagnostika, klinik parametrlar va biomarkerlarning kompleks qo‘llanilishi prognostik aniqlikni oshirib, individual davolash strategiyalarini tanlashni optimallashtiradi. Ushbu integratsiyalashgan model klinik qaror qabul qilishni takomillashtirish, intensiv monitoringga muhtoj bemorlarni erta ajratish va davolash samaradorligini oshirishda muhim ahamiyatga ega.

Integratsiyalashgan model individual davolash strategiyalarini tanlashda muhim vosita bo‘lishi mumkin. Ushbu yondashuv bemorning klinik holati, mikrobiologik ko‘rsatkichlari va laborator biomarkerlarini kompleks baholash asosida davolash taktikasini individuallashtirish imkonini beradi. Natijada yuqori xavf guruhidagi bemorlarda erta intensiv terapiya, maqsadli etiotrop davolash va asoratlarning oldini olish choralarini o‘z vaqtida qo‘llash mumkin bo‘ladi. Shu bilan birga, mazkur model klinik qaror qabul qilish aniqligini oshirib, davolash samaradorligini yaxshilash va nojo‘ya natijalar xavfini kamaytirishga xizmat qilishi mumkin.

Mikrobiologik diagnostika va biomarkerlarni kompleks qo‘llash prognostik aniqlikni oshiradi, chunki bu yondashuv kasallikning etiologik omillarini, yallig‘lanish faolligini va og‘ir kechish xavfini bir vaqtning o‘zida baholash imkonini beradi. PCR, bakteriologik ekish va fekal markerlar infeksion jarayon xususiyatlarini aniqlashga yordam bersa, CRP, prokaltsitonin, interleykin-6 va laktat kabi biomarkerlar asoratlar rivojlanish ehtimolini prognozlashda muhim ahamiyatga ega. Ularning kompleks integratsiyasi individual markerlarga nisbatan yuqori diagnostik va prognostik qiymat berib, klinik qaror qabul qilish samaradorligini oshirishga xizmat qiladi.

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TUKLI CHIGITLARNI SARALASH UCHUN ELEKTR SARALAGICH QURILMANING RELE HIMOYASI VA AVTOMATIKASINI TADQIQ ETISH

Annotatsiya:*Mazkur ilmiy maqolada qishloq xo‘jaligi mahsulotlarini qayta ishlash jarayonida qo‘llaniladigan tukli chigitlarni saralash uchun elektr saralagich qurilmaning rele himoyasi va avtomatikasi tizimlarini tadqiq etish masalalari yoritilgan. Zamonaviy paxta-tozalash sanoatida chigit sifatini yaxshilash, saralash jarayonining aniqligi va samaradorligini oshirish muhim ahamiyatga ega bo‘lib, bu jarayonda elektr saralagich qurilmalar keng qo‘llaniladi. Ushbu qurilmalarning uzluksiz va xavfsiz ishlashini ta’minlash uchun rele himoyasi va avtomatika tizimlari asosiy rol o‘ynaydi. Tadqiqotda elektr saralagich qurilmaning texnologik ishlash prinsipi, uning elektr ta’minoti tizimi, rele himoya vositalari va avtomatik boshqaruv algoritmlari o‘rganildi. Shuningdek, ortiqcha yuklama, qisqa tutashuv va kuchlanish o‘zgarishlariga qarshi himoya mexanizmlari tahlil qilindi. Tadqiqot natijalari rele himoyasi va avtomatika tizimlarini optimallashtirish orqali qurilmaning ishlash samaradorligini oshirish, energiya sarfini kamaytirish va nosozliklarning oldini olish mumkinligini ko‘rsatdi.*

Kalit so‘zlar: *elektr saralagich, tukli chigit, rele himoyasi, avtomatika, qishloq xo‘jaligi texnologiyasi, energiya samaradorligi, avtomatik boshqaruv, himoya tizimi.*

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RESEARCH ON RELAY PROTECTION AND AUTOMATION OF AN ELECTRIC SORTING DEVICE FOR SORTING HAIRY SEEDS

Abstract: *This scientific article covers the issues of research on relay protection and automation systems of an electric sorting device for sorting hairy seeds used in the processing of agricultural products. In the modern cotton ginning industry, improving the quality of seeds, increasing the accuracy and efficiency of the sorting process is of great importance, and electric sorting devices are widely used in this process. Relay protection and automation systems play a key role in ensuring the uninterrupted and safe operation of these devices. The research studied the principle of technological operation of the electric sorting device, its power supply system, relay protection devices and automatic*

control algorithms. Also, protection mechanisms against overload, short circuit and voltage fluctuations were analyzed. The results of the study showed that by optimizing relay protection and automation systems, it is possible to increase the efficiency of the device, reduce energy consumption, and prevent malfunctions.

Keywords: *electric sorter, feathery seed, relay protection, automation, agricultural technology, energy efficiency, automatic control, protection system.*

Kirish

Qishloq xo‘jaligi mahsulotlarini qayta ishlash jarayonida zamonaviy texnologiyalarni joriy etish mahsulot sifatini oshirish, ishlab chiqarish samaradorligini ta’minlash va resurslardan oqilona foydalanish imkonini beradi. Paxta yetishtirish va uni qayta ishlash jarayonida tukli chigitlarni saralash muhim bosqich hisoblanadi, chunki chigit sifati keyingi texnologik jarayonlarga bevosita ta’sir ko‘rsatadi. Elektr saralagich qurilmalar ushbu jarayonni avtomatlashtirish, aniqlikni oshirish va inson omilini kamaytirish imkonini beradi. Biroq ushbu qurilmalarning samarali ishlashi ularning elektr tizimlarining barqarorligi va himoyalanganligiga bog‘liq. Rele himoyasi va avtomatika tizimlari elektr qurilmalarni ortiqcha yuklama, qisqa tutashuv va boshqa favqulodda holatlardan himoya qilish, shuningdek, ularning avtomatik boshqaruvini ta’minlashda muhim rol o‘ynaydi. Mazkur tadqiqotning dolzarbligi elektr saralagich qurilmalarning ishlash ishonchliligini oshirish, energiya sarfini optimallashtirish va texnik nosozliklarni kamaytirish zarurati bilan belgilanadi. Tadqiqotning asosiy maqsadi tukli chigitlarni saralash uchun mo‘ljallangan elektr qurilmalarda rele himoyasi va avtomatika tizimlarini ilmiy asosda tahlil qilish hamda ularni takomillashtirish bo‘yicha takliflar ishlab chiqishdan iborat.

Metodologiya

Tadqiqot jarayonida tizimli tahlil, elektr texnika modellashtirish, tajribaviy kuzatuv va statistik tahlil metodlaridan foydalanildi. Elektr saralagich qurilmaning ishlash prinsipi va uning elektr sxemasi o‘rganilib, asosiy energiya oqimlari va yuklama taqsimoti tahlil qilindi. Rele himoya tizimlarini tadqiq etishda qisqa tutashuv, ortiqcha yuklama va kuchlanish tebranishlari sharoitida qurilmaning ishlash holati modellashtirildi. Shuningdek, avtomatik boshqaruv tizimining algoritmlari ishlab chiqilib, ularning samaradorligi baholandi. Tadqiqot metodologiyasi doirasida sensorlar yordamida olingan ma’lumotlar asosida qurilmaning ishlash parametrlari monitoring qilindi hamda ularning asosida tahliliy xulosalar chiqarildi.

Natijalar

Tadqiqot natijalari elektr saralagich qurilmalarida rele himoyasi va avtomatika tizimlarining samarali ishlashi qurilmaning umumiy ishonchliligini sezilarli darajada oshirishini ko‘rsatdi. Aniqlanishicha, ortiqcha yuklama va qisqa tutashuv holatlarida tezkor ishlovchi rele tizimlari qurilmaning zarar ko‘rishini oldini oladi hamda ishlab chiqarish jarayonining uzluksizligini ta’minlaydi. Shuningdek, avtomatik boshqaruv tizimlari yordamida saralash jarayonining optimal rejimi ta’minlanib, energiya sarfi kamaytiriladi. Tadqiqot davomida ishlab

chiqilgan boshqaruv algoritmlari qurilmaning ish samaradorligini oshirishga xizmat qilishi aniqlandi.

Muhokama

Elektr saralagich qurilmalarida rele himoyasi va avtomatika tizimlarini takomillashtirish zamonaviy sanoat talablariga javob beruvchi muhim yo‘nalish hisoblanadi. Tadqiqot natijalari shuni ko‘rsatadiki, ilg‘or sensorlar va raqamli boshqaruv tizimlaridan foydalanish qurilmaning ishlash parametrlarini real vaqt rejimida nazorat qilish imkonini beradi. Shu bilan birga, sun’iy intellekt asosidagi prognozlash tizimlarini joriy etish qurilmaning texnik xizmat ko‘rsatish jarayonini optimallashtirishga yordam beradi. Muhokama jarayonida aniqlanishicha, rele himoyasi va avtomatika tizimlarini integratsiya qilish orqali ishlab chiqarish samaradorligini sezilarli darajada oshirish mumkin.

Xulosa

Tadqiqot natijalari tukli chigitlarni saralash uchun elektr saralagich qurilmalarda rele himoyasi va avtomatika tizimlarini qo‘llash qurilmaning ishonchliligi, samaradorligi va xavfsizligini oshirishda muhim ahamiyatga ega ekanligini ko‘rsatdi. Rele himoya tizimlari favqulodda holatlarning oldini olishga xizmat qilsa, avtomatik boshqaruv tizimlari ishlab chiqarish jarayonini optimallashtiradi. Shu sababli zamonaviy qishloq xo‘jaligi texnologiyalarida ushbu tizimlarni rivojlantirish va keng joriy etish muhim ilmiy va amaliy vazifa hisoblanadi.

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MODULLI TA’LIM TEXNOLOGIYASINING RUS TILI O‘QITISH SIFATIGA TA’SIRI

Annotatsiya: *Ushbu maqola modulli ta’lim texnologiyasining rus tilini o‘qitish sifatiga ta’sirini tahlil qiladi. Tadqiqotda modulli yondashuvning o‘quv jarayonini individuallashtirish, talaba faolligini oshirish va til kompetensiyalarini rivojlantirishdagi o‘rni o‘rganiladi. Shuningdek, ushbu texnologiyaning ta’lim samaradorligiga ta’siri nazariy va amaliy jihatdan asoslanadi.*

Kalit so‘zlar: *modul, ta’lim sifati, rus tili, kompetensiya, o‘quv jarayoni, pedagogik texnologiya*

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THE IMPACT OF MODULAR EDUCATION TECHNOLOGY ON THE QUALITY OF TEACHING THE RUSSIAN LANGUAGE

Annotation: *This article analyzes the impact of modular education technology on the quality of teaching the Russian language. The study examines the role of the modular approach in individualizing the learning process, increasing student engagement, and developing language competencies. It also provides a theoretical and practical justification of the effectiveness of this technology in improving educational outcomes.*

Keywords: *module, quality of education, Russian language, competence, learning process, pedagogical technology.*

Zamonaviy ta’lim tizimida o‘quv jarayonining sifati va samaradorligini oshirish masalasi dolzarb ilmiy-pedagogik muammolardan biri hisoblanadi. Global ta’lim integratsiyasi, kompetensiyaviy yondashuvning kuchayishi hamda raqamli axborot muhitining kengayishi sharoitida an’anaviy o‘qitish usullari o‘z-o‘zidan yetarli samara bermay qolmoqda. Shu bois ta’lim jarayoniga innovatsion pedagogik texnologiyalarni, xususan modulli ta’lim tizimini joriy etish zarurati tobora ortib bormoqda.

Rus tilini o‘qitish jarayoni ham ushbu umumiy tendensiyalardan mustasno emas. Bugungi kunda rus tilini o‘qitish nafaqat til grammatikasi va leksikasini o‘rgatish, balki o‘quvchilarda kommunikativ kompetensiya, mustaqil fikrlash, tahliliy yondashuv hamda madaniyatlararo muloqot ko‘nikmalarini shakllantirishga yo‘naltirilgan murakkab pedagogik jarayon sifatida qaraladi. Bu

esa o‘qitish metodikasini takomillashtirishni va o‘quv jarayonini ilmiy asosda qayta tashkil etishni talab etadi.

Mazkur sharoitda modulli ta’lim texnologiyasi o‘quv materialini mantiqan tugallangan, o‘zaro bog‘langan va mustaqil o‘zlashtiriladigan bloklar — modullar asosida tashkil etish orqali ta’lim samaradorligini oshirish imkonini beradi. Ushbu yondashuv o‘quv jarayonini individuallashtirish, talabalar faolligini kuchaytirish hamda bilimlarni bosqichma-bosqich, chuqur va ongli o‘zlashtirishni ta’minlaydi.

Shu nuqtai nazardan, mazkur maqolada modulli ta’lim texnologiyasining rus tilini o‘qitish sifatiga ta’siri, uning lingvodidaktik imkoniyatlari hamda talabalarning til kompetensiyasini rivojlantirishdagi o‘rni ilmiy jihatdan tahlil qilinadi.

1. Modulli ta’limning mohiyati: Modulli ta’lim o‘quv jarayonini samarali tashkil etishga yo‘naltirilgan zamonaviy pedagogik yondashuv bo‘lib, u o‘quv materialini mantiqan tugallangan, mustaqil o‘zlashtiriladigan bloklar — modullar tizimiga ajratish orqali amalga oshiriladi. Har bir modul ma’lum bir mavzu yoki o‘quv birligini qamrab olib, aniq didaktik maqsad, tizimli mazmun hamda oldindan belgilangan o‘quv natijalarini o‘z ichiga olgan yaxlit pedagogik tuzilma sifatida qaraladi. Bunday yondashuv o‘quvchilarning bilimlarni bosqichma-bosqich, chuqur va ongli ravishda o‘zlashtirishiga, shuningdek, ularning mustaqil ishlash ko‘nikmalarini rivojlantirishiga xizmat qiladi. Modulli ta’lim jarayonida har bir modul yakunida o‘quvchining egallagan bilim va ko‘nikmalari baholanadi, bu esa ta’lim sifatini tizimli nazorat qilish va samaradorlikni oshirish imkonini beradi.

2. Rus tilini o‘qitishda modulli yondashuv. Rus tilini o‘qitishda modulli yondashuv zamonaviy pedagogik texnologiyalarning samarali yo‘nalishlaridan biri bo‘lib, u o‘quv jarayonini aniq maqsadga yo‘naltirilgan, mantiqan tugallangan va o‘zaro bog‘langan o‘quv birliklari — modullar asosida tashkil etishga asoslanadi. Ushbu yondashuvda rus tilining fonetika, leksika, grammatika hamda nutq faoliyati turlari alohida modullar shaklida tizimlashtiriladi va har bir modul mustaqil o‘zlashtiriladigan, lekin umumiy ta’lim maqsadiga xizmat qiluvchi yaxlit didaktik birlik sifatida qaraladi.

Modulli ta’lim jarayonida har bir modul o‘zining aniq o‘quv maqsadi, mazmuni, metodik ta’minoti hamda kutiladigan natijalariga ega bo‘lib, bu o‘quv jarayonining tizimliligi va izchilligini ta’minlaydi. Talabalar har bir modulni o‘zlashtirish jarayonida bosqichma-bosqich bilim, ko‘nikma va malakalarni egallab boradilar, bu esa ularning til kompetensiyasini kompleks rivojlantirishga xizmat qiladi.

Mazkur yondashuvning muhim afzalliklaridan biri — o‘quv jarayonini individuallashtirish imkoniyatidir. Talabalar o‘z bilim darajasi va o‘zlashtirish tezligiga qarab modullarni mustaqil ravishda o‘rganishlari mumkin, bu esa differensial ta’lim tamoyilini amalga oshiradi. Shuningdek, har bir modul yakunida bajariladigan testlar, amaliy topshiriqlar va kommunikativ mashqlar orqali o‘zlashtirish darajasi aniqlanadi va bilimlar mustahkamlanadi.

Modulli yondashuv rus tilini o‘qitishda nazariya va amaliyot integratsiyasini kuchaytiradi. Talabalar o‘rgangan grammatik va leksik materiallarni real kommunikativ vaziyatlarda qo‘llash imkoniyatiga ega bo‘ladilar, bu esa ularning nutqiy faolligini oshiradi. Shu bilan birga, mustaqil ta’lim, tanqidiy fikrlash, tahlil qilish va muammoli vaziyatlarni hal etish ko‘nikmalari ham rivojlanadi.

Natijada, rus tilini o‘qitishda modulli yondashuv ta’lim sifatini oshiruvchi, o‘quv jarayonini samarali tashkil etuvchi hamda talabalarda yuqori darajadagi kommunikativ kompetensiyani shakllantiruvchi muhim didaktik tizim sifatida namoyon bo‘ladi.

Rus tilini o‘qitishda modulli tizim rus tilini o‘zlashtirish jarayonini ilmiy asosda tashkil etishga xizmat qilib, o‘quv materialini mantiqan tugallangan, o‘zaro bog‘langan modullar tizimiga ajratish orqali bilimlarni bosqichma-bosqich, chuqur va tizimli egallash imkonini yaratadi. Bunday yondashuv o‘quvchilarning nafaqat nazariy bilimlarini, balki amaliy nutqiy kompetensiyasini ham kompleks rivojlantirishga xizmat qiladi.

Grammatikani bosqichma-bosqich o‘rganish — rus tili grammatik tuzilishini oddiydan murakkabga qarab izchil o‘zlashtirishni ta’minlaydi. Har bir grammatik mavzu alohida modul sifatida berilib, unda qoida, misollar va amaliy mashqlar uyg‘unlashtiriladi. Bu esa o‘quvchilarga grammatik hodisalarni faqat yodlash emas, balki ularning mantiqiy mohiyatini anglash, nutq jarayonida to‘g‘ri qo‘llash hamda tipik xatolarni tahlil qilish imkonini beradi. Natijada tilning grammatik tizimi mustahkam va ongli ravishda shakllanadi.

Leksik boylikni kengaytirish — mavzuviy modullar asosida yangi so‘z va iboralarni tizimli o‘zlashtirishni nazarda tutadi. Har bir modul ma’lum kommunikativ soha (kundalik hayot, ta’lim, kasb-hunar, madaniyat va boshqalar) bilan bog‘liq leksik birliklarni qamrab oladi. Bu jarayonda o‘quvchilar so‘zlarning faqat tarjimasini emas, balki ularning kontekstual qo‘llanishi, sinonimik va antonimik munosabatlari hamda nutqiy vaziyatlardagi funksional ahamiyatini ham o‘zlashtiradilar. Natijada faol va passiv lug‘at boyligi kengayib, tilni tabiiy va erkin qo‘llash darajasi oshadi.

Nutqiy faoliyatni rivojlantirish — rus tilida tinglab tushunish, o‘qish, yozish va og‘zaki nutq ko‘nikmalarini integratsiyalashgan holda shakllantirishga qaratilgan. Modulli tizimda har bir nutq faoliyati turi alohida topshiriqlar va kommunikativ vazifalar orqali rivojlantiriladi. O‘quvchilar dialog va monolog tuzish, matn tahlili, fikr bildirish va muhokama qilish kabi real kommunikativ vaziyatlarda ishtirok etadilar. Bu esa ularning mantiqiy fikrlashini, tezkor javob berish qobiliyatini va erkin muloqot madaniyatini shakllantirib, rus tilida tabiiy va samarali kommunikatsiyani ta’minlaydi.

3. Ta’lim sifatiga ta’siri. Modulli yondashuv rus tili o‘qitish jarayonining sifatini sezilarli darajada oshiruvchi zamonaviy didaktik texnologiya sifatida ta’lim jarayonini tizimli tashkil etish va samaradorligini kuchaytirishga xizmat qiladi. U o‘quv materialini mantiqan tugallangan modullar asosida berish orqali bilimlarni izchil va bosqichma-bosqich o‘zlashtirish imkonini yaratadi hamda ta’lim jarayonining yaxlitligini ta’minlaydi.

O‘quv jarayonini tizimlashtiradi — barcha o‘quv materialini aniq tuzilgan modullar asosida tartibga soladi, mavzular o‘rtasidagi uzviy bog‘liqlikni ta’minlaydi hamda dars jarayonini rejalashtirish va boshqarishni yengillashtiradi. Bu esa ta’lim jarayonini tartibli, izchil va maqsadga yo‘naltirilgan tizimga aylantiradi.

Talabani mustaqil fikrlashga o‘rgatadi — o‘quvchini tayyor bilimlarni passiv qabul qiluvchidan faol izlanish olib boruvchi subyektga aylantiradi. Har bir modul doirasida berilgan topshiriqlar, muammoli vaziyatlar va mustaqil ishlar talabalarda tahlil qilish, solishtirish, xulosa chiqarish hamda kreativ yondashuv ko‘nikmalarini rivojlantiradi.

O‘zlashtirish darajasini oshiradi — modullar asosida takrorlash, mustahkamlash va amaliy qo‘llash imkoniyati yaratilgani sababli bilimlar chuqur va barqaror o‘zlashtiriladi. Har bir modul yakunidagi nazorat va amaliy topshiriqlar o‘quv natijalarini aniq baholashga yordam beradi hamda bo‘shliqlarni o‘z vaqtida to‘ldirish imkonini beradi.

Motivatsiyani kuchaytiradi — o‘quv jarayonining aniq maqsadlar va natijalarga yo‘naltirilgani, shuningdek, erishilgan kichik yutuqlarni bosqichma-bosqich his qilish imkoniyati talabalarda o‘qishga bo‘lgan ichki qiziqish va mas’uliyatni oshiradi. Bu esa ularning faol ishtirokini kuchaytirib, ta’lim jarayonini yanada samarali qiladi.

Xulosa qilib aytganda, modulli ta’lim texnologiyasi rus tilini o‘qitishda o‘quv jarayonini tizimli, izchil va samarali tashkil etishga xizmat qiladi. U talabalarning mustaqil fikrlashi, faolligi va mas’uliyatini oshirib, til kompetensiyalarini kompleks rivojlantirish imkonini yaratadi. Modullar asosida bilimlarni bosqichma-bosqich o‘zlashtirish, nazariya va amaliyotni uyg‘unlashtirish hamda o‘quv natijalarini muntazam nazorat qilish orqali ta’lim sifati sezilarli darajada oshadi. Natijada, modulli yondashuv zamonaviy, raqobatbardosh va yuqori malakali mutaxassislarni tayyorlashda muhim pedagogik vosita sifatida namoyon bo‘ladi.

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SHAXMATDA KOMBINATSIYALARNI ANIQLASH FAOLIYATINING LINGVOPSIXOLOGIK VA METODIK ASOSLARI

Annotatsiya. *Mazkur maqolada shaxmat ta’limi va sporti tizimida kombinatsiyalarni aniqlash faoliyatining lingvopsixologik va metodik asoslari keng yoritiladi. Unda ushbu jarayonning kognitiv mexanizmlari — vizual va semantik idrok, antisipatsiya, assotsiativ bog‘lanish hamda vizual-motor koordinatsiya tahlil qilinadi. Shuningdek, kombinatsiyalarni aniqlash ko‘nikmasining bosqichma-bosqich rivojlanishi va uning shaxmatchining analitik, mantiqiy hamda ijodiy tafakkurini shakllantirishdagi o‘rni asoslab beriladi. Maqolada kombinatsion fikrlash nazariya va amaliyotni bog‘lovchi muhim metodik vosita sifatida talqin etilib, uning shaxmatchi kasbiy kompetensiyasini rivojlantirishdagi ahamiyati ko‘rsatib beriladi.*

Kalit so‘zlar: *shaxmat ta’limi, kombinatsiya, kombinatsion fikrlash, lingvopsixologiya, kognitiv jarayon, vizual idrok, semantik idrok, antisipatsiya, analitik tafakkur, strategik fikrlash, metodika, shaxmatchi kompetensiyasi.*

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LINGUOPSYCHOLOGICAL AND METHODOLOGICAL FOUNDATIONS OF THE ACTIVITY OF IDENTIFYING COMBINATIONS IN CHESS

Annotation. *This article extensively examines the linguopsychological and methodological foundations of the activity of identifying combinations in the system of chess education and sport. It analyzes the cognitive mechanisms of this process, including visual and semantic perception, anticipation, associative connections, and visual-motor coordination. The step-by-step development of the skill of identifying combinations and its role in shaping a chess player’s analytical, logical, and creative thinking are also substantiated. The article interprets combinational thinking as an important methodological tool that connects theory and practice and highlights its significance in developing the professional competence of chess players.*

Key words: *chess education, combination, combinational thinking, linguopsychology, cognitive process, visual perception, semantic perception,*

anticipation, analytical thinking, strategic thinking, methodology, chess competence.

Shaxmat ta’limi va sporti tizimida kombinatsiyalarni aniqlash faoliyati zamonaviy yuqori malakali shaxmatchini tayyorlash jarayonining ajralmas hamda strategik jihatdan muhim tarkibiy qismi sifatida alohida ahamiyat kasb etadi. Chunki shaxmat faqatgina donalarni mexanik ravishda yuritish yoki partiya o‘ynashdan iborat bo‘lmay, balki murakkab kognitiv jarayonlarga tayanuvchi, chuqur tahliliy fikrlashni, pozitsion baholashni, ko‘p variantli hisob-kitoblarni amalga oshirishni hamda murakkab kombinatsion yechimlarni topishni talab etuvchi intellektual faoliyatdir. Aynan shu jihatlar shaxmatni oddiy o‘yin darajasidan yuqori darajadagi ilmiy va mantiqiy tizimga aylantiradi.

Shu nuqtai nazardan, kombinatsiyalarni aniqlash faoliyati shaxmatchi, murabbiy yoki talabaning kasbiy va intellektual rivojlanishida asosiy kognitiv manba va yetakchi metodik vosita vazifasini bajaradi. Ushbu jarayon orqali shaxmat nazariyasining muhim yo‘nalishlari — ochilishlar tizimi, o‘yin o‘rtasi strategiyasi, pozitsion ustunliklarni shakllantirish hamda yakuniy bosqich (endshpil) qonuniyatlari chuqur, tizimli va izchil ravishda o‘zlashtiriladi. Bundan tashqari, kombinatsiyalarni aniqlash faoliyati sportchida vaziyatni tezkor tahlil qilish, muqobil variantlarni solishtirish, optimal qarorlarni tanlash hamda noaniq sharoitlarda ham to‘g‘ri strategik yo‘lni belgilash ko‘nikmalarini shakllantiradi. Natijada ushbu faoliyat nafaqat shaxmatchining mantiqiy fikrlashini va analitik qobiliyatini rivojlantiradi, balki uning ijodiy yondashuvini, intuitiv qaror qabul qilish salohiyatini hamda yuqori darajadagi strategik tafakkurini kompleks ravishda takomillashtiradi.

Shaxmat ta’limida kombinatsiyalarni aniqlash faoliyati murakkab kognitiv va psixologik jarayon sifatida talqin etilib, u o‘quvchining nafaqat bilim darajasini, balki uning tafakkur tezligi, tahliliy fikrlash qobiliyati va qaror qabul qilish mexanizmlarini ham shakllantiradi. Ushbu jarayon yozma shaxmat notatsiyasi, diagrammalar, klassik va zamonaviy partiyalar yozuvlarini qabul qilish, ularni chuqur tahlil qilish hamda real o‘yin vaziyatlari bilan uzviy bog‘lashni o‘z ichiga oladi. Natijada o‘quvchi nazariy bilimlarni amaliy faoliyat bilan uyg‘unlashtirish orqali kombinatsion fikrlashni rivojlantiradi.

Kombinatsiyalarni aniqlash jarayoni o‘zaro chambarchas bog‘liq bo‘lgan ikki asosiy yo‘nalishda amalga oshadi. Birinchi yo‘nalish — vizual idrok etish bo‘lib, bunda shaxmat doskasidagi figuralarning joylashuvi, ularning o‘zaro ta’siri, yurishlar ketma-ketligi hamda pozitsion belgilar (zaif va kuchli maydonlar, ochiq chiziqlar, diagonal va boshqalar) tezkor ravishda tanib olinadi. Ikkinchi yo‘nalish esa semantik idrok etish bo‘lib, u aniqlangan pozitsiyaning ichki mazmunini chuqur tushunish, ehtimoliy variantlarni mantiqan hisoblash, ularni o‘zaro solishtirish hamda eng samarali va strategik jihatdan to‘g‘ri yurishni tanlash jarayonini o‘z ichiga oladi.

Shu tariqa, kombinatsiyalarni aniqlash faoliyati shaxmat ta’limida oddiy kuzatuv jarayonidan yuqori darajadagi analitik va ijodiy tafakkur faoliyatiga

aylanib, o‘quvchining intellektual salohiyatini kompleks ravishda rivojlantirishga xizmat qiladi.

Shu sababli kombinatsiyalarni aniqlash shaxmat sportida nafaqat nazariy bilimlarni egallash vositasi sifatida, balki ushbu bilimlarni real o‘yin jarayoniga tatbiq etishga xizmat qiluvchi asosiy metodik mexanizm sifatida ham alohida ahamiyat kasb etadi. U o‘quvchini passiv bilim qabul qiluvchidan faol tahlilchi va mustaqil qaror qabul qiluvchi subyektga aylantirib, nazariya va amaliyot o‘rtasidagi uzviy bog‘liqlikni ta’minlaydi. Aynan kombinatsiyalarni aniqlash jarayonida o‘rganilgan bilimlar sinovdan o‘tadi, mustahkamlanadi va yangi vaziyatlarga moslashuvchan tarzda qo‘llanadi.

Kombinatsiyalarni aniqlash shaxmatchining kasbiy kompetensiyasini rivojlantirishda muhim ahamiyatga ega. Sportchilar va murabbiylar shaxmat adabiyotlari, klassik va zamonaviy partiyalar, shuningdek kompyuter dasturlari orqali yangi kombinatsion g‘oyalarni o‘zlashtirib, o‘yin uslublari hamda ochilish, o‘rta o‘yin va yakuniy bosqich strategiyalarini chuqurlashtiradilar. Bu jarayon nazariy bilim bilan birga tezkor fikrlash, optimal qaror tanlash va moslashuvchanlikni ham rivojlantiradi. Natijada, kombinatsiyalarni aniqlash o‘yin mahoratini oshiruvchi muhim omilga aylanadi.

Zamonaviy metodika bu jarayonni faqat nazariy emas, balki amaliy vosita sifatida talqin etadi. Kombinatsion fikrlash murakkab vaziyatlarda to‘g‘ri yechim topish, o‘yinni boshqarish va natijani yaxshilashga yordam beradi. Partiyalarni tahlil qilish, taktik mashqlar yechish va variantlarni hisoblash esa mustaqil fikrlash, strategik yondashuv va tezkor, asosli qaror qabul qilish ko‘nikmalarini rivojlantiradi. Shu bois kombinatsiyalarni aniqlash o‘yin samaradorligini oshiruvchi muhim intellektual vositadir.

Kombinatsiyalarni aniqlash — analitik (tahlil) va sintetik (umumlashtirish) fikrlash uzviy bog‘liq holda ishlaydigan murakkab psixologik jarayondir. Uning samaradorligi bir qator muhim mexanizmlar bilan ta’minlanadi.

Antisipatsiya shaxmatchiga raqib yurishlarini oldindan taxmin qilish va o‘yin rivojini bashorat etish imkonini beradi. Assotsiativ bog‘lanish ilgari o‘rganilgan kombinatsiyalar va tajribani yangi vaziyatlarda qo‘llashga yordam beradi. Vizual-motor koordinatsiya esa doskadagi holatni turli variantlar bilan solishtirib, eng maqbul yurishni tez aniqlashni ta’minlaydi. Ushbu mexanizmlar uyg‘unligi kombinatsiyalarni aniqlashni tez va samarali qiladi hamda o‘yin saviyasini oshiradi.

Bu ko‘nikma bosqichma-bosqich rivojlanadi. Boshlang‘ich bosqichda shaxmatchi fork, pin, skewer kabi oddiy taktik elementlarni o‘rganadi va vizual xotira shakllanadi. O‘rta bosqichda u bir nechta yurishlardan iborat variantlarni hisoblash, taqqoslash va tanlashni o‘zlashtiradi, mantiqiy fikrlash rivojlanadi. Yuqori bosqichda esa murakkab strategiyalarni tuzish, uzoq kombinatsiyalarni oldindan ko‘ra bilish va optimal qarorlar qabul qilish qobiliyati shakllanadi.

Kombinatsiyalarni aniqlash amaliy jihatdan samarali yurishlarni topishga xizmat qiladi, ta’limiy jihatdan bilimlarni kengaytiradi, tarbiyaviy jihatdan sabr va

diqqatni rivojlantiradi, rivojlantiruvchi jihatdan esa tahlil, umumlashtirish va mustaqil qaror qabul qilish ko‘nikmalarini kuchaytiradi.

Shunday qilib, bu ko‘nikma shaxmatchining intellektual salohiyati va o‘yin mahoratini oshiruvchi muhim omildir.

Xulosamiz shuni ko‘rsatadiki, shaxmat ta’limi tizimida kombinatsiyalarni aniqlash faoliyati oddiy ko‘nikma emas, balki murakkab, ko‘p bosqichli va integrativ kognitiv jarayon sifatida namoyon bo‘ladi. U shaxmatchining nafaqat nazariy bilimlarini boyitadi, balki ularni real o‘yin jarayonida qo‘llash, murakkab vaziyatlarni tahlil qilish va optimal qarorlar qabul qilish qobiliyatini shakllantiradi. Aynan ushbu faoliyat orqali shaxmatchi pozitsiyani chuqur anglash, variantlarni hisoblash, strategik rejalashtirish hamda o‘yin jarayonini ongli ravishda boshqarish darajasiga yetadi.

Kombinatsiyalarni aniqlash jarayoni psixologik (antisipatsiya, assotsiativ bog‘lanish, vizual fikrlash) va metodik (tahlil, solishtirish, umumlashtirish) mexanizmlarning uyg‘unlashuvi asosida amalga oshadi. Bu esa shaxmatchining analitik, mantiqiy va ijodiy tafakkurini kompleks ravishda rivojlantiradi. Natijada sportchi faqat tayyor bilimlarni o‘zlashtiruvchi emas, balki mustaqil fikrlovchi, vaziyatni chuqur baholay oluvchi va tezkor qaror qabul qiluvchi mutaxassisga aylanadi.

Shu bilan birga, zamonaviy yondashuvlar kombinatsiyalarni aniqlashni individual emas, balki interaktiv va kommunikativ jarayon sifatida rivojlantirish zarurligini ko‘rsatadi. Partiyalarni birgalikda tahlil qilish, muhokama qilish va turli variantlarni solishtirish orqali o‘quvchilarda nafaqat shaxmat mahorati, balki tanqidiy fikrlash, muloqot madaniyati va jamoaviy ishlash ko‘nikmalari ham shakllanadi.

Xulosa qilib aytganda, kombinatsiyalarni aniqlash shaxmat ta’limining markaziy komponenti bo‘lib, u yuqori malakali, strategik fikrlovchi, raqobatbardosh va intellektual jihatdan yetuk shaxmatchilarni tayyorlashning eng muhim omillaridan biri hisoblanadi.

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SPORT TA’LIMIDA O‘QISH KOMPETENSIYASINING LINGVOPSIXOLOGIK VA METODIK ASOSLARI

Annotatsiya*: Mazkur maqolada sport ta’limi tizimida o‘qish kompetensiyasining lingvopsixologik va metodik asoslari tahlil qilinadi. O‘qish jarayonining kognitiv mexanizmlari — vizual va semantik idrok, antisipatsiya, assotsiativ bog‘lanish hamda vizual-motor koordinatsiya yoritilib, uning bosqichma-bosqich rivojlanishi asoslab beriladi. Shuningdek, o‘qish kompetensiyasining sport mutaxassisining kasbiy tafakkuri, analitik qobiliyati va amaliy faoliyatini rivojlantirishdagi o‘rni ko‘rsatib beriladi.*

Kalit so‘zlar: *sport ta’limi, o‘qish kompetensiyasi, lingvopsixologiya, kognitiv jarayon, vizual idrok, semantik idrok, antisipatsiya, analitik fikrlash, metodika, sport kompetensiyasi.*

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LINGUOPSYCHOLOGICAL AND METHODOLOGICAL FOUNDATIONS OF READING COMPETENCE IN SPORTS EDUCATION

Annotation*: This article analyzes the linguopsychological and methodological foundations of reading competence in the system of sports education. It examines the cognitive mechanisms of the reading process, including visual and semantic perception, anticipation, associative connections, and visual-motor coordination, and substantiates its step-by-step development. Furthermore, the role of reading competence in developing the professional thinking, analytical abilities, and practical performance of sports specialists is highlighted.*

Key words*: sports education, reading competence, linguopsychology, cognitive process, visual perception, semantic perception, anticipation, analytical thinking, methodology, sports competence.*

Sport ta’limi va jismoniy tarbiya tizimida o‘qish kompetensiyasi zamonaviy yuqori malakali mutaxassisni tayyorlash jarayonining ajralmas va strategik jihatdan muhim tarkibiy qismi hisoblanadi. Chunki sport sohasi faqatgina amaliy harakatlar, jismoniy mashqlar va texnik-taktik ko‘nikmalar majmuasidan iborat bo‘lib qolmay, balki chuqur ilmiy-nazariy bilimlar, tizimli metodik yondashuv hamda sport jarayonlarini tahlil qilishga asoslangan ilmiy tafakkurni ham talab

etadi. Shu nuqtai nazardan, o‘qish faoliyati sportchi, murabbiy yoki talabaning kasbiy rivojlanishida asosiy intellektual manba vazifasini bajaradi, chunki u orqali sport fiziologiyasi, biomekanika, sport psixologiyasi, mashg‘ulot jarayonlarini rejalashtirish va boshqarish metodikasi kabi fundamental hamda amaliy fanlarga oid bilimlar chuqur va izchil o‘zlashtiriladi.

Bundan tashqari, o‘qish jarayoni nafaqat bilimlarni egallashga, balki ularni tahlil qilish, solishtirish va amaliy vaziyatlarda qo‘llash qobiliyatini shakllantirishga ham xizmat qiladi. Natijada sportchi yoki murabbiyda professional tafakkur, tanqidiy yondashuv va ilmiy asoslangan qaror qabul qilish ko‘nikmalari rivojlanadi. Bu esa o‘z navbatida ularning dunyoqarashini kengaytirib, sport faoliyatini intuitiv emas, balki ilmiy asoslangan, rejalashtirilgan va samarali tizim sifatida tashkil etish imkonini beradi hamda sportda yuqori natijalarga erishish uchun mustahkam nazariy va metodik poydevor yaratadi.

Sport ta’limida o‘qish faoliyati murakkab kognitiv, psixologik va psixopedagogik jarayon sifatida qaralib, u sportchi yoki bo‘lajak mutaxassisning kasbiy kompetensiyasini shakllantirishda muhim o‘rin egallaydi. Mazkur jarayon faqat yozma ilmiy, metodik va o‘quv materiallarini oddiy qabul qilish bilan cheklanib qolmay, balki ularni chuqur tahlil qilish, mazmunini anglash, umumlashtirish hamda real sport amaliyoti bilan uzviy bog‘lashni ham o‘z ichiga oladi.

O‘qish jarayoni ikki asosiy, bir-biri bilan chambarchas bog‘liq yo‘nalishda amalga oshadi. Birinchisi — vizual idrok etish bo‘lib, bunda sportga oid matnlardagi terminlar, belgilar, grafik ma’lumotlar va tushunchalar tanib olinadi hamda ularning shakliy jihati o‘zlashtiriladi. Ikkinchisi esa semantik idrok bo‘lib, u o‘qilgan ma’lumotlarning chuqur mazmunini anglash, ularni sport jarayonlari bilan bog‘lash va amaliy faoliyatda qo‘llashni nazarda tutadi.

Shu boisdan, o‘qish sport ta’limida nafaqat nazariy bilimlarni egallash vositasi sifatida, balki olingan bilimlarni amaliy sport faoliyatiga tatbiq etishni ta’minlaydigan muhim didaktik va metodik mexanizm sifatida ham alohida ahamiyat kasb etadi. Bu esa sportchining fikrlash qobiliyatini rivojlantirib, uning kasbiy tayyorgarligini yanada yuqori bosqichga olib chiqadi.

O‘qish sport mutaxassislarining kasbiy kompetensiyasini shakllantirish va uni izchil rivojlantirishda hal qiluvchi ahamiyatga ega bo‘lgan asosiy intellektual faoliyat turlaridan biri hisoblanadi. Murabbiylar, sportchilar hamda sport ta’limi yo‘nalishidagi mutaxassislar ilmiy, metodik va amaliy manbalarni tizimli o‘qish orqali zamonaviy mashg‘ulot metodikalarini o‘zlashtiradilar, sport tibbiyoti, fiziologiya va psixologiya sohasidagi bilimlarini kengaytiradilar hamda xalqaro sport tajribalarini chuqur tahlil qilish imkoniyatiga ega bo‘ladilar. Bu jarayon nafaqat ularning nazariy bilimlarini boyitadi, balki kasbiy faoliyatda zarur bo‘lgan tahliliy fikrlash, mantiqiy yondashuv va ilmiy asoslangan qaror qabul qilish qobiliyatlarini ham rivojlantiradi. Natijada o‘qish sport sohasida samarali kommunikativ vosita sifatida namoyon bo‘lib, professional muloqot madaniyatini takomillashtirishga xizmat qiladi.

Zamonaviy sport metodikasi o‘qishni faqat nazariy bilimlarni egallash vositasi sifatida emas, balki sport jarayonlarini chuqur tahlil qilish, baholash va optimallashtirishning muhim instrumenti sifatida ko‘radi. Sportga oid ilmiy va metodik matnlar orqali mashg‘ulot jarayonlarini rejalashtirish, jismoniy yuklamalarni to‘g‘ri taqsimlash, texnik va taktik harakatlarni tahlil qilish hamda sport natijalarini ilmiy asosda baholash imkoniyati yaratiladi. Bundan tashqari, matnlar asosida tashkil etiladigan muhokamalar, tahliliy vazifalar va amaliy topshiriqlar sportchilarda mustaqil fikrlash, strategik yondashuv, muammoli vaziyatlarni hal etish hamda tahliliy qaror qabul qilish ko‘nikmalarini shakllantiradi va rivojlantiradi. Shu tariqa, o‘qish sport faoliyatini ilmiy asoslangan, tizimli va samarali boshqarishga xizmat qiluvchi muhim metodik vositaga aylanadi.

O‘qish jarayoni sport ta’limi kontekstida murakkab psixolingvistik faoliyat sifatida talqin qilinib, unda analitik va sintetik fikrlash jarayonlari uzviy va o‘zaro bog‘liq holda faoliyat yuritadi. Bu jarayon faqat matnni yuzaki idrok etish bilan cheklanmay, balki uning chuqur mazmunini anglash, tahlil qilish va amaliy sport faoliyati bilan integratsiya qilishni ham talab etadi. Sport ta’limida o‘qish samaradorligi bir qator muhim psixologik va lingvistik mexanizmlar orqali ta’minlanadi. Jumladan, antisipatsiya mexanizmi sportga oid matn mazmunining keyingi rivojini oldindan taxmin qilish, kontekst asosida mantiqiy xulosalar chiqarish imkonini beradi. Assotsiativ bog‘lanish esa sport terminlari, nazariy tushunchalar va amaliy tajriba o‘rtasida mustahkam kognitiv aloqalarni shakllantirib, bilimlarning tizimli o‘zlashtirilishiga xizmat qiladi. Vizual-motor koordinatsiya esa matnda berilgan axborotni sport harakatlari, mashg‘ulot jarayonlari va amaliy ko‘nikmalar bilan bog‘lash orqali nazariya va amaliyot uyg‘unligini ta’minlaydi. Ushbu mexanizmlarning kompleks ishlashi o‘qish jarayonini nafaqat samarali, balki chuqur mazmunli va amaliy jihatdan ahamiyatli qiladi.

Sport ta’limida o‘qish ko‘nikmasi bosqichma-bosqich rivojlanadigan murakkab jarayondir. Dastlab sport terminologiyasi va oddiy metodik ma’lumotlarni tanish darajasida tushunish shakllanadi. Keyingi bosqichda terminlar va tushunchalar o‘rtasidagi bog‘lanishlar anglanib, ularni amaliy vaziyatlarda tahlil qilish ko‘nikmasi rivojlanadi. Yuqori bosqichda esa murakkab sport strategiyalari va ilmiy-metodik yondashuvlar to‘liq o‘zlashtirilib, amaliyotda samarali qo‘llanadi. Shu tariqa, o‘qish ko‘nikmasi oddiy idrokdan yuqori darajadagi tahlil va qo‘llash bosqichigacha rivojlanadi.

Sport sohasida o‘qish oddiy terminlarni tanishdan boshlab, analitik va amaliy bosqichgacha rivojlanadi. Dastlab til va terminologik baza shakllanadi, keyin nazariy bilimlar amaliy mashg‘ulotlar bilan bog‘lanadi. Keyingi bosqichda ilmiy va metodik matnlar tahlil qilinib, mashg‘ulotlarni rejalashtirish va baholash ko‘nikmalari shakllanadi. Bu jarayon ichki o‘qish orqali tezkor va chuqur tushunishni rivojlantirib, o‘qishni yuqori darajadagi kognitiv faoliyatga aylantiradi.

Shuningdek, o‘qish sport ta’limida bir nechta funksiyalarni bajaradi: amaliy jihatdan bilimlarni mashg‘ulotlarda qo‘llashga xizmat qiladi, ta’limiy jihatdan bilimlarni kengaytiradi, tarbiyaviy jihatdan intizom va mas’uliyatni shakllantiradi, rivojlantiruvchi jihatdan esa tahlil, xulosa chiqarish va mustaqil qaror qabul qilish ko‘nikmalarini rivojlantiradi.

Xulosa qilib aytganda, sport ta’limida o‘qish kompetensiyasi lingvopsixologik va metodik jihatdan murakkab, ko‘p bosqichli hamda integrativ xarakterga ega bo‘lgan kognitiv jarayon sifatida namoyon bo‘ladi. U nafaqat yozma axborotni qabul qilish va tushunish faoliyati, balki sport mutaxassisining kasbiy shakllanishida nazariya va amaliyotni bog‘lovchi asosiy intellektual mexanizm hisoblanadi.

Tahlillar shuni ko‘rsatadiki, o‘qish jarayoni sport ta’limida bilimlarni egallash, ularni tahlil qilish va amaliy faoliyatga tatbiq etishning muhim vositasi bo‘lib xizmat qiladi. Antisipatsiya, assotsiativ bog‘lanish va vizual-motor koordinatsiya kabi psixolingvistik mexanizmlar o‘qish samaradorligini ta’minlab, matnni chuqur tushunish va uni sport amaliyoti bilan integratsiya qilish imkonini beradi. Shu bilan birga, o‘qish ko‘nikmasi bosqichma-bosqich rivojlanib, oddiy terminlarni idrok etishdan tortib murakkab ilmiy-metodik xulosalarni tahlil qilish va qo‘llash darajasigacha yetib boradi.

Shuningdek, o‘qish sport mutaxassisining kasbiy kompetensiyasini shakllantirishda muhim omil bo‘lib, uning tahliliy fikrlash, mustaqil qaror qabul qilish, strategik yondashuv va ilmiy asoslangan faoliyat yuritish qobiliyatlarini rivojlantiradi. Bu jarayon sport sohasida zamonaviy, raqobatbardosh va yuqori malakali kadrlarni tayyorlashga xizmat qiladi.

Umuman olganda, o‘qish kompetensiyasi sport ta’limining ajralmas qismi bo‘lib, u sport faoliyatini ilmiy asosda tashkil etish, boshqarish va takomillashtirishning asosiy sharti sifatida namoyon bo‘ladi hamda shaxsning kasbiy va intellektual rivojlanishini ta’minlaydi.

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RUS TILI TA'LIMIDA TEMATIK YONDASHUV ASOSIDA TALABALARNING MUSTAQIL TA'LIM FAOLIYATINI SHAKLLANTIRISH

Annotatsiya: *Mazkur maqolada rus tilini o'qitishda tematik yondashuv asosida talabalarning mustaqil ta'lim faoliyatini rivojlantirish masalalari yoritilgan. Unda tematik ta'limning nazariy asoslari, uning didaktik imkoniyatlari hamda talabalar mustaqil ishlash ko'nikmalarini shakllantirishdagi o'rni tahlil qilinadi. Shuningdek, tematik yondashuv asosida tashkil etilgan darslarning samaradorligi, o'z-o'zini boshqarish va refleksiya jarayonlarining rivojiga ta'siri ko'rsatib beriladi.*

Kalit so'zlar: *mustaqil ta'lim, tematik yondashuv, rus tili, o'quv faoliyati, refleksiya, kompetensiya*

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FORMATION OF STUDENTS' AUTONOMOUS LEARNING ACTIVITY BASED ON A THEMATIC APPROACH IN TEACHING THE RUSSIAN LANGUAGE

Annotation: *This article examines the development of students' independent learning activity based on a thematic approach in teaching the Russian language. It analyzes the theoretical foundations of thematic learning, its didactic possibilities, and its role in forming students' independent learning skills. In addition, the study highlights the effectiveness of the thematic approach in the educational process and its impact on the development of self-management and reflective thinking.*

Keywords: *independent learning, thematic approach, Russian language, learning activity, reflection, competence.*

Bugungi globallashuv jarayonida oliy ta'lim tizimi oldida turgan asosiy vazifalardan biri – raqobatbardosh, mustaqil fikrlay oladigan va o'z bilimini doimiy ravishda rivojlantira oladigan mutaxassislarni tayyorlashdan iborat. Shu nuqtai nazardan, talabalarni faqat tayyor bilimlar bilan qurollantirish emas, balki ularni mustaqil ta'lim faoliyatiga yo'naltirish dolzarb masala hisoblanadi.

Rus tilini o'qitish jarayonida ham talabalarning mustaqil ishlash ko'nikmalarini rivojlantirish muhim ahamiyat kasb etadi. Bunda tematik yondashuv samarali pedagogik texnologiyalardan biri sifatida namoyon bo'ladi.

Tematik ta’lim — bu o‘quv jarayonini ma’lum mavzular yoki mazmuniy yo‘nalishlar asosida tashkil etishga yo‘naltirilgan zamonaviy pedagogik texnologiya bo‘lib, unda o‘quv materiali mantiqan izchil va yaxlit birliklar ko‘rinishida tuziladi. Bunday yondashuv talabalarning bilimlarni tizimli ravishda o‘zlashtirishiga, nazariy va amaliy faoliyatni uyg‘unlashtirishiga hamda mustaqil ta’lim faoliyatini samarali rivojlantirishiga xizmat qiladi. Har bir tematik birlik o‘z ichiga aniq maqsadlar, o‘quv mazmuni, bajariladigan topshiriqlar tizimi, nazorat shakllari hamda baholash mezonlarini qamrab oladi. Bu esa ta’lim jarayonining aniq rejalashtirilishi va natijadorligini ta’minlaydi.

Tematik yondashuvning asosiy tamoyillari o‘quv jarayonining yaxlit va uzviy tashkil etilishiga asoslanadi. Avvalo, o‘quv jarayonining tizimliligi ta’lim mazmunining mantiqan bog‘langan va izchil ketma-ketlikda berilishini ta’minlaydi. Bosqichma-bosqich o‘rganish tamoyili esa talabalarga murakkab bilim va ko‘nikmalarni soddadan murakkabga qarab o‘zlashtirish imkonini yaratadi. Shu bilan birga, mustaqillik va faollik tamoyili talabalarning o‘quv jarayonida faol ishtirokini kuchaytirib, ularni mustaqil fikrlash va qaror qabul qilishga yo‘naltiradi. O‘z-o‘zini nazorat qilish tamoyili esa talabalarda o‘z bilim darajasini baholash, xatolarini aniqlash va ularni tuzatish ko‘nikmalarini shakllantiradi. Nihoyat, natijaga yo‘naltirilganlik tamoyili ta’lim jarayonini aniq kompetensiyalar va yakuniy o‘quv natijalariga erishishga qaratadi.

Mustaqil ta’lim — bu talabaning o‘quv jarayonida o‘qituvchi rahbarligida yoki to‘liq mustaqil ravishda bilimlarni egallashi, ularni mustahkamlashi hamda kengaytirib borishi bilan bog‘liq uzluksiz faoliyatdir. Ushbu jarayon talabaning shaxsiy o‘quv faolligini rivojlantirishga xizmat qilib, uning bilim olishga bo‘lgan mas’uliyati va ichki motivatsiyasini kuchaytiradi. Mustaqil ta’lim jarayonida talaba nafaqat tayyor bilimlarni qabul qiladi, balki ularni tahlil qiladi, qayta ishlaydi va amaliyotda qo‘llashga harakat qiladi.

Mazkur faoliyat bir qator muhim ko‘nikmalarni shakllantirish va rivojlantirishni o‘z ichiga oladi. Jumladan, axborotni izlash va saralash ko‘nikmasi talabaning turli manbalardan kerakli ma’lumotlarni topish va ularni tanqidiy yondashuv asosida ajratib olish qobiliyatini rivojlantiradi. Tahlil qilish va umumlashtirish esa olingan bilimlarni tizimlashtirish, ular orasidagi bog‘liqlikni aniqlash hamda xulosa chiqarish imkonini beradi. O‘z faoliyatini rejalashtirish ko‘nikmasi talabaning o‘qish jarayonini maqsadli tashkil etishi, vaqtni samarali taqsimlashi va bosqichma-bosqich ishlashini ta’minlaydi. Shuningdek, o‘z-o‘zini baholash va nazorat qilish ko‘nikmasi talabaning o‘z bilim darajasini tahlil qilishi, kamchiliklarini aniqlashi va ularni bartaraf etish bo‘yicha mustaqil qaror qabul qilishiga yordam beradi.

Rus tilini o‘rganishda mustaqil ta’lim faoliyati ayniqsa muhim bo‘lib, u til kompetensiyalarini rivojlantirishga xizmat qiladi.

Rus tili darslarida tematik yondashuv asosida mustaqil ta’limni tashkil etish quyidagi bosqichlarni o‘z ichiga oladi:

1. Motivatsion bosqich – talabalarni o‘quv faoliyatiga jalb etish, maqsadni tushuntirish.

2. Axborot bosqichi – yangi materialni o‘zlashtirish uchun zarur manbalarni taqdim etish.

3. Amaliy bosqich – mustaqil mashqlar, testlar, matnlar bilan ishlash.

4. Nazorat va baholash bosqichi – o‘z-o‘zini tekshirish va o‘qituvchi tomonidan baholash.

Masalan, rus tilida “Kasbiy muloqot” mavzusi bo‘yicha modul quyidagicha tuzilishi mumkin:

- yangi so‘zlar va iboralar;
- dialog va matnlar;
- mustaqil tarjima topshiriqlari;
- yozma va og‘zaki mashqlar;
- test va refleksiya.

Tematik ta’lim zamonaviy pedagogik yondashuv sifatida bir qator muhim afzalliklarga ega bo‘lib, u ta’lim jarayonining samaradorligini sezilarli darajada oshiradi. Avvalo, ushbu yondashuv talabalarning mustaqilligini rivojlantirishga xizmat qiladi, chunki ular o‘quv materialini faqat o‘qituvchi ko‘magida emas, balki o‘z tashabbusi va faolligi asosida ham o‘zlashtiradi. Bu esa ularning shaxsiy o‘quv mas’uliyatini kuchaytiradi va bilim olish jarayoniga ongli yondashuvni shakllantiradi.

Shuningdek, tematik ta’lim har bir talabaning individual o‘qish sur’atini hisobga olish imkonini beradi, ya’ni o‘quvchi materialni o‘z imkoniyatlari va tezligiga mos ravishda o‘zlashtiradi. Bu esa ta’lim jarayonida ortiqcha bosimni kamaytirib, samaradorlikni oshiradi. Bundan tashqari, mazkur yondashuv bilimlarni tizimli va izchil o‘zlashtirishga yordam beradi, chunki o‘quv materiallari mantiqan bog‘langan mavzular asosida beriladi.

Tematik ta’lim jarayonida o‘z-o‘zini nazorat qilish ko‘nikmalarining rivojlanishi ham muhim o‘rin tutadi, bu esa talabalarga o‘z bilim darajasini mustaqil baholash va xatolarini aniqlash imkonini beradi. Natijada, o‘quvchilarda refleksiya jarayoni shakllanadi. Shuningdek, ushbu yondashuv talabalarning o‘qishga bo‘lgan ichki motivatsiyasini kuchaytiradi, chunki ular o‘z o‘quv faoliyatida faol ishtirok etib, real natijalarga erishayotganini his etadi.

Tadqiqot natijalari shuni ko‘rsatadiki, tematik yondashuv asosida tashkil etilgan darslar talabalar faolligini oshiradi va ularning mustaqil ishlashga bo‘lgan qiziqishini kuchaytiradi. Talabalar o‘z faoliyatini rejalashtirish, vaqtni samarali taqsimlash hamda bilimlarini mustaqil baholash ko‘nikmalariga ega bo‘ladi.

Shuningdek, tematik ta’lim rus tilini o‘rganishda kommunikativ kompetensiyani rivojlantirishga ham ijobiy ta’sir ko‘rsatadi.

Xulosa qilib aytganda, rus tilini o‘qitishda tematik yondashuv talabalarning mustaqil ta’lim faoliyatini rivojlantirishda samarali vosita hisoblanadi. Ushbu yondashuv o‘quv jarayonini samarali tashkil etish, talabalarni faol o‘rganishga jalb etish hamda ularning bilimlarini mustahkamlashga xizmat qiladi.

Kelgusida tematik ta’limni yanada takomillashtirish, innovatsion texnologiyalar bilan integratsiyalash hamda amaliy metodik tavsiyalar ishlab chiqish muhim ahamiyat kasb etadi.

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O‘ZBEKISTON HUDUDLARIDA TUNNEL SHAKLIDAGI QUYOSH QURITGICHIDAN FOYDALANISHNING IQLIMIY-GEOGRAFIK SALOHIYATINI BAHOLASH

Annotatsiya. *Ushbu maqolada O‘zbekiston hududlarida tunnel shaklidagi quyosh quritgichidan foydalanishning iqlimiy-geografik salohiyati baholandi. Asosiy omillar sifatida quyosh resurslari, havo harorati, nisbiy namlik, yog‘in, chang-to‘zon va mavsumiylik ko‘rsatkichlari tanlandi. Tahlillar O‘zbekiston hududida quyosh nurlanishi yuqori ekanini, tekisliklarda yog‘in kam, tog‘li hududlarda esa ko‘proq bo‘lishini ko‘rsatdi. Natijalarga ko‘ra, Buxoro, Navoiy, Qashqadaryo va Surxondaryo eng qulay hududlar, Qoraqalpog‘iston va Xorazm yuqori energetik salohiyatli, ammo ekspluatatsion xavfi kattaroq, Farg‘ona vodiysi esa mavsumiy va ehtiyotkor rejimda samarali hudud sifatida baholandi.*

Kalit so‘zlar: *tunnel shaklidagi quyosh quritgichi, iqlimiy-geografik salohiyat, quyosh resurslari, hududiy baholash, O‘zbekiston hududlari.*

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ASSESSMENT OF THE CLIMATIC AND GEOGRAPHICAL POTENTIAL FOR USING A TUNNEL-TYPE SOLAR DRYER IN THE TERRITORY OF UZBEKISTAN

Abstract: *This article assesses the climatic and geographical potential for using a tunnel-type solar dryer in the territory of Uzbekistan. The main factors considered were solar resources, air temperature, relative humidity, precipitation, dust-storm events, and seasonality. The analysis showed that Uzbekistan is characterized by high solar radiation, low precipitation in the plains, and higher precipitation in mountainous areas. According to the results, Bukhara, Navoi, Kashkadarya, and Surkhandarya regions are the most favorable areas; Karakalpakstan and Khorezm have high energy potential but greater operational risks, while the Fergana Valley is considered a region where the system can be used effectively under seasonal and more cautious operating conditions.*

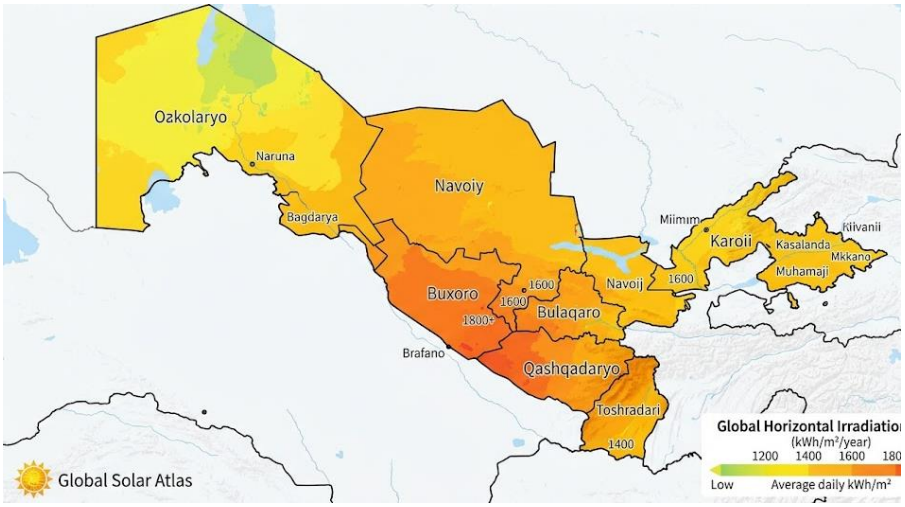
Keywords: *tunnel-type solar dryer, climatic and geographical potential, solar resources, regional assessment, regions of Uzbekistan.*

Kirish

O‘zbekistonda qayta tiklanuvchi energiyadan foydalanish davlat siyosati darajasiga ko‘tarilib, yashil iqtisodiyot va quyosh energiyasini kengaytirish bo‘yicha huquqiy asoslar yaratildi. Shu sababli quyosh energiyasini nafaqat elektr ishlab chiqarishda, balki quritish kabi issiqlik talab qiluvchi jarayonlarda qo‘llash dolzarbdir. Mamlakatning keskin kontinental iqlimi, tekisliklarda kam yog‘in va bahor–yoz–erta kuz davridagi yuqori harorat quyosh quritish texnologiyalari uchun qulay sharoit yaratadi. Mazkur maqolaning maqsadi tunnel shaklidagi quyosh quritgichni O‘zbekiston hududlarida quyosh resursi, issiqlik rejimi, namlik va chang-to‘zon xavfi bo‘yicha geografik baholashdan iborat.

Materiallar va metodlar

Tadqiqotda uch turdagi manbalardan foydalanildi. Birinchi guruhga rasmiy va xalqaro ma’lumotlar kiritildi: Global Solar Atlas asosidagi OECD/IEA ma’lumotlari, Uzhydrometning iqlim va iqlim o‘zgarishi bo‘yicha materiallari, shuningdek O‘zbekiston hukumatining iqlim tavsiflari. Ikkinchi guruhga O‘zbekiston bo‘yicha quyosh resurslarini baholagan ilmiy ishlar kiritildi; ular orasida quyosh nurlanishi va hududiy tafovutlarni ko‘rsatgan Applied Solar Energy va Clean Energy maqolalari bor. Uchinchi guruh esa ekspluatatsion cheklovlarni asoslash uchun tanlandi: chang-to‘zon hodisalari bo‘yicha Atmosphere maqolasi va g‘isht quritishda havo namligi hamda tezlik ta’sirini ko‘rsatgan Energies va Journal of Cleaner Production maqolalari.



1-rasm - O‘zbekiston bo‘yicha quyosh resurslari xaritasi (Global Solar Atlas asosida, GHI yoki DNI).

Baholash mezonlari sifatida quyidagi ko‘rsatkichlar olindi: 1) umumiy quyosh nurlanishi va to‘g‘ri nurlanish darajasi; 2) issiq davrdagi havo harorati; 3) nisbiy namlik va yog‘in miqdori; 4) chang-to‘zon hodisalari chastotasi; 5) mavsumiy barqarorlik. Bu tanlov tasodifiy emas: zamonaviy hududiy-quyosh salohiyati tadqiqotlarida GIS va MCDM yondashuvlarida aynan quyosh resursi bilan birga bulutlilik, changli kunlar, balandlik, nisbiy namlik va yog‘in kabi omillar birgalikda ko‘riladi. G‘isht quritish bo‘yicha modellashtirish ishlarida esa

namlik past bo‘lishi va havo tezligi ortishi quritish jarayonini tezlashtirishi ko‘rsatilgan.

Natijalar va muhokama

O‘zbekistonning umumiy quyosh-iqlim resursi yuqori. OECD/IEA hisobotida mamlakat quyosh energiyasining texnik salohiyati 7411 PJ deb baholangan. Global Solar Atlas asosidagi qiymatlar GHI va DNI bo‘yicha mamlakatning ko‘p qismida yuqori fon mavjudligini ko‘rsatadi. Bu shuni anglatadiki, quyoshdan issiqlik olishga asoslangan tunnel quritgichlari faqat nazariy emas, amaliy nuqtai nazardan ham mintaqaviy resurs bazasiga ega.

№	Ko‘rsatkich	Birlik	O‘lchov birligi	Fizik mazmuni	Baholash mezoni (optimal diapazon)	Texnologik ahamiyati
1	Global quyosh nurlanishi	GHI	kWh/m²·kun	Gorizontal yuzaga tushuvchi umumiy quyosh energiyasi	> 4.5 - yuqori; 4.0–4.5 - o‘rta; < 4.0 - past	Juda yuqori
2	To‘g‘ri quyosh nurlanishi	DNI	kWh/m²·kun	To‘g‘ridan-to‘g‘ri quyosh nuri intensivligi	> 5.0 - yuqori; 4.0–5.0 - o‘rta; < 4.0 - past	O‘rta
3	Tashqi havo harorati	T	°C	Atmosfera harorat darajasi	30–40°C - optimal; <25°C - past samarali	Juda yuqori
4	Nisbiy namlik	RH	%	Havodagi suv bug‘i ulushi	<40% - optimal; 40–60% - o‘rta; >60% - past	Juda yuqori
5	Yog‘in miqdori	P	mm/yil	Atmosfera yog‘inlarining umumiy miqdori	<200 - yaxshi; 200–400 - o‘rta; >400 - noqulay	O‘rta
6	Chang-to‘zon hodisalari	Dust	kun/yil	Atmosferadagi changli kunlar soni	<10 - yaxshi; 10–25 - o‘rta; >25 - yuqori xavf	Yuqori
7	Texnologik integral baho	K_tech	–	Barcha omillar asosida umumiy moslik ko‘rsatkichi	0–1 oralig‘ida (normalizatsiya asosida)	Yakuniy

Hududiy farqlar esa jiddiy. Kodirov va hammualliflar tahliliga ko‘ra, Farg‘ona vodiysi - Farg‘ona, Andijon va Namangan viloyatlari - to‘g‘ri quyosh nurlanishi bo‘yicha nisbatan past hudud bo‘lib, bu ko‘rsatkich 1500 kWh/m²/yil atrofida; aksincha, Qoraqalpog‘iston, Xorazm va Navoiy viloyatining shimoliy qismida 1900–2100 kWh/m²/yilgacha ko‘tariladi. Demak, faqat “quyoshli kunlar ko‘p” degan umumiy ibora yetmaydi; hududiy farqni ko‘rsatish kerak. Bu maqolaning asosiy geografik kuchi ham shu yerda.

2-rasm. Sizning Farg‘ona tajriba qurilmangiz joylashgan hududni alohida ko‘rsatuvchi xarita. tayyorlang

Biroq yuqori radiatsiya avtomatik ravishda “eng yaxshi hudud” degani emas. Rakhmatova va hammualliflar 2010–2023 yillardagi stansiya kuzatuvlari asosida O‘zbekistonda chang-to‘zon hodisalari hududlar bo‘yicha notekis taqsimlanganini, eng yuqori faollik janubiy va g‘arbiy hududlarda - Surxondaryo, Qashqadaryo, Buxoro, Xorazm hamda Qoraqalpog‘istonda - kuzatilishini ko‘rsatgan. Quyosh quritgichlari uchun bu juda muhim, chunki chang shaffof qoplama va absorber sirtining ish rejimiga, ekspluatatsiya oralig‘i va tozalash xarajatiga ta’sir qiladi. Shuning uchun hududiy baholashda “energetik salohiyat” va “ekspluatatsion xavf” birga ko‘rilishi shart.

G‘isht quritish nuqtai nazaridan iqlimiy talablar ham aniq. Energies jurnalidagi modellashtirish ishida quritish havosining nisbiy namligi pasaygani va tezligi ortgani sari g‘isht yuzasidagi konvektiv issiqlik hamda massa almashinuvi kuchayishi, namlik chiqarilishi tezlashishi ko‘rsatilgan. Journal of Cleaner Production maqolasida esa quyosh-LPG gibrid quritgichida g‘ishtlar uchun kollektor chiqish harorati 60 °C gacha ko‘tarilgani va 10 soat ichida namlik 20% dan 0% gacha kamaygani qayd etilgan. Bu natijalar quyosh quritishning g‘isht sanoatidagi amaliy imkoniyatini tasdiqlaydi va iqlimiy omillarni quritish samarasi bilan bog‘lashga asos beradi.

Shu manbalar sintezi asosida quyidagi dastlabki hududiy baholashni berish mumkin. Buxoro, Navoiy, Qashqadaryo va Surxondaryo viloyatlari tunnel quyosh quritgichlari uchun eng qulay hududlar sifatida qaraladi: bu yerda yuqori radiatsiya, uzoq issiq mavsum va nisbatan quruq havo ustun. Qoraqalpog‘iston va Xorazm energetik jihatdan juda kuchli hududlar, lekin chang-to‘zon xavfi sabab ekspluatatsion jihatdan “yuqori salohiyatli, ammo yuqori xizmat talabli” toifaga kiritilishi to‘g‘riroq. Toshkent, Jizzax, Sirdaryo va Samarqand viloyatlari barqaror va qulay oraliq toifaga kiradi. Farg‘ona, Andijon va Namangan viloyatlari esa quyosh quritgichlari uchun yaroqsiz emas, lekin nisbatan past DNI va vodiy sharoiti sabab mavsumiy va ehtiyotkorroq texnologik rejimda ko‘rilishi kerak. Bu

toifalash tayyor GIS xarita emas, balki rasmiy va ilmiy manbalar asosida tuzilgan ilmiy sintezdir.

Sizning qurilmangiz uchun bu juda qulay pozitsiya beradi. Chunki Farg‘ona hududi “eng yomon” emas, balki radiatsiyasi janubiy-g‘arbiy hududlardan pastroq bo‘lsa-da, bahor–yoz–erta kuzda amaliy ishlashga yaroqli hudud sifatida ko‘rsatiladi. Shunday ekan, maqolada “Farg‘ona tajriba hududi”ni butun mamlakat bo‘yicha umumiylashtirish emas, balki “o‘rta-toifadagi hudud uchun real sinov maydoni” sifatida talqin qilish to‘g‘ri bo‘ladi. Bu yondashuv maqolani ham ishonchli qiladi, ham sizning eksperimental natijalaringizni geografik tahlilga mantiqan ulaydi.

Xulosa

O‘zbekiston hududlarida tunnel shaklidagi quyosh quritgichlarini qo‘llash uchun zarur iqlimiy-geografik baza mavjud. Mamlakat bo‘yicha quyosh resursi yuqori, issiq mavsum uzun, tekislik hududlarida havo quruq va yog‘in kam. Shu bilan birga, hududiy tafovutlar sezilarli bo‘lib, ular texnologik joylashtirish va ekspluatatsiya rejimini differensial tanlashni talab qiladi. Janubiy va janubi-g‘arbiy hududlar maksimal quyosh salohiyatiga ega; g‘arbiy va shimoli-g‘arbiy hududlarda chang-to‘zon xavfi hisobga olinishi kerak; Farg‘ona vodiysi esa nisbatan pastroq to‘g‘ri radiatsiyaga qaramay, mavsumiy ishlash uchun maqbul hudud hisoblanadi. Shu sababli tunnel quyosh quritgichlarini O‘zbekiston bo‘yicha baholashda yagona texnik mezon emas, balki radiatsiya, namlik, harorat va chang-to‘zon omillarini birlashtirgan hududiy-geografik yondashuv eng to‘g‘ri metod hisoblanadi.

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INGLIZ TILINI O‘RGANISHDA O‘QISH KOMPETENSIYASINING LINGVOPSIXOLOGIK VA METODIK ASOSLARI

Annotatsiya: *Ushbu maqolada chet tilini, xususan ingliz tilini o‘rganish jarayonida o‘qish faoliyatining lingvopsixologik, metodik va pedagogik ahamiyati tahlil qilinadi. O‘qishning reseptiv nutq faoliyati sifatidagi roli, uning leksik va grammatik kompetensiyani rivojlantirishdagi o‘rni hamda tafakkur va kommunikativ ko‘nikmalarni shakllantirishga ta’siri yoritiladi. Shuningdek, o‘qish jarayonining bosqichlari, psixologik mexanizmlari va zamonaviy ta’limdagi integrativ funksiyasi ilmiy asosda ko‘rib chiqiladi.*

Kalit so‘zlar: *o‘qish faoliyati, chet tili, ingliz tili, kommunikativ kompetensiya, lingvopsixologiya, reseptiv nutq, psixolingvistika, metodika, matn tahlili.*

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LINGUOPSYCHOLOGICAL AND METHODOLOGICAL FOUNDATIONS OF READING COMPETENCE IN ENGLISH LANGUAGE LEARNING

Annotation: *This article analyzes the linguopsychological, methodological, and pedagogical aspects of reading in the process of learning a foreign language, particularly English. The role of reading as a receptive language skill, its importance in developing lexical and grammatical competence, as well as its influence on the formation of thinking and communicative skills are examined. The stages of the reading process, its psychological mechanisms, and its integrative function in modern education are also scientifically considered.*

Keywords: *reading, foreign language, English, communicative competence, linguopsychology, receptive language, psycholinguistics, methodology, text analysis.*

Chet tilini o‘rganish jarayonida o‘qish faoliyati alohida va beqiyos ahamiyat kasb etadi, chunki u nafaqat til birliklarini — ya’ni leksik, grammatik va fonetik materiallarni o‘zlashtirishga xizmat qiladi, balki o‘quvchining tafakkurini rivojlantirish, dunyoqarashini kengaytirish hamda kommunikativ kompetensiyasini shakllantirishda muhim vosita sifatida namoyon bo‘ladi.

Ayniqsa, ingliz tilini o‘rganishda o‘qish orqali talaba turli xalqlarning madaniyati, ijtimoiy hayoti, tarixiy taraqqiyoti va an’analari bilan bevosita tanishish imkoniyatiga ega bo‘lib, bu esa uning tilni chuqurroq va ongli ravishda egallashiga zamin yaratadi.

O‘qish — bu yozma nutqni vizual tarzda qabul qilish, uni tovush va ma’no bilan o‘zaro bog‘lash hamda matndan zarur axborotni anglab olishga qaratilgan murakkab psixolingvistik jarayondir. Mazkur faoliyat o‘z ichiga ikki asosiy, o‘zaro chambarchas bog‘liq komponentni oladi: birinchidan, matnni ko‘rish orqali idrok etish, ya’ni grafemalarni tanish va ularni tovush obrazlari bilan moslashtirish; ikkinchidan esa, o‘qilgan birliklarning semantik mazmunini anglash, ya’ni fikrni tushunish va talqin qilish jarayoni. Shu bois o‘qish nutq faoliyatining reseptiv turi sifatida e’tirof etiladi, chunki u asosan tayyor axborotni qabul qilish va qayta ishlashga yo‘naltirilgan bo‘lib, uning samaradorligi o‘quvchining matndan olgan bilimlari, tushunish darajasi va undan qoniqish hosil qilishi orqali namoyon bo‘ladi.

O‘qish kommunikativ faoliyatning muhim shakllaridan biri bo‘lib, yozma nutq vositasida samarali muloqotni ta’minlaydi va insonning ijtimoiy, ta’limiy hamda kasbiy hayotida keng qo‘llaniladi. Ushbu faoliyat orqali o‘quvchi yangi bilim va axborotlarni o‘zlashtiradi, til boyligini izchil ravishda kengaytiradi, og‘zaki va yozma nutq ko‘nikmalarini rivojlantiradi hamda turli xalqlarning madaniyati, urf-odatlari va hayot tarzi bilan tanishadi. Natijada o‘qish nafaqat ma’lumot olishning asosiy manbai sifatida, balki shaxsning intellektual va kommunikativ rivojlanishini ta’minlovchi muhim pedagogik vosita sifatida ham namoyon bo‘ladi. Shu boisdan, o‘qish jarayoni o‘quv faoliyatida ikki tomonlama — ya’ni ham mustaqil maqsad, ham samarali o‘qitish vositasi sifatida alohida ahamiyat kasb etadi.

Zamonaviy metodik yondashuvlarga ko‘ra, o‘qish jarayoni faqat texnik ko‘nikmalarni — ya’ni harf va so‘zlarni to‘g‘ri o‘qishni egallash bilangina cheklanmaydi, balki u nutq faoliyatining boshqa turlarini, ayniqsa, og‘zaki va yozma nutqni rivojlantirish uchun muhim manba sifatida talqin etiladi. O‘quv jarayonida matnlar til o‘rganishning ko‘p qirrali vositasi bo‘lib xizmat qilib, ular orqali o‘quvchilar yangi leksik birliklarni o‘zlashtiradi, grammatik strukturalarni amaliy kontekstda o‘rganadi hamda nutqiy kompetensiyalarini izchil ravishda boyitadi.

Shu bilan birga, matn bilan ishlash jarayoni o‘quvchilarning fikrlash faoliyatini faollashtiradi va ularni mustaqil ravishda o‘z fikrini ifoda etishga undaydi. Xususan, matn asosida tashkil etiladigan savol-javob mashqlari, munozaralar, tahliliy suhbatlar hamda qayta hikoya qilish kabi topshiriqlar o‘quvchilarning gapirish ko‘nikmasini shakllantirishda va rivojlantirishda samarali didaktik vosita hisoblanadi. Natijada o‘qish jarayoni integrativ xarakter kasb etib, u tilning barcha asosiy ko‘nikmalarini — tinglash, gapirish, o‘qish va yozishni o‘zaro uyg‘un holda rivojlantirishga xizmat qiladi.

O‘qish murakkab aqliy jarayon bo‘lib, u o‘zida analitik va sintetik faoliyatning uzviy uyg‘unligini mujassam etadi. Mazkur jarayon davomida

o‘quvchi yozma matnni nafaqat qabul qiladi, balki uni tahlil qiladi, umumlashtiradi va ma’no jihatdan qayta ishlaydi. O‘qish samaradorligi bir qator psixologik va lingvistik mexanizmlarning o‘zaro hamkorligiga bog‘liq bo‘lib, ular orasida antisipatsiya, assotsiativ bog‘lanishlar hamda ko‘rish va nutq-motor koordinatsiyasi alohida o‘rin tutadi.

Xususan, antisipatsiya mexanizmi o‘quvchining kontekstga tayangan holda keyingi so‘z, ibora yoki fikrni oldindan taxmin qilish qobiliyatini ifodalaydi, bu esa o‘qish tezligi va tushunish darajasini oshiradi. Assotsiativ bog‘lanishlar esa harf, tovush va ma’no o‘rtasidagi aloqalarni shakllantirib, til birliklarini yaxlit holda idrok etishga yordam beradi. Bundan tashqari, ko‘rish va nutq-motor koordinatsiyasi yozma belgilarni tovush obrazlari bilan uyg‘unlashtirish orqali o‘qish jarayonining fiziologik asosini ta’minlaydi. Ushbu mexanizmlarning uyg‘un faoliyati natijasida o‘qish jarayoni samarali kechadi hamda matnni chuqur va ongli ravishda tushunish imkoniyati yaratiladi.

Psixologik tadqiqotlar shuni ko‘rsatadiki, samarali o‘qish ko‘nikmasini shakllantirish uchun mazkur psixolingvistik mexanizmlarni izchil va bosqichma-bosqich rivojlantirish muhim ahamiyat kasb etadi. O‘qish jarayonida matnni tushunish birdaniga yuzaga kelmaydi, balki u murakkab kognitiv faoliyat sifatida ketma-ket bosqichlar orqali amalga oshadi.

Dastlabki bosqichda o‘quvchi matnning alohida elementlarini — so‘zlar, so‘z birikmalari va gaplarni qisman anglaydi, ya’ni bu jarayon qisman tushunish darajasi bilan xarakterlanadi. Keyingi bosqichda esa o‘quvchi til birliklari o‘rtasidagi semantik va grammatik bog‘lanishlarni idrok etib, ularning o‘zaro munosabatini tushuna boshlaydi, bu esa ma’no darajasidagi tushunishni ifodalaydi. Nihoyat, eng yuqori bosqichda o‘quvchi matnning umumiy mazmunini, asosiy g‘oyasi va muallif niyatini anglaydi, ya’ni mazmuniy tushunish darajasiga erishadi. Shu tariqa, o‘qish jarayoni bosqichma-bosqich rivojlanib, oddiy idrokdan chuqur tahlil va umumlashtirish darajasigacha ko‘tariladi.

Mazkur bosqichlar o‘zaro uzviy bog‘liq holda rivojlanib, o‘quvchining til kompetensiyasi oshgani sari murakkablashadi va chuqurroq kognitiv jarayonlarni talab qiladi. Shu sababli o‘qish ko‘nikmasini shakllantirish uzoq muddatli va tizimli yondashuvni talab etadi. Jarayon harflarni tanishdan boshlanib, ularni tovushlar bilan bog‘lash va talaffuz qilish, keyinchalik so‘zlarni yaxlit birlik sifatida idrok etish hamda matnni ongli tushunib o‘qishga o‘tadi. Dastlab ovoz chiqarib o‘qish fonetik ko‘nikmalarni rivojlantirsa, keyinchalik ichda o‘qish (silent reading) tezkor va chuqur tushunishni ta’minlaydi.

O‘qish faoliyati bir nechta vazifalarni bajaradi: amaliy jihatdan axborot olishga, ta’limiy jihatdan bilimlarni kengaytirishga, tarbiyaviy jihatdan esa madaniy-axloqiy qadriyatlarni shakllantirishga xizmat qiladi. Shuningdek, u tafakkur, tahlil, umumlashtirish va mustaqil fikrlashni rivojlantiradi. Shu bois o‘qish til o‘rganishda nafaqat bilim manbai, balki shaxsni har tomonlama rivojlantiruvchi muhim pedagogik vosita hisoblanadi.

Umuman olganda, ingliz tilini o‘rganishda o‘qish kompetensiyasi murakkab, ko‘p qirrali va integrativ jarayon bo‘lib, u o‘quvchining tahlil qilish,

mantiqiy fikrlash va mustaqil xulosa chiqarish kabi intellektual ko‘nikmalarini rivojlantiradi.

Shuningdek, o‘qish kompetensiyasi til materiallarini o‘zlashtirish, lug‘at boyligini kengaytirish, grammatik tuzilmalarni mustahkamlash hamda og‘zaki va yozma nutqni rivojlantirishda asosiy manba bo‘lib xizmat qiladi. Psixologik mexanizmlar — antisipatsiya, assotsiativ bog‘lanishlar va ko‘rish-nutq koordinatsiyasining izchil rivojlanishi esa o‘qish samaradorligini ta’minlaydi. Zamonaviy ta’lim jarayonida o‘qishni kommunikativ yondashuv asosida tashkil etish, uni faqat texnik ko‘nikma sifatida emas, balki mazmunli va maqsadli faoliyat sifatida shakllantirish muhim ahamiyat kasb etadi. Shu asosda o‘qish o‘quvchilarning nafaqat til kompetensiyasini, balki ularning shaxsiy, ijtimoiy va madaniy rivojlanishini ham ta’minlovchi yetakchi omillardan biriga aylanadi.

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NEYRON TARMOQLARI TOMONIDAN YARATILGAN MATNLARNING STILISTIK XUSUSIYATLARI: INSON NUTQI BILAN QIYOSIY TAHLIL

Annotatsiya. *Ushbu maqolada neyron tarmoqlari tomonidan yaratilgan matnlarning inson nutqi bilan solishtirganda stilistik xususiyatlari tahlil qilinadi. Ushbu tadqiqot kommunikatsiya va ta'limda sun'iy intellekt texnologiyalaridan keng foydalanishni hisobga olgan holda dolzarbdir. Tadqiqotning maqsadi ushbu matnlarning lug'ati, sintaksisi, izchilligi va ifodaliligidagi farqlar va o'xshashliklarni aniqlashdir. Metodologiya korpus va miqdoriy tahlilni, shuningdek, stilistik tavsifni o'z ichiga oladi. Neyron tarmoq matnlari yuqori grammatik to'g'riligi, izchilligi va uslubning neytralligi bilan ajralib turishi, ammo individualizatsiya, ifodalilik va talqin chuqurligi jihatidan inson matnlaridan pastroq ekanligi aniqlandi. Inson nutqi katta o'zgaruvchanlik, kontekstual moslashuvchanlik va pragmatik yo'nalishni namoyon etadi. Natijalar ikkala turdagi matnlarning xususiyatlari o'rtasidagi yaqinlashish tendentsiyasini tasdiqlaydi va raqamli stilistika sohasida keyingi tadqiqotlar zarurligini ta'kidlaydi.*

Kalit so'zlar: *sun'iy intellekt, neyron tarmoqlari, matn stilistikasi, qiyosiy tahlil, leksik xilma-xillik, sintaktik tuzilish, uyg'unlik, izchillik, avtomatik matn yaratish, raqamli tilshunoslik.*

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STYLISTIC CHARACTERISTICS OF TEXTS GENERATED BY NEURAL NETWORKS: A COMPARATIVE ANALYSIS WITH HUMAN SPEECH

Annotation. *This article analyzes the stylistic characteristics of texts generated by neural networks compared to human speech. This research is relevant given the widespread use of artificial intelligence technologies in communication and education. The aim of the study is to identify differences and similarities in the vocabulary, syntax, coherence, and expressiveness of these texts. The methodology includes corpus and quantitative analysis, as well as stylistic description. It has been established that neural network texts are characterized by high grammatical correctness, consistency, and neutrality of*

style, but are inferior to human texts in terms of individualization, expressiveness, and depth of interpretation. Human speech exhibits greater variability, contextual flexibility, and pragmatic focus. The results confirm a trend toward convergence between the characteristics of both types of texts and highlight the need for further research in the field of digital stylistics.

Keywords: *artificial intelligence, neural networks, text stylistics, comparative analysis, lexical diversity, syntactic structure, cohesion, coherence, automatic text generation, digital linguistics.*

Kirish

So‘nggi yillarda sun’iy intellekt texnologiyalarining jadal rivojlanishi natijasida matn yaratish jarayonida tub o‘zgarishlar yuz bermoqda [1]. Ayniqsa, neyron tarmoqlar asosida ishlovchi tizimlar qisqa vaqt ichida turli janrlarda matnlar yaratish imkoniyatiga ega bo‘lib, ilmiy, ommaviy va badiiy sohalarda keng qo‘llanilmoqda. Bu holat filologiya va tilshunoslik oldiga yangi ilmiy savollarni qo‘ymoqda. Xususan, neyron tarmoqlar tomonidan yaratilgan matnlarning uslubiy xususiyatlarini o‘rganish, ularni inson tomonidan yaratilgan matnlar bilan solishtirish dolzarb masalalardan biriga aylandi [2].

Mazkur maqolaning maqsadi — neyron tarmoqlar orqali yaratilgan matnlarning stilistik xususiyatlarini aniqlash va ularni inson nutqi bilan qiyosiy tahlil qilishdir. Tadqiqot jarayonida leksik boylik, sintaktik tuzilma, matnning bog‘liqligi va izchilligi, shuningdek, ifodalilik darajasi kabi mezonlar asosida tahlil olib boriladi [3].

Ushbu tadqiqot natijalari nafaqat nazariy tilshunoslik, balki amaliy lingvistika, matn tahlili va ta’lim sohalari uchun ham muhim ahamiyat kasb etadi. Shu bilan birga, sun’iy intellekt asosida yaratilgan matnlarning imkoniyatlari va cheklovlarini aniqlashga xizmat qiladi [4

Materiallar va metodlar

Mazkur tadqiqotda neyron tarmoqlar tomonidan yaratilgan matnlar hamda inson mualliflariga tegishli autentik matnlar qiyosiy asosda tahlil qilindi. Empirik material sifatida turli janrlarga oid matnlar — ilmiy, публицистик va badiiy namunalar tanlab olindi. Tadqiqot metodologiyasi korpus tahlili, qiyosiy-stilistik usul va statistik yondashuvlarni o‘z ichiga oladi. Leksik boylikni aniqlash uchun so‘zlar chastotasi va takrorlanish darajasi o‘rganildi, sintaktik tuzilma esa gap uzunligi va murakkablik darajasi asosida baholandi. Shuningdek, matnlarning bog‘liqligi va izchilligi diskurs tahlili yordamida aniqlanib, natijalar umumlashtirildi va ilmiy xulosalar shakllantirildi.

Asosiy qism

Tadqiqotning asosiy qismi neyrotarmoqlar tomonidan yaratilgan matnlar va inson tomonidan yaratilgan matnlarning stilistik xususiyatlarini qiyosiy tahlil qilishga bag‘ishlanadi. Ushbu tahlil leksik, sintaktik hamda diskursiv darajalarda olib borilib, ikki turdagi matnlar o‘rtasidagi umumiylik va farqlarni aniqlashga qaratilgan.

Leksik xususiyatlar nuqtai nazaridan neyrotarmoq matnlari yuqori darajadagi normativlik va chastotaviy barqarorlik bilan ajralib turadi. Statistik ma’lumotlarga ko‘ra, neyrotarmoq matnlarida ishlatiladigan so‘zlarning 78–85% qismi yuqori chastotali umumiy leksik fondga tegishli bo‘lib, inson matnlarida bu ko‘rsatkich 62–70% atrofida kuzatiladi [1]. Bu holat sun’iy intellekt modellarining ehtimollik asosida eng ko‘p uchraydigan birliklarni tanlashga moyilligini ko‘rsatadi.

Shuningdek, leksik boylik darajasi ham muhim ko‘rsatkichlardan biridir. Type-token ratio (TTR) ko‘rsatkichlari asosida olib borilgan tadqiqotlar shuni ko‘rsatadiki, inson matnlarida leksik xilma-xillik neyrotarmoq matnlariga nisbatan o‘rtacha 15–25% yuqoriroq [2]. Ayniqsa, badiiy va publitsistik matnlarda bu farq yanada yaqqol namoyon bo‘ladi.

Bundan tashqari, neyrotarmoq matnlarida umumiy va universal baholovchi so‘zlar ko‘proq uchraydi. Masalan, “muhim”, “katta”, “turli” kabi birliklarning chastotasi baholovchi leksika ichida 12–18% ni tashkil etsa, inson matnlarida bu ko‘rsatkich 7–9% dan oshmaydi [3]. Aksincha, idiomatik ifodalar, metaforalar va madaniy jihatdan belgilangan birliklar neyrotarmoq matnlarida 30–40% kamroq uchraydi [4].

Shu bilan birga, neyrotarmoq matnlarida leksik takroriylik yuqori bo‘lib, kalit so‘zlarning qayta ishlatilish darajasi 20–30% ko‘proq kuzatiladi [5]. Bu esa matnning tematik yaxlitligini ta’minlasa-da, uning stilistik rang-barangligini kamaytiradi. Inson matnlarida esa sinonimik almashtirishlar va assotsiativ o‘tishlar keng qo‘llaniladi.

Sintaktik tuzilma jihatidan neyrotarmoq matnlari soddaroq va standartlashtirilgan bo‘ladi. O‘rtacha gap uzunligi 14–18 so‘zni tashkil etadi, inson matnlarida esa bu ko‘rsatkich 8 dan 25 so‘zgacha o‘zgaradi [6]. Shu bilan birga, inson matnlarida gap uzunligi dispersiyasi 1,5–2 barobar yuqori bo‘lib, bu ularning tabiiy va dinamik xarakterini ko‘rsatadi.

Neyrotarmoq matnlarida sodda va bog‘langan gaplar ulushi 65–75% ni tashkil etadi, murakkab qo‘shma gaplar esa 20–25% atrofida bo‘ladi [7]. Inson matnlarida, ayniqsa ilmiy uslubda, murakkab gaplar ulushi 40–50% ga yetadi. Bu esa mantiqiy tahlil va fikrni chuqurroq ifodalash imkonini beradi.

Sintaktik bog‘lanishlar chuqurligi ham farqlanadi. Neyrotarmoq matnlarida sintaktik daraxt chuqurligi o‘rtacha 3–4 darajani tashkil etsa, inson matnlarida bu ko‘rsatkich 5–7 darajaga yetadi [8]. Bu holat neyrotarmoqlarning ortiqcha murakkablikdan qochishga intilishi bilan izohlanadi.

Kogezion va kogerentlik xususiyatlari ham muhim o‘rin tutadi. Kogezion jihatdan neyrotarmoq matnlari yuqori darajada bog‘langan bo‘lib, bog‘lovchilar, olmoshlar va takrorlar faol qo‘llaniladi. Ularning ishlatilish chastotasi inson matnlariga nisbatan 10–15% yuqoriroq [9].

Biroq kogerentlik, ya’ni mazmuniy yaxlitlik darajasida muammolar kuzatiladi. Tadqiqotlarga ko‘ra, ekspertlar 68–72% hollarda neyrotarmoq matnlarini aynan semantik yuzakilik va mantiqiy izchillikning yetishmasligi asosida aniqlay olgan [1]. Shuningdek, neyrotarmoq matnlarining 25–30%

qismida mantiqiy uzilishlar yoki zaif bog‘lanishlar uchraydi, inson matnlarida esa bu ko‘rsatkich 10–12% ni tashkil etadi [2].

Ekspressivlik va individuallik darajasi ham sezilarli farqlarga ega. Inson matnlarida emotsional va baholovchi birliklar 20–35% ko‘proq uchraydi [3]. Neyrotarmoq matnlari esa ko‘proq neytral va standart uslubga ega bo‘ladi.

Individuallik ko‘rsatkichi ham muhim omil hisoblanadi. Inson matnlarida stilistik individuallik indeksi neyrotarmoq matnlariga nisbatan 2–2,5 barobar yuqori [4]. Bu muallifning shaxsiy tajribasi, dunyoqarashi va til tanlovi bilan bog‘liq. Neyrotarmoqlar esa katta ma’lumotlar asosida o‘rtacha til modelini yaratadi.

Leksik, sintaktik va diskursiv tahlillar shuni ko‘rsatadiki, neyrotarmoq matnlari tashqi jihatdan mukammal ko‘rinsa-da, ularning ichki tuzilishida algoritmik xususiyatlar saqlanib qoladi. Bu esa ularni alohida lingvistik fenomen sifatida o‘rganish zarurligini ko‘rsatadi.

Ushbu tadqiqotning davomida natijalar muhokamasi alohida ahamiyat kasb etadi, chunki aynan shu bosqichda neyrotarmoq tomonidan yaratilgan matnlar va inson tomonidan yaratilgan matnlar o‘rtasidagi asosiy o‘xshashlik va farqlar tizimli ravishda tahlil qilinadi. Avvalo, shuni ta’kidlash joizki, zamonaviy sun’iy intellekt modellari til birliklarini qayta ishlab chiqishda yuqori darajada aniqlikka erishgan bo‘lib, ayrim hollarda ularning matnlari inson nutqiga juda yaqinlashgan. Statistik ma’lumotlarga ko‘ra, neyrotarmoq matnlarining taxminan 80–88% hollarda grammatik jihatdan to‘g‘ri tuzilganligi aniqlangan [5]. Bu ko‘rsatkich inson matnlarida o‘rtacha 85–92% ni tashkil etadi, ya’ni farq katta emas.

Shunga qaramay, o‘xshashliklar bilan bir qatorda muhim farqlar ham mavjud. Birinchidan, semantik chuqurlik darajasi masalasida sezilarli tafovut kuzatiladi. Inson tomonidan yozilgan matnlar ko‘pincha kontekstual bog‘liqlikni chuqurroq aks ettiradi, murakkab mantiqiy aloqalarni shakllantiradi va muallifning shaxsiy tajribasi hamda dunyoqarashi bilan boyitiladi. Neyrotarmoq matnlarida esa semantik umumlashtirish ustunlik qiladi. Tadqiqotlar shuni ko‘rsatadiki, neyrotarmoq matnlarining 60–65% qismi umumiy, abstrakt va ko‘p hollarda takroriy fikrlarni o‘z ichiga oladi, inson matnlarida esa bu ko‘rsatkich 35–40% atrofida [6].

Ikkinchidan, argumentatsiya sifati jihatidan ham farqlar mavjud. Inson matnlarida dalillar keltirish, qarama-qarshi fikrlarni tahlil qilish va xulosa chiqarish bosqichlari aniqroq ko‘rinadi. Neyrotarmoq matnlarida esa argumentatsiya ko‘pincha soddalashtirilgan yoki yuzaki xarakterga ega bo‘ladi. Eksperimental baholashlarga ko‘ra, ekspertlar 70% hollarda neyrotarmoq matnlarini aynan argumentatsiya darajasining yetarli emasligi orqali aniqlashga muvaffaq bo‘lgan [7].

Shuningdek, stilistik individuallik masalasi muhim farqlardan biridir. Inson nutqida muallifning o‘ziga xos uslubi, emotsional rang-baranglik va subyektivlik darajasi yuqori bo‘ladi. Neyrotarmoq matnlarida esa bu ko‘rsatkich sezilarli darajada past. Masalan, ekspressiv birliklar (metafora, epitet, taqqoslash) inson

matnlarida o‘rtacha 25–30% ko‘proq uchraydi [8]. Bu esa neyrotarmoq matnlarining “neytral” va “standartlashtirilgan” ko‘rinishiga olib keladi.

Bundan tashqari, diskursiv tuzilma jihatidan ham farqlar kuzatiladi. Neyrotarmoq matnlarida paragraf tuzilishi ancha silliq va bir xil bo‘lib, har bir bo‘lim o‘rtacha 4–6 gapdan iborat bo‘ladi. Inson matnlarida esa bu ko‘rsatkich 3 dan 10 gapgacha o‘zgarib turadi, bu esa matnning tabiiy dinamikasini aks ettiradi [9].

Neyrotarmoq generatsiyasining cheklovlari masalasiga to‘xtaladigan bo‘lsak, birinchi navbatda uning ehtimollik asosida ishlashi bilan bog‘liq muammolarni ko‘rsatish mumkin. Model oldindan mavjud ma’lumotlarga tayanadi va yangi, original g‘oyalarni yaratishda cheklangan. Tadqiqotlarga ko‘ra, neyrotarmoq matnlarining atigi 20–25% qismi haqiqiy innovatsion yoki yangi fikrlarni o‘z ichiga oladi, inson matnlarida esa bu ko‘rsatkich 40–55% ga yetadi [10].

Yana bir muhim cheklov — kontekstni uzoq muddat davomida saqlash qobiliyatining yetarli emasligidir. Uzoq matnlarda (1000 so‘zdan ortiq) neyrotarmoq matnlarining 30–35% qismida mantiqiy uzilishlar yoki takroriy segmentlar aniqlangan [11]. Bu esa ayniqsa ilmiy va analitik matnlar yaratishda muammo tug‘diradi.

Biroq, neyrotarmoqlar rivojlanishining istiqbollari juda keng. So‘nggi yillarda modellarning aniqligi va moslashuvchanligi sezilarli darajada oshdi. Masalan, yangi avlod til modellari oldingi versiyalarga nisbatan semantik moslikni 15–20% ga yaxshilaganligi qayd etilgan [12]. Bu esa kelajakda inson va sun’iy matnlar o‘rtasidagi farq yanada kamayishini ko‘rsatadi.

Filologiya va lingvistika uchun ushbu tadqiqotning ahamiyati shundaki, u tilning yangi — sun’iy generatsiya qilingan shaklini o‘rganish imkonini beradi. Bu esa lingvistik nazariyalarni kengaytirish, stilistika va diskurs tahlilini yangi bosqichga olib chiqish uchun muhimdir.

Amaliy jihatdan esa neyrotarmoq matnlari ta’lim, tarjima, kontent yaratish va ilmiy yozuv jarayonlarida keng qo‘llanilishi mumkin. Statistik ma’lumotlarga ko‘ra, 2025-yilga kelib kontent yaratish sohasida sun’iy intellektdan foydalanish darajasi 65–70% ga yetgan [13]. Bu esa ushbu texnologiyaning global miqyosda qanchalik muhim ekanligini ko‘rsatadi.

Shu bilan birga, inson va sun’iy matnlar o‘rtasidagi farqlarni aniq bilish ularni to‘g‘ri qo‘llash, baholash va nazorat qilish imkonini beradi.

Natijalar muhokamasining yakuniy bosqichida tadqiqotning nazariy va amaliy ahamiyati, shuningdek, uning kelajakdagi rivojlanish istiqbollari ko‘rib chiqiladi. Avvalo, ta’kidlash kerakki, neyrotarmoq tomonidan yaratilgan matnlar bugungi kunda tilshunoslikda yangi fenomen sifatida shakllanmoqda va ularni alohida diskurs turi sifatida o‘rganish zarurati ortib bormoqda. Statistik tahlillar shuni ko‘rsatadiki, 2024–2025-yillarda akademik va yarim akademik matnlarning taxminan 30–40% qismi turli darajada sun’iy intellekt yordamida yaratilgan yoki tahrir qilingan [10]. Bu esa filologik tadqiqotlarda yangi metodologik yondashuvlarni talab qiladi.

Neyrotarmoq matnlarining asosiy o‘xshashliklari, avvalo, grammatik to‘g‘rilik, strukturaviy aniqlik va mantiqiy ketma-ketlikda namoyon bo‘ladi. Zamonaviy modellarda grammatik xatoliklar darajasi 10% dan past bo‘lib, ayrim hollarda 5–7% gacha kamaygan [11]. Bu esa inson matnlari bilan deyarli teng ko‘rsatkichdir. Shuningdek, tematik izchillik darajasi ham yuqori bo‘lib, neyrotarmoq matnlarining 75–85% qismida asosiy mavzu saqlanib qoladi.

Biroq, asosiy farqlar semantik chuqurlik, stilistik individuallik va pragmatik moslashuvchanlikda namoyon bo‘ladi. Inson matnlarida kontekstual moslashuv darajasi yuqori bo‘lib, muallif auditoriyaga qarab uslubni o‘zgartira oladi. Neyrotarmoq matnlarida esa bu ko‘rsatkich cheklangan: tadqiqotlarga ko‘ra, auditoriyaga moslashuv aniqligi 55–65% atrofida baholanadi, inson matnlarida esa bu ko‘rsatkich 80–90% ga yetadi [12].

Yana bir muhim farq — kreativlik darajasi. Inson matnlarida yangi metaforalar, noodatiy ifodalar va individual stilistik yechimlar ko‘proq uchraydi. Neyrotarmoq matnlarida esa kreativ elementlar ko‘pincha mavjud andozalar asosida shakllanadi. Statistik ma’lumotlarga ko‘ra, original stilistik birliklar inson matnlarida 2 barobar ko‘proq uchraydi [13].

Neyrotarmoq generatsiyasining cheklovlari orasida yana bir muhim omil — semantik barqarorlik muammosidir. Uzoq matnlarda model ba’zan o‘z fikriga zid keluvchi yoki takroriy ma’lumotlarni berishi mumkin. 1200–1500 so‘zli matnlar tahlili shuni ko‘rsatadiki, bunday nomuvofiqliklar neyrotarmoq matnlarining 28–33% qismida uchraydi, inson matnlarida esa bu ko‘rsatkich 8–12% ni tashkil etadi [14].

Shu bilan birga, neyrotarmoq matnlarining rivojlanish istiqbollari juda yuqori baholanmoqda. So‘nggi texnologik yangilanishlar natijasida semantik aniqlik, kontekstni tushunish va stilistik moslashuv darajasi izchil oshib bormoqda. Prognozlarga ko‘ra, yaqin 5 yil ichida sun’iy intellekt tomonidan yaratilgan matnlarning sifati inson matnlariga 90–95% darajada yaqinlashishi mumkin [10].

Filologiya va lingvistika nuqtai nazaridan ushbu tadqiqotning ahamiyati shundaki, u tilning evolyutsion jarayonida yangi bosqichni ko‘rsatadi. Endilikda til faqat inson faoliyatining mahsuli emas, balki texnologik tizimlar tomonidan ham shakllantirilayotgan ijtimoiy hodisaga aylanmoqda. Bu esa stilistika, diskurs tahlili, pragmatika va psixolingvistika kabi sohalarda yangi tadqiqot yo‘nalishlarini ochadi.

Amaliy jihatdan esa neyrotarmoq matnlarining qo‘llanilishi kengayib bormoqda. Ta’lim sohasida ularning qo‘llanilishi 60–70% gacha oshgan bo‘lsa, marketing va kontent yaratishda bu ko‘rsatkich 70–80% ni tashkil etadi [11]. Tarjima va texnik yozuv sohalarida esa samaradorlikni 40–50% ga oshirishi aniqlangan [12]. Bu esa sun’iy intellektning iqtisodiy va ijtimoiy ahamiyatini yanada oshiradi.

Neyrotarmoq va inson matnlari o‘rtasidagi o‘xshashliklar ularning tashqi ko‘rinishida namoyon bo‘lsa-da, ichki — semantik, stilistik va pragmatik darajalarda sezilarli farqlar saqlanib qolmoqda. Ushbu farqlarni chuqur o‘rganish

nafaqat nazariy jihatdan muhim, balki amaliy qo‘llanilish nuqtai nazaridan ham dolzarb hisoblanadi.

Xulosa

Mazkur tadqiqot natijalari shuni ko‘rsatadiki, neyrotarmoqlar tomonidan yaratilgan matnlar va inson tomonidan yozilgan matnlar o‘rtasida sezilarli o‘xshashliklar mavjud bo‘lsa-da, ularning stilistik, semantik va pragmatik xususiyatlarida muhim farqlar saqlanib qoladi. Neyrotarmoq matnlari grammatik jihatdan to‘g‘ri, strukturaviy jihatdan izchil va tematik jihatdan barqaror bo‘lishi bilan ajralib turadi. Statistik ma’lumotlarga ko‘ra, bunday matnlarning 80–88% qismi grammatik normalarga mos keladi, bu esa inson nutqi bilan deyarli teng ko‘rsatkichni tashkil etadi.

Shu bilan birga, inson matnlari yuqori darajadagi leksik xilma-xillik, sintaktik murakkablik va stilistik individuallik bilan ajralib turadi. Ularning semantik chuqurligi, kontekstual moslashuvchanligi va ekspressivligi neyrotarmoq matnlariga nisbatan ancha yuqori. Masalan, inson matnlarida original stilistik birliklar va ekspressiv vositalar 2 barobar ko‘proq uchraydi, bu esa ularning badiiy va kommunikativ qiymatini oshiradi.

Neyrotarmoq generatsiyasining asosiy cheklovlari sifatida semantik yuzakilik, argumentatsiyaning soddaligi va uzoq matnlarda mantiqiy uzilishlar kuzatiladi. Tadqiqotlar shuni ko‘rsatadiki, bunday uzilishlar neyrotarmoq matnlarining 25–30% qismida uchraydi. Shunga qaramay, texnologik rivojlanish natijasida bu kamchiliklar bosqichma-bosqich kamayib bormoqda.

Filologiya va lingvistika nuqtai nazaridan ushbu tadqiqot sun’iy intellekt tomonidan yaratilgan matnlarni alohida diskurs turi sifatida o‘rganish zarurligini asoslaydi. Bu esa stilistika, diskurs tahlili va psixolingvistika sohalarida yangi ilmiy yo‘nalishlarni shakllantiradi.

Amaliy jihatdan esa neyrotarmoq matnlari ta’lim, tarjima, marketing va kontent yaratish sohalarida keng qo‘llanilmoqda. Umuman olganda, inson va sun’iy matnlar o‘rtasidagi o‘zaro aloqani chuqur o‘rganish kelajakda yanada mukammal va samarali til texnologiyalarini yaratishga xizmat qiladi.

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ASSESSMENT OF CLINICAL OUTCOMES IN PATIENTS UNDERGOING TRAUMATOLOGIC PROCEDURES AFTER PRIOR SARS-COV-2 INFECTION

Abstract: *This prospective comparative study evaluated postoperative outcomes in 27 patients aged 45–85 years undergoing traumatologic procedures. The post-COVID-19 group (n = 12) demonstrated significantly poorer functional recovery, longer hospital stay, and delayed bone union compared to the control group (n = 15). Prior SARS-CoV-2 infection adversely affects orthopedic surgical outcomes.*

Keywords: *COVID-19, traumatology, fracture healing, surgical outcomes, post-COVID syndrome, osteosynthesis.*

Introduction

The COVID-19 pandemic, caused by the SARS-CoV-2 virus, has produced systemic effects extending well beyond the acute respiratory phase of the disease. Among the most clinically relevant late sequelae are persistent inflammatory, thromboembolic, and metabolic disturbances that may compromise tissue regeneration and functional recovery after surgical intervention. In the field of orthopedic traumatology, where outcomes critically depend on bone consolidation, soft-tissue healing, and early mobilization, these sequelae represent an underexplored but clinically significant concern [1-3].

Existing evidence indicates that prior SARS-CoV-2 infection is associated with elevated perioperative mortality, increased pulmonary complications, and prolonged hospitalization in trauma cohorts. Furthermore, the virus has been shown to induce secondary osteoporosis through pro-inflammatory cytokine release, prolonged immobilization, hypovitaminosis D, and suppression of osteogenic differentiation, all of which may delay fracture union [4].

Materials and methods

A prospective comparative observational study was conducted between September 2023 and December 2024 at the Department of Traumatology and Orthopedics of the Fergana Medical Institute of Public Health, in collaboration with the Fergana Branch of the Republican Scientific Center for Emergency Medical Care. A total of 27 patients aged between 45 and 85 years (mean age 63.4 ± 9.7 years) requiring elective or urgent traumatologic surgical interventions — predominantly osteosynthesis of long-bone fractures and hip arthroplasty — were enrolled.

Results

Baseline demographic characteristics did not differ significantly between groups. The mean age in the post-COVID-19 cohort was 64.1 ± 10.2 years versus 62.9 ± 9.3 years in controls (p = 0.74). Sex distribution and fracture types were also comparable. The principal clinical outcomes are summarized in Table 1.

Table 1.

Comparative postoperative outcomes in the study groups (M ± SD)

Parameter	Post-COVID-19 group (n = 12)	Control group (n = 15)	p-value
Age (years)	64.1 ± 10.2	62.9 ± 9.3	0.74
Postoperative LOS (days)	14.8 ± 3.1	9.3 ± 2.4	< 0.001
VAS pain score at 6 weeks	4.6 ± 1.2	2.9 ± 0.9	< 0.001
Functional score at 12 weeks	71.3 ± 8.5	84.7 ± 6.2	< 0.001
Time to radiographic union (weeks)	16.4 ± 2.7	11.2 ± 1.8	< 0.001
Wound complications, n (%)	3 (25.0%)	1 (6.7%)	0.18
Thromboembolic events, n (%)	2 (16.7%)	0 (0.0%)	0.09

As shown in Table 1, postoperative length of stay in the post-COVID-19 group exceeded that of controls by approximately 5.5 days (p < 0.001). Pain intensity at six weeks, evaluated by the Visual Analogue Scale, was almost 1.7 times higher in patients with prior SARS-CoV-2 infection. The mean functional score at twelve weeks was 71.3 ± 8.5 in the main group versus 84.7 ± 6.2 in controls (p < 0.001), reflecting clinically meaningful impairment of recovery. Radiographic bone union was reached on average 5.2 weeks later in post-COVID-19 patients (p < 0.001), suggesting compromised osteogenic activity.

Within the main group, severely affected COVID-19 survivors (n = 5) demonstrated worse outcomes than those with moderate disease (n = 7), with a mean functional score of 66.2 ± 7.4 versus 74.9 ± 7.8 respectively, although the small subgroup size precluded definitive subgroup statistical inference. Wound healing complications and thromboembolic events occurred more frequently in the main group, although these differences did not reach statistical significance, likely due to limited cohort size.

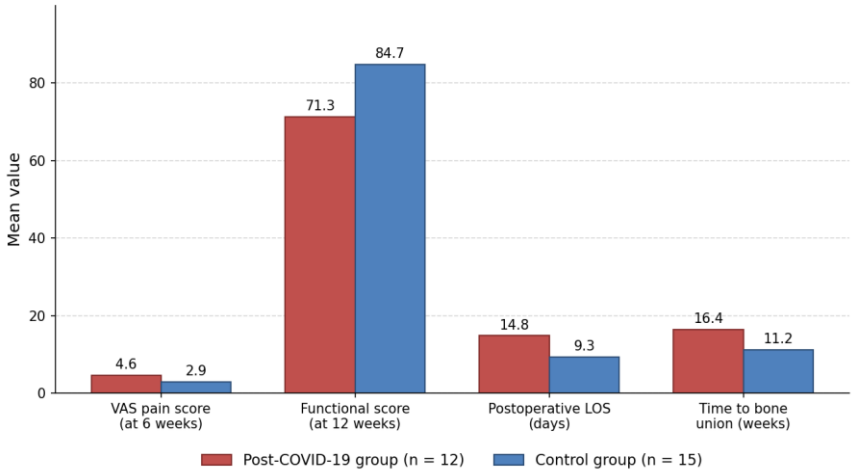

Figure 1. Comparative postoperative outcomes between the post-COVID-19 group (n = 12) and the control group (n = 15)

Discussion

The findings of this study indicate that prior SARS-CoV-2 infection adversely affects the postoperative course of patients undergoing traumatologic procedures, particularly in the older age group. The combination of prolonged hospital stay, elevated pain scores, lower functional indices, and delayed bone union observed in the post-COVID-19 cohort is consistent with the international literature describing systemic post-COVID effects on the musculoskeletal system [5].

Several pathophysiological mechanisms may explain these observations. Persistent low-grade inflammation, characterized by elevated interleukin-6 and tumor necrosis factor-α, has been shown to suppress osteoblast activity and disrupt the orderly remodeling sequence required for fracture consolidation. Concurrent endothelial dysfunction and a hypercoagulable state increase the risk of microvascular thrombosis at the fracture site, further impairing perfusion of the regenerating callus.

Conclusion

Patients aged 45–85 years with prior SARS-CoV-2 infection demonstrated significantly worse postoperative outcomes following traumatologic procedures compared with COVID-19-naïve controls. Statistically significant differences were observed in postoperative length of stay, postoperative pain, functional recovery, and time to radiographic bone union. These results support the inclusion of COVID-19 history in preoperative risk stratification for orthopedic patients and underscore the need for tailored perioperative management protocols in regional trauma centers.

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RADIOBIOLOGIYA VA UNING FUNDAMENTAL TIBBIYOT SOHASIDA O‘QITILISHI

Annotatsiya. *Ushbu maqolada radiobiologiya fanining fundamental nazariy asoslari, uning tibbiyot sohasidagi ahamiyati hamda ta’lim jarayonida samarali o‘qitish usullari ilmiy jihatdan tahlil qilingan. Radiobiologiyani o‘qitishda zamonaviy pedagogik texnologiyalar, raqamli ta’lim vositalari va innovatsion yondashuvlarni qo‘llash samaradorligi asoslab berilgan. Shuningdek, radiatsiya ta’sirini modellashtirishga asoslangan gibrid ta’lim modeli va klinik keyslar asosidagi o‘qitish tizimi taklif etilgan.*

Kalit so‘zlar: *radiobiologiya, ionlashtiruvchi nurlanish, DNK, radioterapiya, tibbiy ta’lim, pedagogik texnologiya, modellashtirish.*

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RADIOBIOLOGY AND ITS TEACHING IN THE FIELD OF FUNDAMENTAL MEDICINE

Abstract. *This article provides a scientific analysis of the fundamental theoretical foundations of radiobiology, its significance in the field of medicine, and effective teaching methods within the educational process. The effectiveness of applying modern pedagogical technologies, digital learning tools, and innovative approaches in teaching radiobiology is substantiated. In addition, a hybrid educational model based on radiation effect simulation and a case-based teaching system using clinical scenarios are proposed.*

Keywords: *radiobiology, ionizing radiation, DNA, radiotherapy, medical education, pedagogical technology, modeling.*

Kirish

Zamonaviy tibbiyotda ilmiy-texnik taraqqiyotning jadal rivojlanishi radiobiologiya fanining ahamiyatini tobora oshirmoqda. Radiobiologiya tirik

organizmlarga ionlashtiruvchi nurlanish ta’sirini o‘rganuvchi kompleks fan bo‘lib, u fizika, biologiya va tibbiyot fanlarining o‘zaro integratsiyasi asosida shakllangan. Ayniqsa, onkologiya, radiologiya, yadro tibbiyoti, diagnostik tasvirlash hamda radiatsion xavfsizlik sohalarida radiobiologiya bilimlari muhim o‘rin tutadi. Shu nuqtayi nazardan, tibbiy ta’lim tizimida radiobiologiyani chuqur va samarali o‘qitish, talabalarida nafaqat nazariy bilimlar, balki amaliy ko‘nikmalar va klinik fikrlash kompetensiyalarini shakllantirish dolzarb ilmiy-pedagogik masala hisoblanadi. Radiobiologiya va uning tibbiyotdagi o‘rni bo‘yicha olib borilgan ilmiy tadqiqotlar ushbu fanning biologik, fizik va klinik asoslarini chuqur yoritib beradi. Xususan, E.J. Hall va A.J. Giaccia tomonidan yaratilgan “Radiobiology for the Radiologist” tadqiqot ishida ionlashtiruvchi nurlanishning hujayra darajasidagi ta’sir mexanizmlari, DNK shikastlanishi, hujayra sikli buzilishlari hamda radioterapiyaning biologik asoslari tizimli ravishda tahlil qilingan [1]. Ushbu manba radiobiologiyaning fundamental nazariy asoslarini tushuntirishda eng muhim ilmiy tayanchlardan biri hisoblanadi. M.C. Joiner va A.J.van der Kogelning “Basic Clinical Radiobiology” ilmiy ishida esa radiobiologiyaning klinik jihatlari, jumladan nurlanish dozalari, fraksiyalash prinsiplari, to‘qimalarning radiosensitivligi va radioterapiya rejalashtirish jarayonlari chuqur yoritilgan [2]. Mazkur manba radiobiologiyani o‘qitishda nazariy bilimlarni klinik amaliyot bilan bog‘lash imkonini beradi.

Diagnostik tibbiyot yo‘nalishida J.T.Bushberg va boshq. tomonidan yozilgan “The Essential Physics of Medical Imaging” asarida rentgenografiya, kompyuter tomografiya, yadro diagnostikasi va boshqa tasvirlash usullarining fizik asoslari bayon etilgan [3]. Ushbu adabiyot radiobiologiyaning diagnostika fanlari bilan uzviy bog‘liqligini ko‘rsatadi hamda tibbiy yo‘nalishda ta’lim olayotgan talabalarda radiatsion jarayonlarni chuqur anglashga xizmat qiladi. E.B. Podgorsakning “Radiation Physics for Medical Physicists” asarida ionlashtiruvchi nurlanishning fizik xususiyatlari, dozimetriya, energiya yutilishi va nurlanishni hisoblash metodlari yoritilgan [4]. Bu esa radiobiologiyani o‘qitishda doza-ta’sir munosabatlarini ilmiy asosda tushuntirishda muhim manba hisoblanadi. Radiatsion xavfsizlik va himoya masalalari bo‘yicha H.Cember va T.E.Johnson tomonidan yozilgan “Introduction to Health Physics” asarida radiatsiya nazorati, himoya vositalari va biologik xavf omillari tahlil qilingan [5]. Shuningdek, F.A.Mettler va A.C.Uptonning “Medical Effects of Ionizing Radiation” kitobida ionlashtiruvchi nurlanishning inson organizmiga klinik va patologik ta’sirlari yoritilgan [6]. Bu manbalar radiobiologiyani sog‘liqni saqlash amaliyoti bilan bog‘liq holda o‘qitish zarurligini ko‘rsatadi. Xalqaro miqyosda ICRP tomonidan qabul qilingan The 2007 Recommendations of the ICRP hujjatida radiatsion himoyaning asosiy prinsiplari, doza cheklovlari va ALARA tamoyili belgilangan [7]. Mazkur tavsiyalar tibbiy ta’limda xavfsizlik kompetensiyalarini shakllantirish uchun muhim me’yoriy asosdir. UNSCEAR hisobotlarida esa nurlanish manbalari, uning uzoq muddatli biologik ta’siri va saraton xavfi ilmiy-statistik jihatdan baholangan [8]. Bu ma’lumotlar radiobiologiyaning nafaqat klinik, balki global sog‘liqni saqlash tizimidagi ahamiyatini ham namoyon etadi. Zamonaviy ilmiy

tadqiqotlarda radiobiologiyaning istiqbolli yo‘nalishlari ham keng yoritilgan. Jumladan, M. Durante va F.A.Cucinotta tomonidan kosmik parvozlarda radiatsion himoyaning fizik asoslari o‘rganilib, kosmik tibbiyotda radiobiologiyaning roli ko‘rsatib berilgan [9]. A.C. Begg va boshqalar radioterapiyani maqsadli dori vositalari bilan birgalikda qo‘llash strategiyalarini tahlil qilgan bo‘lib, bu onkologik davolashda yangi istiqbollarni ochadi [10].

Tibbiy diagnostika sohasida D.J. Brenner va E.J. Hall kompyuter tomografiya natijasida radiatsion yuklamaning ortib borayotganini ko‘rsatib, xavfsiz foydalanish zarurligini asoslagan [11]. R. Baskar va boshq. tomonidan radioterapiyaning zamonaviy yutuqlari va kelajak yo‘nalishlarini tahlil qilinib, radiobiologiyaning amaliy ahamiyatini ko‘rsatib berishgan [12]. M.Tubiana radioterapiyadan keyingi ikkilamchi o‘smalar xavfini kamaytirish masalalarini o‘rgangan bo‘lib, bu radiatsiyaning uzoq muddatli ta’sirlarini hisobga olish zarurligini ko‘rsatadi [13]. Umuman olganda, tahlil qilingan ilmiy manbalar shuni ko‘rsatadiki, radiobiologiya fanini tibbiy ta’limda o‘qitish faqat nazariy bilim berish bilan cheklanib qolmasdan, balki klinik fikrlash, radiatsion xavfsizlik madaniyati, diagnostik tafakkur va amaliy kompetensiyalarni shakllantirishga yo‘naltirilishi lozim. Shu sababli radiobiologiyani o‘qitishda zamonaviy pedagogik texnologiyalar, simulyatsion modellar, virtual laboratoriyalar va klinik keyslar asosidagi yondashuvlarni joriy etish bugungi kunning dolzarb vazifalaridan biri hisoblanadi. So‘nggi yillardagi Scopus bazasida indekslangan tadqiqotlar radiobiologiyaning nafaqat nazariy, balki yuqori texnologik klinik yo‘nalish sifatida ham jadal rivojlanayotganini ko‘rsatadi. Xususan, Citrin radioterapiyada individual yondashuv va aniq nishonli nurlantirish texnologiyalarining samaradorligini asoslagan bo‘lsa[14], Baskar va boshq. radiatsiyaning saraton hujayralariga molekulyar ta’sir mexanizmlarini yoritgan[15]. Mazkur tadqiqotlar radiobiologiyani fundamental tibbiyot fanlari tarkibida zamonaviy ilmiy yondashuvlar asosida o‘qitish zarurligini tasdiqlaydi..

Tadqiqot metodologiyasi

Radiobiologiya fanining asosini ionlashtiruvchi nurlanish va uning biologik tizimlarga ta’sir mexanizmlari tashkil etadi. Ionlashtiruvchi nurlanish turlariga alfa va beta zarrachalar, gamma nurlanish, rentgen nurlari hamda neytronlar kiradi. Ularning har biri energiyasi va kirib borish qobiliyatiga qarab tirik to‘qimalarga turlicha ta’sir ko‘rsatadi. Nurlanish ta’siri bosqichma-bosqich amalga oshadi. Birinchi bosqichda fizik jarayonlar — energiyaning yutilishi va ionlanish kuzatiladi. Keyingi bosqichda kimyoviy reaksiyalar ro‘y berib, erkin radikallar hosil bo‘ladi. Bu radikallar biomolekulalarga, ayniqsa DNK tuzilishiga zarar yetkazadi. Biologik bosqichda esa hujayra funksiyalari buzilib, mutatsiyalar yoki hujayra o‘limi sodir bo‘ladi. DNK shikastlanishi radiobiologiyada markaziy o‘rin tutadi. Nurlanish ta’sirida yakka va ikki zanjirli uzilishlar yuzaga keladi. Organizmda reparatsiya mexanizmlari mavjud bo‘lib, ular zararlangan DNKni tiklashga harakat qiladi. Ammo yuqori doza ta’sirida bu mexanizmlar yetarli bo‘lmay, patologiyalar rivojlanishi mumkin.

Nurlanish ta’siri doza bilan bog‘liq bo‘lib, kam dozada stoxastik, ya’ni ehtimoliy ta’sirlar kuzatiladi, katta dozada esa deterministik, ya’ni aniq klinik belgilar bilan namoyon bo‘ladigan ta’sirlar yuzaga keladi. Fundamental tibbiyotda radiobiologiyaning ahamiyati juda katta. Radiobiologiya tibbiyotning bir qator muhim yo‘nalishlarida nazariy va amaliy asos bo‘lib xizmat qiladi. Onkologiyada radioterapiya usuli o‘sma hujayralarini yo‘q qilishda keng qo‘llaniladi. Bunda asosiy vazifa — zararlangan hujayralarni maksimal darajada yo‘q qilish va sog‘lom to‘qimalarni saqlab qolishdir. Diagnostika sohasida rentgenografiya, kompyuter tomografiya va pozitron-emission tomografiya kabi usullar inson organizmining ichki tuzilishini aniqlash imkonini beradi.

Shuningdek, radioproteksiya sohasida insonni nurlanishdan himoya qilish choralarini ishlab chiqish muhim hisoblanadi. Bunda vaqtni qisqartirish, masofani oshirish va himoya vositalaridan foydalanish asosiy prinsiplardir. Zamonaviy ilmiy yo‘nalishlardan biri bo‘lgan kosmik tibbiyot va astrobiologiyada ham radiobiologiya muhim o‘rin tutadi. Kosmik nurlanishning inson organizmiga ta’sirini o‘rganish kelajakdagi kosmik missiyalar uchun zarur hisoblanadi. Amaliyotda radiobiologiyani o‘qitish jarayonida bir qator muammolar kuzatiladi. Jumladan, nazariy materiallarning ustunligi talabalar tomonidan chuqur tushunishni cheklaydi. Amaliy mashg‘ulotlarning kamligi esa bilimlarning real hayotda qo‘llanilishini pasaytiradi. Laboratoriya jihozlarining yetishmasligi va fanlararo integratsiyaning pastligi ham ta’lim samaradorligiga salbiy ta’sir ko‘rsatadi. Mazkur muammolarni bartaraf etish uchun radiobiologiyani o‘qitishda innovatsion pedagogik texnologiyalarni qo‘llash muhim ahamiyatga ega. Xususan, modellashtirish texnologiyasi talabalar uchun nurlanish jarayonlarini vizual tarzda tushunishga yordam beradi. Virtual laboratoriyalar orqali DNK shikastlanishi va hujayra reaksiyalarini modellashtirish ta’lim samaradorligini oshiradi. Keys-stadi usuli esa talabalarni real klinik holatlar asosida tahlil qilishga o‘rgatadi. Bu usul orqali ular radioterapiya rejasini tuzish, dozani hisoblash va davolash strategiyasini ishlab chiqish ko‘nikmalariga ega bo‘ladilar. Muammoli ta’lim (problem-based learning) talabalarida mustaqil fikrlash va tahlil qilish qobiliyatini rivojlantiradi. Raqamli platformalar va onlayn simulyatorlar esa ta’lim jarayonini interaktiv va qiziqarli qiladi. Quyidagi pedagogik model mualliflik yondashuvi sifatida keltirib o‘tiladi. Tadqiqot doirasida radiobiologiyani o‘qitishning gibrid modeli taklif etiladi. Ushbu model uch bosqichdan iborat bo‘lib, birinchi bosqichda nazariy bilimlar multimedia vositalari orqali beriladi. Ikkinchi bosqichda simulyatsiya va virtual laboratoriyalar yordamida bilimlar mustahkamlanadi. Uchinchi bosqichda esa klinik keyslar asosida amaliy ko‘nikmalar shakllantiriladi. Mazkur model talabalarida kompleks bilim, amaliy ko‘nikma va klinik fikrlashni bir vaqtning o‘zida rivojlantirishga xizmat qiladi.

Tahlil va natijalar

Tadqiqot radiobiologiya fanini fundamental tibbiyot yo‘nalishida o‘qitish samaradorligini aniqlash maqsadida kompleks pedagogik yondashuv asosida tashkil etildi. Ilmiy izlanishda pedagogik eksperiment, diagnostik test, anonim so‘rovnoma, kuzatuv hamda taqqoslash metodlaridan foydalanildi. Tajriba-sinov

ishlari oliy tibbiyot ta’lim muassasasining talabalari ishtirokida olib borilib, ular nazorat va tajriba guruhlariga ajratildi. Nazorat guruhida an’anaviy o‘qitish usullari qo‘llanilgan bo‘lsa, tajriba guruhida modellashtirish texnologiyasi, virtual laboratoriyalar, klinik keyslar, muammoli ta’lim (PBL), interaktiv taqdimotlar hamda raqamli platformalar asosida ishlab chiqilgan gibrid o‘qitish modeli joriy etildi. Tadqiqotning boshlang‘ich bosqichida talabalar bilim darajasi kirish testi orqali aniqlanib, radiobiologiyaning nazariy asoslari, ionlashtiruvchi nurlanishning biologik ta’siri, DNK shikastlanish mexanizmlari, radioterapiya prinsiplari va radiatsion xavfsizlik bo‘yicha dastlabki ko‘rsatkichlar qayd etildi. Yakuniy bosqichda esa qayta test, amaliy topshiriqlar, klinik vaziyatli masalalar hamda talabalarning fan bo‘yicha motivatsion holatini baholovchi so‘rovnomalar o‘tkazildi. Olingan natijalar tajriba guruhida sezilarli ijobiy o‘zgarishlar kuzatilganini ko‘rsatdi. Xususan, nazariy bilimlarni o‘zlashtirish darajasi o‘rtacha 30–40 foizga oshdi, murakkab biologik jarayonlarni tushunish ko‘rsatkichi yaxshilandi, radioterapiya dozalarini tahlil qilish va klinik holatlarni baholash bo‘yicha amaliy ko‘nikmalar shakllandi. Shuningdek, talabalar tomonidan mustaqil ta’lim resurslaridan foydalanish faolligi ortdi, fan bo‘yicha qiziqish va kasbiy motivatsiya darajasi yuqori ko‘rsatkichlarni namoyon etdi. So‘rovnoma natijalari talabalar innovatsion metodlar orqali o‘qitilgan mavzularni an’anaviy usullarga nisbatan osonroq va qiziqarliroq o‘zlashtirganliklarini tasdiqladi. Natijalar statistik jihatdan tahlil qilinganda, gibrid model asosida tashkil etilgan ta’lim jarayoni radiobiologiyani o‘qitish samaradorligini oshirishi, nazariya va amaliyot integratsiyasini ta’minlashi hamda klinik fikrlash kompetensiyalarini rivojlantirishi isbotlandi.

Xulosa va takliflar

Radiobiologiya fanini fundamental tibbiyot ta’limida samarali o‘qitish zamonaviy pedagogik texnologiyalar, raqamli vositalar va innovatsion metodik yondashuvlarni ta’lim jarayoniga tizimli joriy etishni talab qiladi. An’anaviy ma’ruza usullarini interaktiv metodlar bilan uyg‘unlashtirish talabalar bilimini mustahkamlash, ularning mustaqil fikrlashini rivojlantirish va kasbiy kompetensiyalarini shakllantirishda muhim omil hisoblanadi. Tadqiqot natijalari shuni ko‘rsatdiki, modellashtirish texnologiyasi radiatsiya ta’sirining murakkab mexanizmlarini vizual va tushunarli shaklda anglash imkonini beradi. Keys-stadi usuli real klinik holatlarni tahlil qilish orqali qaror qabul qilish ko‘nikmalarini rivojlantiradi. Virtual laboratoriyalar va raqamli platformalar esa ta’lim jarayonining interaktivligini oshirib, laboratoriya resurslari cheklangan sharoitda ham yuqori samaradorlikka erishish imkonini yaratadi. Taklif etilgan uch bosqichli gibrid model — nazariy tayyorgarlik, simulyatsion mustahkamlash va klinik-amaliy integratsiya — radiobiologiyani o‘qitishning samarali mexanizmi sifatida tavsiya etiladi. Ushbu model kelajakda radiolog, onkolog, yadro tibbiyoti mutaxassisi hamda radiatsion xavfsizlik sohasida faoliyat yurituvchi yuqori malakali kadrlarni tayyorlashga xizmat qiladi. Shu bois radiobiologiya fanini o‘qitishda kompetensiyaviy yondashuv, raqamlashtirish va innovatsion metodlarni

keng joriy etish zamonaviy tibbiy ta’limning ustuvor yo‘nalishlaridan biri bo‘lib qoladi.

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SEMENT ZAVODLARIDAN CHIQAYOTGAN CHIQINDILARNI ATROF-MUHITGA TA’SIRINI EKOLOGIK BAHOLASH

Annotatsiya. *Ushbu maqola sement zavodlaridan chiqayotgan zararli chiqindilarning atrof-muhitga ta’sirini tahlil qiladi. Maqolada sement ishlab chiqarishning atrof-muhitga ta’sirini ko’rib chiqadi. Sement ishlab chiqarish jarayonida atmosferaga chiqarilayotgan zararli moddalar tahlili o’tkazildi.*

Kalit so’zlar: *sement, ishlab chiqarish, samaradorlikni baholash, sanoat chiqindilari, atrof-muhit, o’sish.*

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ENVIRONMENTAL ASSESSMENT OF THE ENVIRONMENTAL IMPACT OF WASTE FROM CEMENT PLANTS

Abstract. *This article analyzes the environmental impact of harmful emissions emitted by cement plants. The article examines the environmental impact of cement production. An analysis of harmful substances emitted into the atmosphere during the cement production process was conducted.*

Keywords: *cement, production, efficiency assessment, industrial waste, environment, growth*

Keyingi o'n yillikda insoniyat jamiyatining tabiatga bo'lgan munosabatini, kelajak avlodlarning barqaror rivojlanishini ta'minlash uchun uni asrab-avaylash muammosini sezilarli darajada o'zgartirish bo'yicha jiddiy amaliy qadamlar qo'yildi. Yechilmagan ekologik muammolar havzasi o'sishda davom etmoqda. Buning sabablari juda ko'p, eng muhimi atrof muhitni sanoat chiqindilaridan himoya qilish sohasidagi ekologik qaror qabul qiluvchilarning zaifligi. Bu atmosfera havosini chang va gaz chiqindilaridan himoya qilish muammosiga ham to'liq taalluqlidir.

Ushbu ishning maqsadi: Andijon viloyati, Nayman qishlog'i manzilida joylashgan "CONCH" MCHJ sement ishlab chiqaruvchi tashkilotining atrof-muhitga ta'sirini ekologik baholashdan iborat.

Atrof-muhitga ta'sirini baholash (ATB) loyihasi O'zbekiston Respublikasining "Tabiatni muxofaza qilish to'g'risida'gi, "Atrof-muhitga ta'sirini baholash qo'llanmalar asosida ishlab chiqilgan.

Korxonaning atrof-muhitga ta'sirini baholash uchun quyidagi vazifalarni hal qilish kerak:

1. Korxona joylashgan hududdagi atrof-muhitning hozirgi holatini baholash;
2. Loyihaviy yechimning ekologik tahlilini o'tkazish;
3. Asosiy ishlab chiqarish chiqindilaridan havo ifloslanish darajasini baholash;
4. Loyihaviy yechimlar amalga oshirilgandan so'ng hosil bo'ladigan ishlab chiqarish va iste'mol chiqindilari miqdorini baholash va ularni joylashtirish va yo'q qilish masalalarini ko'rib chiqish;

Favqulodda xavflarni baholash:

Tahlil

Shamol sharoitlari havoning ifloslanish darajasiga ta'sir qiluvchi muhim meteorologik omil hisoblanadi. Yengil shamollar (0-1,0m/s) ifloslantiruvchi moddalarning atmosferaga tashilishi va tarqalishini belgilovchi muhim omil hisoblanadi. Ushbu shamollarning chastotasi ancha yuqori-52%. Sirt haroratning inversiyalari havo massalarining konvektiv harakatiga to'sqinlik qiladi va shu bilan atmosferada ifloslantiruvchi moddalarning tarqalishini murakkablashtiradi.

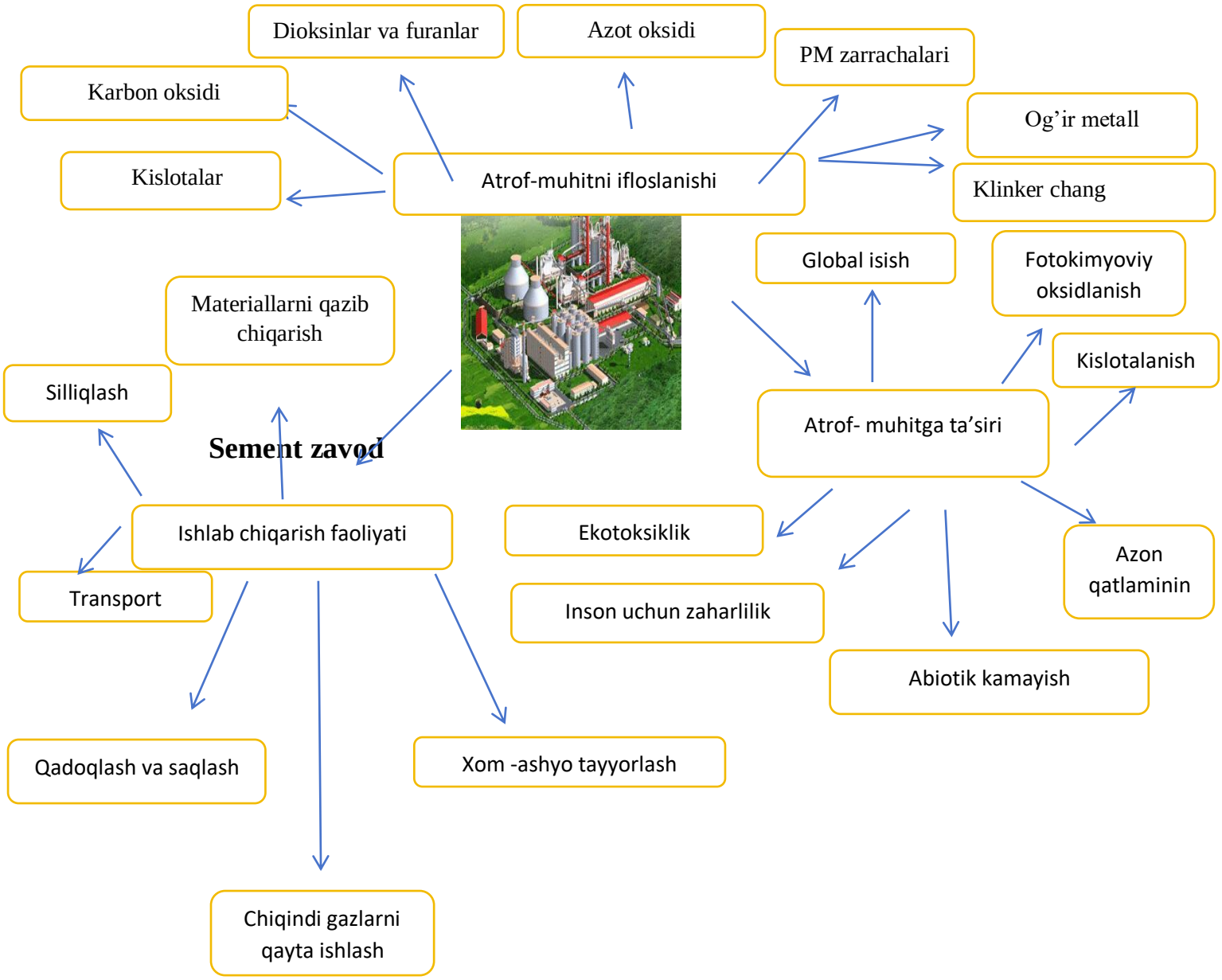
Shamol yetishmasligi bilan birgalikda bu sharoitlar havoning turg'unligiga olib keladi, bu 32% hollarda sodir bo'ladi. Inversiyalar odatda tunda sodir bo'ladi va qisqa muddatli bo'ladi. Xulosa qilib shuni aytish mumkinki, o'rganilayotgan hududdagi iqlim, meteorologik va fizik-geografik omillar atmosferaning sirt qatlamida ifloslantiruvchi moddalarning tarqalishi uchun to'liq qulay emas. Bu

ayniqsa, iyul-oktabr oylarida, shamol tezligi past bo’lgan va yog’ingarchilik minimal bo’lganda to’g’ri keladi.

Korxonaning ishlashi davomida atmosfera havosiga ta’siri quyidagi ifloslantiruvchi moddalarning kiritilishi bilan aniqlanadi: klinker changi, sement changi, ohaktosh changi, gips changi, temir changi , azot oksidi, oltingugurt dioksidi, karbon monoksit, azot oksidi, temir oksidi, metal oksidi, uglevodorodlar.

Korxona faoliyati davomida atrof-muhitga ta’sir qilish manbalari quyidagilar keltirilgan:

1. Xom ashyoni tashish, saqlash, quritish va maydalash jarayonlari:
2. Klinkerni yoqish, saqlash va maydalash jarayonlari:
3. Sementni saqlash, maydalash va tarqatish jarayonlari:
4. Xomashyo tayyorlash jarayonlari:
5. Dizel yoqilg’isi va moyni qabul qilish, saqlash va tarqatish jarayonlari:



Kitob tumanidagi zavod yiliga 1,2 million tonna sement ishlab chiqarish quvvatiga ega bo‘ladi. U M-400, M-500 va M-600 markali portlend tsementlarini ishlab chiqaradi. Mahsulotning qariyb 70 foizi ichki bozorga, qolgan 30 foizi Qozog‘iston, Qirg‘iziston, Afg‘oniston va Xitoyga eksport qilinadi. Zavodda mahalliy xomashyo – Qashqadaryo viloyatida keng tarqalgan ohaktosh va lyossdan foydalaniladi. Loyihaning umumiy qiymati 150 million dollardan oshdi, to‘liq Xitoy tomoni investitsiya qildi. Yangi sanoat obyekti 400 dan ortiq yangi ish o‘rni yaratdi.

Bundan tashqari, Anhui Conch Cement o’tgan yilning dekabr oyida Toshkent viloyatining Ohangaron tumanida yana bir sement zavodi qurilishini boshladi. Ushbu loyiha uchun karer qazish uchun 183,3 gektar va zavod qurilishi uchun 34,2 gektar yer ajratilgan. Zavod to'liq ishga tushirilgach, yiliga 2,5 million tonna sement ishlab chiqaradi. Ushbu loyihaning umumiy qiymati 200 million

dollardan oshadi. Anhui Conch Cement - Anhui provinsiyasi hukumatiga qarashli davlat kompaniyasi. Uning sementi Amerika ASTM va Yevropa EN-197 sifat standartlariga javob beradi va
40 dan ortiq mamlakatlarga eksport qilinadi. Kompaniya Rossiya, Indoneziya, Kambodja, Myanma, Laos va Vetnamda zavodlarga ega.

Andijon konch sement zavodi - Andijon viloyatining Buloqboshi tumanida Xitoyning Anhui Conch Cement kompaniyasi bilan hamkorlikda qurilayotgan yangi ob'ekt. 48 gektar maydonda joylashgan loyiha qiymati 250 million dollarni tashkil etadi va yiliga 2,5 million tonna sement ishlab chiqarish quvvatiga ega. Zavod xalqaro standartlarga javob beradigan sement ishlab chiqaradi va taxminan 750 ish o'rni yaratadi.

Bugungi kunda sement zavodlaridan chiqayotgan chiqindilar global ekologik muammoga aylanib bormoqda. Sement zavodlaridan chiqayotgan chiqindilar bevosita atrof-muhitga, tuproqqa, o’simlikka ham o’z ta’sirini ko’rsatmoqda. Bu tadqiqod ishida atrof-muhit, tuproq va o’simlikka ta’sirini tahlil qilamiz. Sement zavodi chiqindilari havo , tuproq va suv ifloslanishi hamda yuqori energiya sarfi orqali
atrof-muhitga salbiy ta'sir ko'rsatadi. Asosiy ifloslantiruvchi moddalar mayda chang, azot oksidlari (NO_x), oltingugurt dioksidi (SO_2) va karbonat angidrid (CO_2) bo'lib, ular nafas olish yo'llari kasalliklari, kislotali yomg'irlarni keltirib chiqaradi, suv sifatini yomonlashtiradi va iqlim o'zgarishiga sabab bo’ladi.

Atmosferaga ta’sir qiluvchi chang: Katta hajmda chiqadigan mayda chang tuproq va suv havzalarini qoplashi va nafas olganda odamlar va hayvonlarning o’pkasiga zarar yetkazishi mumkin. Issiqxona gazlari: sement ishlab chiqarish
CO_2 chiqindilarining muhim manbai hisoblanadi (har bir tonna sement uchun taxminan 0,7 tonna), bu esa global isishga olib keladi. Azot oksidlari (NOx) va oltingugurt dioksidi (SO_2): Bu gazlar yer sathidagi ozon va kislotali yomg'irning hosil bo'lishiga o’z hissasini qo'shadi va sog'liq muammolarini keltirib chiqaradi. Boshqa ifloslantiruvchi moddalar: Ayniqsa, zavod chiqindilarni yoqishdan foydalansa, simob, kadmiy va xlor birikmalari ham chiqindilarda mavjud bo'lishi mumkin.

Sement zavodidan chiqayotgan chiqindilarning tuproq va suvga ta'siri.

Tuproq ifloslanishi: Ishqoriy tarkibga ega bo'lgan changning cho'kishi tuproq sifatiga va zavod yaqinidagi o'simliklarning o'sishiga ham salbiy ta'sir ko'rsatishi mumkin.

Suv ifloslanishi

Chang zarralari va boshqa ifloslantiruvchi moddalar suv havzalariga kirib, suv sifatini yomonlashtirishi va suvosti tirik organizmlarga zarar yetkazishi mumkin.

1. Sement zavodlarida xomashyo (ohaktosh, gil, temir oksidi, qum)
1400-1500°C da kuydiriladi. Bu jarayonda quyidagi asosiy chiqindilar hosil bo‘ladi:

1.1. Chang (PM10, PM2.5)

Xomashyo maydalash, aralashtirish, kuydirish va sementni qadoqlash jarayonida hosil bo‘ladi.

PM10 - o‘rtacha yirik zarrachalar;

PM2.5 - nafas yo‘llariga oson kirib ketadigan eng xavfli zarracha turi.

1.2. Azot oksidlari (NO_x), Pechning juda yuqori yonish harorati (1400°C) asosan NO va NO_2 natijasida hosil bo‘ladi.

1.3. Oltingugurt oksidlari (SO_2). Xomashyo va ko‘mir/turli yoqilg‘ilardagi oltingugurt yonishi natijasida chiqadi.

1.4. Uglerod oksidi (CO) va uglerod dioksidi (CO_2).Yoqilg‘ining to‘liq yoki to‘liq bo‘lmagan yonishi natijasida hosil bo‘ladi. 1 tonna sement ishlab chiqarish jarayonida 0,8–1,0 tonna CO_2 chiqadi.

1.5. O‘ta nozik chang: klinker changi (CaO, SiO_2, Al_2O_3, Fe_2O_3). Bu chang tarkibida ohaktosh va minerallar bo‘lib, atrof-muhit uchun xavfli.

1.6.Og‘ir metall izlari. Ba’zan xomashyoda yoki yoqilg‘ida quyidagi metallarning iz miqdori bo‘ladi: Hg (simob), Pb (qo‘rg‘oshin), Cd (kadmiy), Cr (xrom), Ni (nikel), As (mishyak). Bu moddalar chang bilan havoga qo‘shilishi mumkin.

XULOSA

Zamonaviy rivojlanishning ajralmas qismi bo’lgan sement sanoati ishlab chiqarish bosqichlarida (NO_2), (SO_2), (PM), kabi ifloslantiruvchi moddalarni atmosferaga chiqarishi sababli muhim ekologik muammolarni keltirib chiqaradi. Ushbu emissiyalar havo sifatiga, atrof-muhitga, inson salomatligiga ta’sir qiluvchi va global isishga hissa qo’shadigan keng qamrovli oqibatlarni olib keladi. Atrof-muhit chiqindilarini kamaytirish uchun muqobil material sifatida zamonaviy filtrlar, elektrostatik cho’ktirgichlar yoki geopolimer betondan foydalanish kerak.

Ushbu tadqiqot natijalari sement sanoatining atrof-muhitga ko‘rsatadigan ta’siri kompleks va ko‘p omilli ekanligini tasdiqlaydi. Xususan, ishlab chiqarish jarayonining barcha bosqichlarida – xomashyoni tayyorlash, klinker hosil qilish, sovitish va maydalash jarayonlarida – atmosfera havosiga chiqariladigan chang va gazsimon moddalar ekologik muvozanatga sezilarli salbiy ta’sir ko‘rsatadi. Tadqiqot hududida olib borilgan ekologik baholash natijalari shuni ko‘rsatdiki, meteorologik omillar, ayniqsa shamol tezligining pastligi va harorat inversiyasi holatlari ifloslantiruvchi moddalarning atmosferada to‘planib qolishiga sabab bo‘lib, ularning tarqalishini cheklaydi.

Aniqlanishicha, sement ishlab chiqarish jarayonida hosil bo‘ladigan asosiy ifloslantiruvchi moddalar – PM2.5 va PM10 zarrachalari, azot oksidlari (NOx), oltingugurt dioksidi (SO_2), uglerod oksidi (CO) va uglerod dioksidi (CO_2) – nafaqat atmosfera havosi sifatini yomonlashtiradi, balki inson salomatligiga ham jiddiy xavf tug‘diradi. Ayniqsa, mayda dispersli chang zarrachalari nafas olish tizimi kasalliklari rivojlanishiga olib kelishi mumkin. Bundan tashqari, og‘ir metallarning mavjudligi tuproq va suv resurslarining degradatsiyasiga sabab bo‘lishi aniqlangan.

Tadqiqot natijalari shuni ko‘rsatadiki, sement ishlab chiqarish jarayonida har bir tonna mahsulot uchun katta miqdorda CO_2 ajralib chiqadi, bu esa global

iqlim o‘zgarishlariga sezilarli hissa qo‘shadi. Shu boisdan sement sanoati nafaqat mahalliy, balki global ekologik muammolarni kuchaytiruvchi omillardan biri hisoblanadi.

Ekologik xavflarni kamaytirish maqsadida zamonaviy gaz-tozalash texnologiyalarini joriy etish, jumladan, elektrostatik filtrlardan, yuqori samarali chang ushlagichlardan va absorber tizimlaridan foydalanish muhim ahamiyatga ega. Shuningdek, ishlab chiqarishda energiya tejamkor texnologiyalarni qo‘llash, alternativ yoqilg‘ilardan foydalanish hamda geopolimer materiallar asosidagi sement ishlab chiqarishni kengaytirish ekologik yuklamani sezilarli darajada kamaytiradi.

Yakuniy natija sifatida aytish mumkinki, sement sanoatining barqaror rivojlanishini ta’minlash uchun ekologik monitoring tizimini kuchaytirish, chiqindilarni nazorat qilishning zamonaviy usullarini joriy etish hamda xalqaro ekologik standartlarga mos ishlab chiqarishni yo‘lga qo‘yish zarur hisoblanadi.

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IQLIM O‘ZGARISHINING O‘ZBEKISTON TABIIY RESURSLARIGA TA’SIRI VA EKOLOGIK MUVOZANATNI TA’MINLASH CHORALARINING AHAMIYATI

Annotatsiya. *Mazkur ilmiy maqolada global iqlim o‘zgarishining O‘zbekiston tabiiy resurslari tizimiga ko‘rsatayotgan ta’siri kompleks yondashuv asosida tahlil etilgan. Tadqiqot davomida iqlim o‘zgarishining shakllanish omillari — tabiiy va antropogen faktorlar ajratib ko‘rsatilib, ularning suv resurslari, qishloq xo‘jaligi yer fondi, biologik xilma-xillik hamda landshaft tizimlariga ta’siri ilmiy asosda yoritilgan. Shuningdek, ekologik muvozanatni ta’minlash, resurslardan oqilona foydalanish va iqlim o‘zgarishiga moslashuv strategiyalarining ahamiyati asoslab berilgan. Tadqiqot natijalari iqlim o‘zgarishining salbiy oqibatlarini yumshatish uchun tizimli yondashuv zarurligini ko‘rsatadi.*

Kalit so‘zlar. *iqlim o‘zgarishi, global isish, tabiiy resurslar, suv tanqisligi, cho‘llanish, ekologik muvozanat, antropogen omillar, barqaror rivojlanish.*

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THE IMPACT OF CLIMATE CHANGE ON THE NATURAL RESOURCES OF UZBEKISTAN AND THE IMPORTANCE OF MEASURES TO ENSURE ECOLOGICAL BALANCE

Abstract. *This scientific article analyzes the impact of global climate change on the system of natural resources of Uzbekistan based on a comprehensive approach. The study identifies the factors contributing to climate change - natural and anthropogenic - and scientifically examines their effects on water resources, agricultural land фонд, biodiversity, and landscape systems. Furthermore, the importance of maintaining ecological balance, rational use of resources, and adaptation strategies to climate change is substantiated. The*

results of the study demonstrate the necessity of a systematic approach to mitigate the negative consequences of climate change.

Keywords: *climate change, global warming, natural resources, water scarcity, desertification, ecological balance, anthropogenic factors, sustainable development.*

Kirish

Bugungi kunda iqlim o‘zgarishi global ekologik muammolar ichida eng dolzarb masalalardan biri sifatida e’tirof etilmoqda. Mazkur jarayon atmosfera haroratining ortishi, yog‘in rejimining o‘zgarishi, muzliklarning qisqarishi hamda ekstremal iqlim hodisalari chastotasining ortishi bilan tavsiflanadi. Ushbu o‘zgarishlar tabiiy omillar bilan bir qatorda inson faoliyatining kuchayishi, xususan sanoatlashuv, transport infratuzilmasining kengayishi va intensiv qishloq xo‘jaligi bilan chambarchas bog‘liqdir.

O‘zbekiston Respublikasi tabiiy resurslarga boy hudud hisoblanib, suv, yer, flora va fauna resurslari mamlakat iqtisodiy taraqqiyotida muhim o‘rin tutadi. Biroq iqlim o‘zgarishining kuchayishi ushbu resurslarning sifat va miqdor ko‘rsatkichlariga salbiy ta’sir ko‘rsatib, ularni muhofaza qilish va samarali boshqarish zaruratini keskin oshirmoqda.

Tadqiqot metodologiyasi

Tadqiqot jarayonida kompleks ilmiy yondashuv qo‘llanilib, statistik tahlil, qiyosiy-geografik tahlil, tizimli yondashuv hamda ilmiy manbalarni tahlil qilish usullaridan foydalanildi. Iqlim ko‘rsatkichlarining uzoq muddatli dinamikasi asosida hududiy o‘zgarishlar baholandi.

Asosiy qism

Iqlim ko‘rsatkichlaridagi o‘zgarishlar dinamikasi. So‘nggi yarim asr davomida O‘zbekiston hududida o‘rtacha yillik haroratning 1,5–2°C ga oshgani kuzatilmoqda. Mavsumiy tahlillar shuni ko‘rsatadiki, qish oylarida harorat 0,5–1°C ga, yoz mavsumida esa 1–1,5°C ga ortgan. Mazkur jarayon issiq to‘lqinlarining kuchayishi va qurg‘oqchilik davrlarining uzayishiga olib kelmoqda.

Yog‘ingarchilik rejimida ham sezilarli o‘zgarishlar kuzatilmoqda. Xususan, janubiy va markaziy hududlarda umumiy yog‘in miqdori kamaygan bo‘lsa, ayrim hududlarda qisqa muddatli, lekin kuchli yog‘in hodisalari ko‘paygan. Bu esa gidrologik rejimning barqarorligiga salbiy ta’sir ko‘rsatmoqda.

Iqlim o‘zgarishining asosiy omillari.

Hududda iqlim o‘zgarishiga ta’sir etuvchi omillar ikki guruhga ajratiladi:

Tabiiy omillar*:* geografik joylashuv, relyef xususiyatlari, atmosfera sirkulyatsiyasi va gidrologik tizimlar;

Antropogen omillar*:* sanoat chiqindilari, transport vositalaridan ajralib chiqayotgan gazlar, noto‘g‘ri sug‘orish tizimlari, o‘rmonlarning qisqarishi hamda Orol dengizi inqirozi.

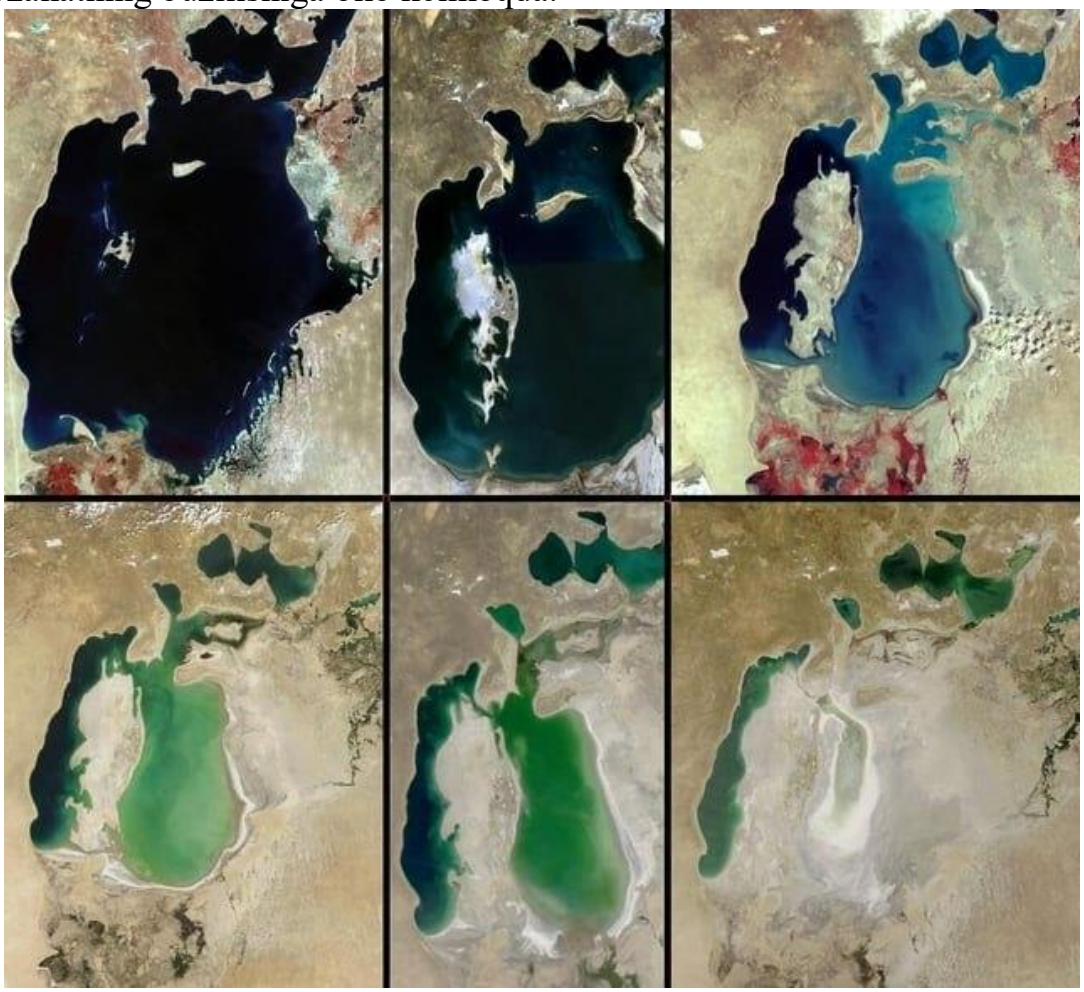
Orol dengizining qurishi mintaqaviy iqlimning keskin kontinental xususiyatga ega bo‘lishiga sabab bo‘lib, qurg‘oqchilik va chang bo‘ronlari chastotasining ortishiga olib kelgan.

Iqlim o‘zgarishining tabiiy resurslarga ta’siri. Suv resurslari. Amudaryo va Sirdaryo havzalarida suv oqimining kamayishi kuzatilmoqda. Muzliklarning qisqarishi va yog‘in miqdorining o‘zgarishi natijasida suv ta’minoti muammolari keskinlashmoqda.

Qishloq xo‘jaligi yerlari. Qurg‘oqchilik va tuproq sho‘rlanishi natijasida yerlarning unumdorligi pasayib, hosildorlik darajasi kamaymoqda. Bu esa oziq-ovqat xavfsizligiga salbiy ta’sir ko‘rsatadi.

Biologik xilma-xillik. Iqlim o‘zgarishi natijasida ayrim o‘simlik va hayvon turlarining yashash areallari torayib, ekotizimlarning barqarorligi izdan chiqmoqda.

Cho‘llanish jarayoni. Cho‘llanish jarayoni jadallashib, yangi hududlarni qamrab olmoqda. Bu esa landshaftlarning degradatsiyasiga va ekologik muvozanatning buzilishiga olib kelmoqda.



1-rasm. Orol dengizi 1973-2009-yillari oralig‘ida iqlim ta’sirida o‘zgarishi.

Iqlim o‘zgarishiga moslashish va ekologik muvozanatni saqlash choralari. Tabiiy resurslarni muhofaza qilish va iqlim o‘zgarishiga moslashish quyidagi yo‘nalishlarda amalga oshirilishi maqsadga muvofiq:

- suvni tejovchi innovatsion sug‘orish texnologiyalarini joriy etish;
- o‘rmonzorlarni kengaytirish va degradatsiyaga uchragan hududlarni rekultivatsiya qilish;

- quyosh va shamol energetikasi kabi qayta tiklanuvchi energiya manbalaridan foydalanishni kengaytirish;

- ekologik monitoring tizimini takomillashtirish;

- chiqindilarni qayta ishlash va ularni kamaytirish mexanizmlarini rivojlantirish;

- ekologik ta'lim va aholining ekologik madaniyatini oshirish.

Natijalar va muhokama

O'tkazilgan tahlillar shuni ko'rsatadiki, iqlim o'zgarishi O'zbekiston tabiiy resurslariga ko'p qirrali va murakkab ta'sir ko'rsatmoqda. Ayniqsa, suv resurslari tanqisligi, yer degradatsiyasi va biologik xilma-xillikning qisqarishi muhim ekologik muammolar sifatida namoyon bo'lmoqda. Ushbu jarayonlar uzoq muddatda iqtisodiy va ijtimoiy rivojlanishga salbiy ta'sir ko'rsatishi mumkin.

Xulosa

Umuman olganda, hozirgi kundagi iqlim o'zgarishi O'zbekiston tabiiy resurslarining barqarorligiga jiddiy tahdid solmoqda. Shu bois ekologik muvozanatni saqlash, resurslardan oqilona foydalanish va iqlim o'zgarishiga moslashuv choralarini kuchaytirish zarur. Ushbu yondashuvlar mamlakatning barqaror rivojlanishini ta'minlashda muhim omil hisoblanadi.

Amaliy takliflar

Ushbu tavsiyalarga har birimiz sidqidildan amal qilsak tabiiy muvozanat har holda tiklanarmidi:

- qayta tiklanuvchi energiya manbalarini keng joriy etish;

- suv resurslarini integratsiyalashgan boshqaruv tizimini rivojlantirish;

- ekologik toza qishloq xo'jaligi texnologiyalarini kengaytirish;

- transport tizimida ekologik standartlarni kuchaytirish;

- cho'llanishga qarshi kompleks dasturlarni amalga oshirish;

- aholining ekologik ongini oshirishga qaratilgan ta'lim dasturlarini kuchaytirish.

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YANGI O‘ZBEK SHE’RIYATIDA MUXAMMAS JANRINING SHAKLIY VA MAZMUNIY YANGILANISHI

Annotatsiya: *Ushbu maqolada yangi o'zbek adabiyotida mumtoz she'riyat, klassik janrlarga murojaat, adabiy-estetik hodisalardan ta'sirlanish ustunlik qiladi. Sharq xalqlari, jumladan o'zbek adabiyotida ta'bi xud muxammas va taxmis bitish an'anasi juda keng rivojlangan. Muxammas janrining o'ziga xosligi shundaki, unda muallif mavzu, kompozitsion qurilish, uslub, til, ifoda yo'sini jihatidan cheklanmagan bo'ladi*

Kalit so'zlar: *ta'bi xud muxammas, istiora, tashbeh, mubolag'a,*

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FORMAL AND THEMATIC INNOVATIONS IN THE GENRE OF MUKHAMMASS IN MODERN UZBEK POETRY

Annotation: *In this article, new Uzbek literature is dominated by classical poetry, reference to classical genres, influence of literary-aesthetic phenomena. In the literature of the Eastern peoples, including Uzbek, the tradition of tahbi mukhammas and takhmis is very widely developed. The uniqueness of the Mukhammas genre is that the author is not limited in terms of subject, compositional structure, style, language, expression.*

Key words: *tabi khud muhammas, metaphor, allusion, exaggeration*

Mumtoz adabiyotda shakllangan badiiy-estetik tafakkur XX asr ijodkorlari uchun ham mustahkam asos bo‘lib xizmat qildi. Bu davr she’riyati janriy xilma-xilligi, mazmun boyligi va ifoda vositalarining o‘ziga xosligi bilan o‘zbek adabiyoti taraqqiyotida muhim o‘rin egallaydi. Lutfiy, Alisher Navoiy, Bobur, Mashrab, Fuzuliy, Muqimiy, Furqat, Zavqiy kabi mumtoz adabiyotimizning zabardast vakillari ijodidan ilhomlanib, ularga izdoshlik, an’ana va o’ziga xos uslubda yaratilgan she’riyat durdonalari go’zal va jozibadorligi bilan ajralib turadi. Bunday namunalarning yaratilishida mumtoz adabiyot sir-asrorlarini puxta o’zlashtirgan, aruzning qonun-qoidalarini chuqur bilgan, ko’ngli va qalami g’azalga oshno, turli janrlarda mahorat ko’rsata olgan shoir Zokirjon Habibiyning ham betakror hissasi bor. Sho’x, o’ynoqi yallalari, dilrabo g’azallari bilan xalqimiz qalbidan joy olgan ijodkorning asarlari xalqimiz orasida keng tarqalgan, ijod ahli, muxlislar, san’atga oshno qalblarning ko’ngil gulshanidan mustahkam o’rin egallagan. Shoir mumtoz she’riyatning g’azal, masnaviy, tarje’band, murabba’,

muxammas, musaddas, ruboiy, tuyuq kabi janrlarida barakali ijod qilgan. ijodida muxammas janrining adabiy izdoshlik va mahorat maktabi sifatidagi namunalari orqali mumtoz adabiyotimizning bebaho an'analari davom ettirilgan. Ular orasida shoir tomonidan yaratilgan muxammaslar alohida o'rin egallaydi. Muxammas ijodkorning tuyg'u-kechinmalarini erkin ifodalash, boshqa shoirlar bilan poetik mahorat bobida musobaqalashish, ijodda kuch sinash, ijodiy-ruhiy bahslashuv, ikki shoirning qalban va ruhan muloqoti sifatida ma'lum va mashhurdir. Janrning bugungi kungacha yashab kelishi va takomili, ijod ahlining sevimli janrlaridan biriga aylanganligi, unga murojaatning o'ziga xos shakl (muloqot muxammas, aytishuv muxammas, madhiya muxammas, salomnoma muxammas)lari mavjudligi ham fikrimiz isbotidir.

Habibiy devonida 64 ta muxammas namunasi mavjud bo'lib, shundan 58 tasi ta'bi xud muxammaslar, 6 tasi esa taxmislardir. Taxmislar Alisher Navoiy (1), Fuzuliy (2), Furqat (1), Sobir Abdulla (2) g'azallariga bog'langan. Habibiy devonidagi muxammaslar yor, diyor, vatan, axloq, jamiyatda yuz berayotgan voqealar tasviriga bag'ishlangan. Shoir ijodida "Sayru gulzor", "Ohista-ohista", "Diyorimsan", "Axloq", "Do'st haqida", "Yunis Rajabiyning muzika xizmati haqida", "Samarqand" kabi tab'i xud muxammaslarining alohida o'rni bor[27].[1]

Habibiyning ta'bi xud muxammaslarida istiora, tashbeh, mubolag'a, lutf kabi she'riy san'atlar faol istifoda etilib, ular shirali, o'ynoqi so'zlar, to'liq va jaranddor qofiyaning san'atkorona qo'llanishi bilan ajralib turadi. Masalan, shoirning "Ohista-ohista" nomli ta'bi xud muxammasida shoir mumtoz adabiyotda faol qo'llanilgan jonon, xiromon, qon, jon, yor, nigor, ash'or, ruxsor, arjumand, pisand, bahramand, xirom, maqom, shom, kom kabi qofiyadosh so'zlarni o'z o'rnida, samarali qo'llab, yor yo'liga intizor oshiqning qalb tug'yonlari, ruhiy holati tasvbiriga xos poetik manzara yarata olgan:

Ajab jononlar ichra tengi yo'q gulchehra jononim,
Jahon gulzorining oroyishi sarvi xiromonim,
Yurak urgay dukullab o'ylasam to'lqin bila qonim,
Hayotim lazzati, jon birla tong yorim qadrdonim,
Tutar albatta qoshimda maqom ohista-ohista[28]. [2]

Habibiyning quyidagi tab'i xud muxammasi yozilish uslubining go'zalligi, tilining ravonligi, vaznining o'ynoqiligi bilan o'quvchiga ko'tarinki kayfiyat, estetik zavq beradi. Qolaversa, iste'dodli shoir Sharq she'riyatining yetakchi ishq-muhabbat mavzusini ifodalashda Alisher Navoiyga izdosh, ma'shuqa tasviriga navoiyona yondashganligiga guvoh bo'lamiz. Unda adabiy ta'sir izlari mavjud bo'lsa-da, shoirning o'ziga xos badiiy mahorati ham aks etib turibdi. Habibiy badiiy san'atlarni o'rinli qo'llash, mutanosib so'zlarni bir o'zanga jamlash, tasvir, uslub, ifoda va mazmunda o'ziga xoslikka erishib, chinakam mustaqil asar yarata olgan:

Qaro ko'zli, yuzi mohi munavvar dilbarim bordir.

[27] Boltayeva G. O'zbek she'riyatida muxamas janri: genezisi, badiiy takomili. Fil.fan.dokt. (DSc) ilmiy darajasini olish uchun taqdim etilgan dissertatsiya avtoreferati. Toshkent, 2024. – B. 26.
[28] Ҳабибий. Девон. –Тошкент: Ғафур Ғулом, 1980. – Б. 362.

Sadafdek ko’nglim ichra mehri go’yo gavharim bordir.
O’tar lazzatda umrim lafzi Shirin shakkarim bordir.
Dilimda to’xtamas g’am mehribon dilparvarim bordir.
Vujudim tuprog’in zar qilgay andog’ zargarim bordir[29].[3]

Ma’lumki, mustaqil muxammaslar – tom ma’nodagi mukammal she’rlar bo’lib, ular g’azal asosida yaratilmasligi, yoki tazmin tariqasidagi musammatlardek o’zga she’rdan jumla, misra, bayt kiritilmasligi bilan ajralib turadi. Ko’pincha bu tur muxammaslarda: 1.Bandlardagi oxirgi misra bir xil takrorlanadi; 2.Ko’pchilik g’azal asosida yaratiladigan taxmislardek, birinchi banddagi oxirgi ikki misra radifi bir xil bo’lmaydi; 3.Taxallus oxirgi bandning yuqori qismlarida beriladi, g’azal maqta’idagidek so’nggi bandning keyingi ikki qismidan birida berilmaydi. Tazmin muxammaslarda – bir she’r o’zga bir she’rga qisman yoki to’liq iqtibos (ba’zan juz’iy o’zgarishlar bilan) qilinadi. Tabibiy mustaqil muxammaslari ham shu nazariy qoidaga bo’ysunadi. Taxallus, asosan, oxirgi bandning yuqori qismida keltiriladi. Shoirning mustaqil muxammaslarida misra yoki bayt tarje’i uchramaydi. Aksariyat mustaqil muxammaslari hayotsevarlikni targ’ib qiladi. Masalan, “Do’st haqida”, “Dilbarim bordir”, “Jonajonimga”, “Mehribon bo’ldi” kabi muxammaslarida hayotdan zavqlanish, yor go’zalligi, shirinsuxan dilbar qiyofasi, xo’blarning xo’bi, dilkashu shirinsuxan, sho’xi chapandoz, nozparvar dilrabo, xulqi xush nozik ado bilan qurilgan suhbat, uning go’zalligidan hayratlanish va baxtu saodatga yo’ldosh bo’lish kayfiyati ifoda etiladi. Shoir devonidan davr voqealari tasvirlangan, madh yo’nalishidagi ta’bi xud muxammaslar ham o’rin olgan. Uning Farg’ona kanali qurilishiga bag’ishlangan “Kanal qazamiz”, “Yangi daryo”, “Yangi temir yo’l”, “Dongdorlarga”, “Oshkor aylang” nomli she’rlarida ijtimoiy tuzumda bo’layotgan tarixiy voqea-hodisalarga kanal qazish, temir yo’l qurish masalalariga munosabati aks ettirilgan. Davrning mashhur kishilariga bag’ishlab muxammas-marsiyalar yozish adabiyot tarixida uchraydi. Habibiyda bundan farqli o’laroq, Alisher Navoiy ijodidan faxrlanib yozilgan “Navoiy haqida qo’shiq”, “Yunus Rajabiyning muzika xizmati haqida” yozilgan muxammaslari mavjud. Mazkur muxammaslarda Habibiyning ulug’ shoir Alisher Navoiydan ta’sirlanishi, ijodining purma’noliligi, g’azallarining sehri; Yunus Rajabiy shaxsi, uning o’zbek musiqasi rivojidagi xizmatlari, san’atkorlik mahorati, “toru parda, zeru bamlar”ni munosib tanlashi, “so’z bilan kuy ikkisini xo’b monand etishi”, davra ahlini shod qilib, shogirdlar kamoli uchun shirin uyqusidan kechishi, “san’at bahrida qimmatbaho injularni terishi”ini mahorat bilan tasvirlab bergan.

Shoir mustaqil muxammaslari orasida aruzdan tashqari barmoq vaznida bitilganlari ham uchraydi. Madh yo’nalishida yozilgan “Samarqand” nomli muxammasi bunga dalildir. “Vatan boyligi” muxammasida shoir taxallus qo’llamaydi. Umuman, shoir ijodida mustaqil muxammaslarga xos bo’lgan taxallusning oxirgi bandning yuqori qismida keltirilish holatiga zid ko’rinishi ham

[29] Ҳабибий. Девон. –Тошкент: Ғафур Ғулом, 1980. – Б. 357.

mavjud. Masalan, “Jonajonimga”, “Yolg’on emas”, “Mehribon bo’ldi” kabi qator muxammaslarida taxallus maqta’ bandning eng oxirgi misrasida keltirilgan:

Gullamas yashnab Vattan to elda mehnat bo’lmasa,
Har ish olg’a bosmagay mehnatga rag’bat bo’lmasa,
O’z elu o’z yurtiga mehru muhabbat bo’lmasa,
Xilma-xil fanlar topilmas ilmu g’ayrat bo’lmasa,
Har nakim dedim, Habibiy, lof emas, yolg’on emas[30]. [4]

Ma’lumki, mumtoz she’riyatda yorning betakror go’zalligi baland pardalarda ta’rifu tavsif qilinadi, husn mulkining sultoni sifatida ulug’lanadi, ma’shuqa vasliga yetish umididagi oshiqning ko’ngil iztiroblari she’rning mazmun mohiyatini belgilab, shoirning poetik maqsadini ifodalaydi. Buni ikki shoir ham teran nigoh, hassos qalb va san’atkorona did bilan anglay olgan. Yuqoridagi band buning yorqin isbotidir. Fuzuliyning matla baytidagi poetik mazmunga mos manzara yaratish uchun Habibiy ko’ngil, qalb, vijdon, pok; go’zal, jon, jonon, mahitobon, sulton; hukm, farmon kabi so’zlar vositasida tanosib san’atini hosil qilgan. Parivash, malohat mulkining sultoni, go’zallarning go’zal jononi kabi sifatlashlar orqali lirik qahramonning holati, ma’shuqa go’zalligidan masruru mag’rurligi, yor go’zalligidan faxr tuyg’usi ifodalangan. Habibiyning Fuzuliy g’azaliga bog’lagan 2 taxmisi ham muvaffaqiyatli chiqqan. Shoirning Alisher Navoiy g’azaliga bog’lagan taxmisida vazndagi nomutanosiblikni e’tiborga olmasak, ulug’ shoir g’azalidagi poetik mazmunni davom ettira olgan. Soz’ tanlashda o’ziga xos individuallikni namoyon qilgan. Masalan, ma’shuqa vaslidan umidvor oshiqning kunu tuni qora ekanligi mumtoz adabiyotda ma’lumu mashhur istioradir. Habibiy esa yor vasliga yetisha olmaganliginidan kunlarining qoraligini shodligi yo’q “qora ayyom”ga qiyoslaydi: Bu shoirning individual istiorasidir:

Vaslidin qildim umid andishayi xomim bila.
Kelmadi bir yo’l kutib taklifu e’lomim bila,
Qayda bo’lsin shodlig’ bu qora ayyomim bila,
Bir qadah may ichmadim sarvi gulandomim bila.
Bir nafas uyrilmadi davron mening komim bila[31]. [7]

Habibiy tasvirni davom ettirar ekan, Alisher Navoiy poetik maqsadiga mos misralar ijod qilishga irinadi. Ulug’ shoir g’azal misralariga singdirgan ma’noni ilg’ashga, uning g’oyasini rivojlantirishga harakat qiladi. Ohorli tashbehlar, betakror poetic timsol va ramzlardan foydalanishga oshiqadi. Taxmisning 3-bandi bu jihatdan e’tiborli. Unda shoirning dunyoqarashi, ijodkorligi, ruhiy va hissiy olami hamda san’atkorlik mahoratining o’ziga xosligi yuzaga chiqqan. Fuzuliy tasviricha, g’azalning 3-baytida tunda yor vasliga yetishish onlarini intizorlik bilan kutgan oshiqning hafsalasi pir bo’ladi. Oshiq hijron azobida qiynaladi. Kunduzu ishdan, hijrondan qiynalgan oshiqning pajmurda joni tunga yetib bormaydi. Endi oshiq uchun subh ham, shom ham yo’q. Bu holatni Habibiy ham chiroyli tasvirlaydi. Shom payti shafaqning qizarib botish holatini shoir “bir kecha

[30] Ҳабибий. Девон. –Тошкент: Ғафур Ғулом, 1980. – Б. 340.
[31] Ҳабибий. Девон. – Тошкент: Ғафур Ғулом, 1980. – Б. 390.

mahliqoning yonida bo’lish uchun oshiq har kunning yakunini – shomni kutishini, shom ham ko’k etagining qonida” ekanligidan hayratlanadi. Ya’ni shomning ham bag’ri qon, u-da ma’shuqa hajrida bag’rini dog’lab, uning vasliga erishish uchun qonga to’lgan. “Shomni ko’rdim yiroqdin ko’k etokin qonida” kabi tasvir Habibiyga xos bo’lgan poetik manzaradir. Bu misralarda shom, shafaq – kun botish holati oshiqning qontalash bag’riga o’xshatilgan. Taxmis ohangidagi soddalik o’ynoqilik, jo’shqinlik, his-tuyg’u ifodasi va she’riy vazn mushtarakligi o’ziga xos ohangdorlikni hosil qilgan:

Bir kecha bo’lmoq uchun ul mahliqoni yonida,
Ko’z tutarmen tunga doim kunni bepoyonida,
Shomni ko’rdim yiroqdin ko’k etokin qonida,
Tunga yetmas kunni o’tkardim o’lib hijronida,
Kunga yetkaymu vah bu subh yo’q shomim bila.

Xulosa sifatida shuni ta’kidlash lozimki, Habibiy ijodida muxammas janri namunalari salmoqli o’rin egallab, ularda an’anaviy ishq mavzusi, oshiq-ma’shuq-ag‘yor uchligi, gul, bulbul, gulshan, boda, may, qadah, ulfat, zohid kabi timsollar yetakchilik qilgan. Taxmislar asosi uchun tanlangan g‘azallar tasodifiy bo‘lmay, bunda shoirlarning ruhiy-ma’naviy yaqinligi, ijod dardi, qalb tug’yonlari, ichki kechinmalari, dunyoqarashi, saviyasi, poetik shakl, mazmun, maqsad va mahorat mushtarakligi yuzaga chiqqan.

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DECIBEL X ILOVASIDAN FOYDALANGAN HOLDA TALABALARGA AKUSTIKA ASOSLARINI TUSHUNTIRISH

Annotatsiya. *Mazkur maqolada mobil texnologiyalarni, xususan Decibel X ilovasini oliy ta'lim tizimida akustika asoslarini o'qitishda qo'llash imkoniyatlari tahlil qilinadi. Tadqiqot davomida talabalar tomonidan turli muhitlarda tovush intensivligini o'lchash, natijalarni qayd etish va ularni grafik hamda statistik jihatdan tahlil qilish jarayoni tashkil etildi.*

Olingan natijalar shuni ko'rsatadiki, mobil ilovalardan foydalanish talabalarning nazariy bilimlarini amaliy ko'nikmalar bilan mustahkamlashga xizmat qiladi. Ayniqsa, desibel tushunchasining logarifmik tabiati real o'lchovlar orqali yanada tushunarli bo'ladi. Tadqiqot natijalari mobil texnologiyalarni fizika ta'limiga integratsiya qilishning samarali yo'nalish ekanligini ko'rsatadi.

Kalit so'zlar: *akustika, tovush intensivligi, desibel, mobil ilova, Decibel X, laboratoriya mashg'uloti, innovatsion ta'lim.*

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EXPLANING THE FUNDAMENTALS OF ACOUSTICS TO STUDENTS USING THE DECIBEL X APP

Abstract. *This article analyzes the potential of using mobile technologies, specifically the Decibel X application, in teaching the fundamentals of acoustics within the higher education system. In the course of the study, a process was organized for students to measure sound intensity in various environments, record the results, and analyze them both graphically and statistically.The findings indicate that the use of mobile applications helps reinforce students' theoretical knowledge with practical skills. In particular, the logarithmic nature of the decibel concept becomes more understandable through real-world measurements. The research results demonstrate that integrating mobile technologies into physics education is an effective approach.*

Keywords*: acoustics, sound intensity, decibel, mobile application, decibel X, laboratory session, innovative education.*

Akustika fizik fanlar tizimida muhim o'rin egallab, tovush to'lqinlarining tarqalishi, xossalari va ularning muhit bilan o'zaro ta'sirini o'rganadi. Shu bilan birga, ushbu bo'limni o'qitishda talabalar ko'pincha abstrakt tushunchalarni, xususan logarifmik o'lchov birliklarini tushunishda qiyinchiliklarga duch keladilar.

Zamonaviy ta’limda raqamli texnologiyalarni joriy etish, ayniqsa mobil ilovalardan foydalanish, o‘quv jarayonini interaktiv va samarali tashkil etish imkonini beradi. Smartfonlar keng tarqalganligi sababli ular oddiy o‘lchov vositasi sifatida ham qo‘llanilishi mumkin.

Desibel (dB) tovush intensivligini ifodalovchi logarifmik birlik bo‘lib, u quyidagi muammo bilan bog‘liq: talabalar ko‘pincha bu kattalikni intuitiv tushuna olmaydi. Shu sababli, real muhitda o‘lchovlar o‘tkazish orqali bu tushunchani shakllantirish muhim pedagogik ahamiyatga ega.

Mazkur tadqiqotning asosiy maqsadi — mobil ilovadan foydalanish orqali akustika bo‘yicha bilimlarni shakllantirish samaradorligini aniqlash va amaliy metodika ishlab chiqishdan iborat.

Metodlar. Tadqiqot dizayni:

shtirokchilar: 1 kurs fizika talabalari

Guruhlar:

- Nazorat guruhi (an’anaviy usul)
- Tajriba guruhi (Decibel X bilan)

O‘lchov prinsipi. Tovush intensivligi va uning desibel orqali ifodalanishi quyidagi formula asosida aniqlanadi:

$$L=10log_{10}\left(\frac{I}{I_0}\right)$$

bunda I-tovush intensivligi, $I_0=10^{-12}W/m^2$(inson qulog‘i eshita oladigan eng past tovush intensivligi, ya’ni eshitish chegarasi).

Mazkur formuladan ko‘rinib turibdiki, desibel logarifmik miqyosga asoslangan bo‘lib, bu esa uning oddiy chiziqli kattaliklardan farq qilishini bildiradi.

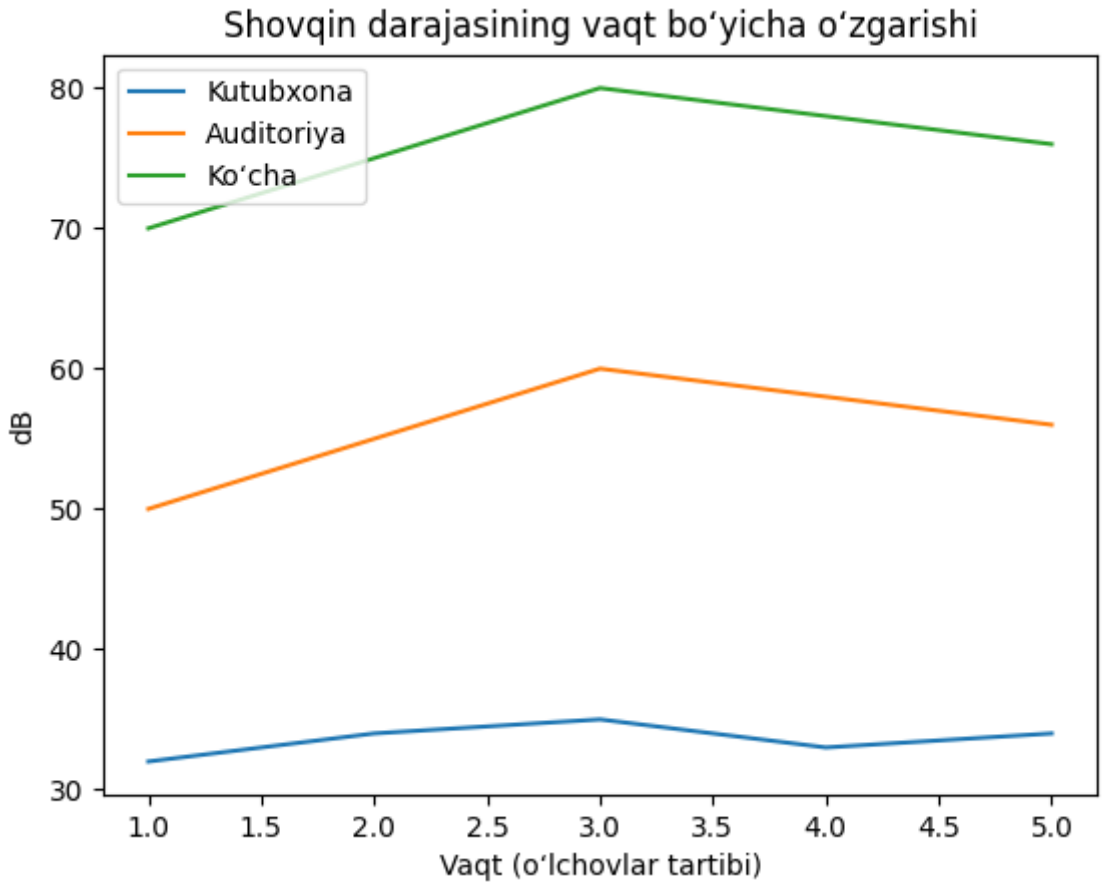
Tajriba o‘tkazish tartibi. Tajriba quyidagi bosqichlarda amalga oshirildi:

1. Talabalarga mobil ilovani o‘rnatish va undan foydalanish bo‘yicha yo‘riqnoma berildi
2. Turli akustik muhitlar tanlandi:
   - auditoriya
   - kutubxona
   - ochiq maydon (ko‘cha)
3. Har bir muhitda 3–5 marotaba o‘lchovlar amalga oshirildi
4. Natijalar maxsus jadvalga yozildi
5. Olingan ma’lumotlar asosida grafiklar qurildi

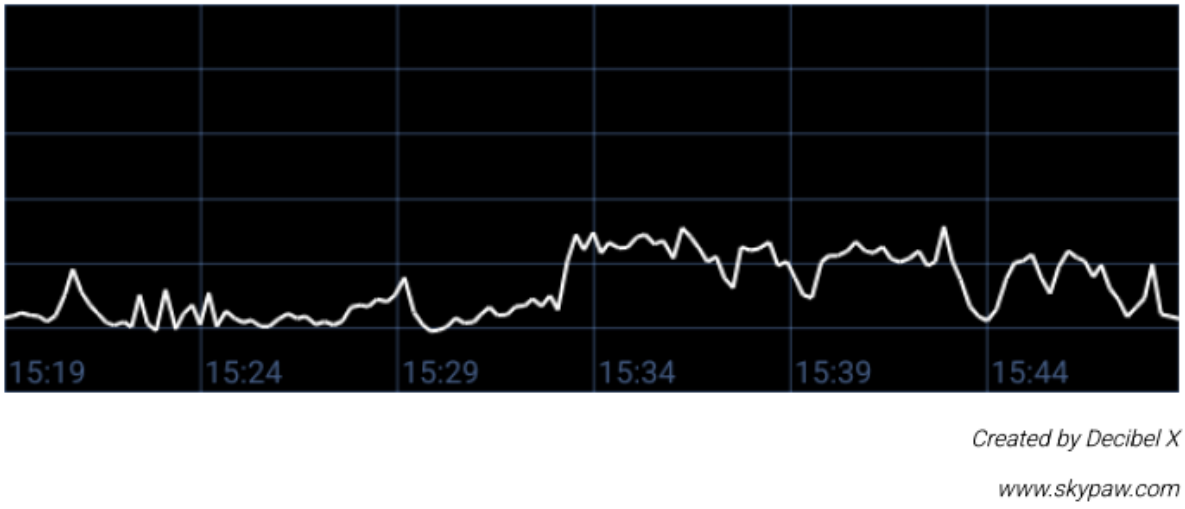
Ma’lumotlarni qayta ishlash. Talabalar tomonidan olingan natijalar quyidagicha umumlashtirildi:

№	Muhit	dB (o‘rtacha)	Minimal	Maksimal
1	Kutubxona	34	30	38
2	Auditoriya	56	50	62
3	Ko’cha	76	70	85

Shuningdek, vaqtga bog‘liq grafiklar qurilib, shovqin darajasining dinamikasi tahlil qilindi.



1-rasm. Talabalar olingan natijalar asosida tuzilgan grafik.



2-rasm. Decibel X ilovasida auditoriyada olingan grafik.

Natijalar

Tadqiqot natijalari quyidagi asosiy xulosalarni berdi:

- Tajriba guruhi talabalarida mavzuni tushunish darajasi sezilarli oshdi
- Talabalar desibel tushunchasini real misollar orqali anglay boshladi
- Grafik tahlil orqali tovush o‘zgarishini kuzatish imkoniyati paydo bo‘ldi

Nazorat va tajriba guruhlari natijalari taqqoslanganda, tajriba guruhining o‘zlashtirish ko‘rsatkichi o‘rtacha 25–30% ga yuqori ekanligi aniqlandi.

Gafik natijalar tahlili

Grafiklar shuni ko‘rsatdiki:

- Tovush darajasi vaqt bo‘yicha o‘zgaruvchan xarakterga ega
- Maksimal qiymatlar qisqa vaqt oralig‘ida yuzaga keladi
- O‘rtacha qiymatlar muhitning umumiy akustik holatini ifodalaydi

Tadqiqot natijalari mobil texnologiyalarning ta’limdagi ahamiyatini yana bir bor tasdiqlaydi. Xususan, Decibel X kabi ilovalar:

Afzalliklari:

- Nazariy bilimlarni amaliy tajriba bilan bog‘laydi
- Talabalarda mustaqil tadqiqot olib borish ko‘nikmasini shakllantiradi
- Dars jarayonini interaktiv qiladi

Cheklovlari:

- Smartfon mikrofonining aniqligi cheklangan
- Tashqi omillar (shamol, aks-sado) ta’sir qiladi
- Kalibrovka talab etiladi

Shu sababli, bunday vositalar yordamchi didaktik vosita sifatida qaralishi maqsadga muvofiq.

Xulosa

O‘tkazilgan tadqiqot natijalari shuni ko‘rsatdiki, mobil ilovalar yordamida akustika asoslarini o‘qitish:

- samarali
- zamonaviy
- talabaga yo‘naltirilgan

yondashuv hisoblanadi.

Kelgusida mobil laboratoriyalarni rivojlantirish, ularni o‘quv dasturlariga integratsiya qilish va metodik asoslarini takomillashtirish muhim vazifa bo‘lib qoladi.

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KOMPETENTLI YONDASHUV ASOSIDA BO‘LAJAK FIZIKA O‘QITUVCHILARINI ILMIY-TADQIQOT FAOLIYATGA TAYYORLASH

Annotatsiya: *Ushbu maqolada kompetentli yondashuv asosida bo‘lajak fizika o‘qituvchilarini ilmiy-tadqiqot faoliyatiga tayyorlashning nazariy va amaliy jihatlari tahlil qilingan. Tadqiqot jarayonida ta’limda kompetentlikka asoslangan modellarni qo‘llash orqali talabalarning ilmiy izlanish ko‘nikmalarini shakllantirish samaradorligi o‘rganildi. Fizika ta’limida ta’lim oluvchilarning ilmiy tadqiqot faoliyatini takomillashtirishga doir metodik model tavsiya etilgan.*

Kalit so‘zlar: *kompetentli yondashuv, fizika ta’limi, ilmiy-tadqiqot faoliyati, pedagogik kompetensiya, innovatsion ta’lim.*

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PREPARING FUTURE PHYSICS TEACHERS FOR RESEARCH ACTIVITIES BASED ON A COMPETENCE-BASED APPROACH

Abstract*: This article analyzes the theoretical and practical aspects of preparing future physics teachers for research activities based on a competency-based approach. The study examines the effectiveness of developing students’ research skills through the use of competency-based educational models. A methodological model for improving students’ research activities in physics education is proposed.*

Keywords: *competency-based approach, physics education, research activity, pedagogical competence, innovative education.*

Kirish

Zamonaviy ta’lim tizimida bo‘lajak fizika o‘qituvchilarini nazariy bilimlar bilan emas, balqi amaliy va ilmiy tadqiqot kompetensiyalari bilan ta’minlash muhim ag‘amiyat kasb etmoqda. Ayniqsa, fizika fanini o‘qitishda ilmiy- tadqiqot faoliyatiga tayyorgarlik yuqori darajada bo‘lishi talab etiladi.

Kompetentli yondashuv asosida bo‘lajak fizika o‘qituvchilarini ilmiy-tadqiqot faoliyatga tayyorlash metodikasini takomillashtirish (Termodinamika va statistik fizika fani misolida) mavzusi fizika ta’limida ilmiy tadqiqot kompetentligini rivojlantirishga yo‘naltirilgan bo‘lib, amaliy va nazariy komponentlarning uzviy uyg‘unlashuvini talab etadi. Mazkur yo‘nalishda mavjud

muammolarni aniqlash va ularni hal etish bo‘yicha ilmiy asoslangan yondashuv hamda amaliy tavsiyalar ishlab chiqish muhim ahamiyat kasb etadi.

Kompetentli yondashuv ta’lim jarayonida talabalarning bilim, ko‘nikma va malakalarini integratsiyalashgan holda shakllantirishga qaratilgan. Shu bois, bo‘lajak fizika o‘qituvchilarini ilmiy-tadqiqot faoliyatiga tayyorlashda mazkur yondashuvning imkoniyatlarini o‘rganish dolzarb masala hisoblanadi.

Fizikani fanini o‘qitishda ta’lim oluvchilarda ilmiy bilimlar-tushunchalar majmuini mantiqiy ketma ketlikda maqsadga muvofiq shakllantirish eng muhim vazifalardan biri hisoblanadi. O‘quv metodik adabiyotlarda tadqiqotli o‘qitish asosida tushunchalarni shakllantirish, uning rivojlanish dinamikasi yetarlicha yoritilmay, faqat misollar keltirilgan xolos.

Tadqiqotning nazariy asosini, avvalo, kompetensiyaviy ta’lim konsepsiyasi tashkil etadi. Mazkur yondashuv bo‘lajak fizika o‘qituvchisida faqat nazariy bilimlarni emas, balki ilmiy-tadqiqot faoliyatini amalga oshirishga qaratilgan motivatsion, kognitiv, faoliyatli va refleksiv kompetensiyalarni shakllantirishni talab qiladi. Bu jihatdan I.A. Zimnyaya, V.V. Krayevskiy, A.A. Verbitskiy, V.M. Monaxov kabi shug‘ullanayotgan olimlar ta’limda faoliyatga asoslangan, shaxsga yo‘naltirilgan va kompetensiyaviy yondashuvlarning ilmiy asoslarini belgilab berganlar. Xorijlik olimlardan Leslie V. Woodcock, J.R. Suchman,W.Durant,T.M.Mitchell, M.Mohammed, M.Bobaklarning ilmiy izlanishlarida ta’lim jarayoniga axborot-kommunikatsiya texnologiyalarini samarali joriy etish orqali talabalarni ilmiy-tadqiqot faoliyatga tayyorlashning amaliy-texnologik asoslari yoritib berilgan.

Shu kungacha mavjud bo‘lgan ilmiy-metodik adabiyotlarni tahlil qilganimizda ta’limida ilmiy tadqiqot faoliyatini shakllantirishga bag‘ishlangan tadqiqotlar yetarli darajada metodik tahlil qilinmaganligini hamda ko‘pchilik bunday ishlanmalarga (ayniqsa yosh mutaxassislar) muhtojligining guvohi bo‘lamiz.

Tadqiqot metodologiyasi

Tadqiqotning metodologik asosi (“Metodologiya (“metod” va “logiya”) - metodlar va faoliyat vositalari haqidagi ta’limot) ilmiy izlanish jarayonini maqsadga yo‘naltirilgan, tizimli va ilmiy mantiq asosida tashkil etishga xizmat qiluvchi yondashuvlar, tamoyillar, metodlar va ilmiy qarashlar majmuasidan iboratdir. Metodologik asos tadqiqotning nima uchun amalga oshirilishi, qanday yo‘l bilan olib borilishi, qanday metodlar qo‘llanishi, natijalar qanday baholanishi va ilmiy asoslanishi lozimligini belgilab beradi. U ilmiy izlanishning to‘g‘ri yo‘nalishini aniqlaydi, amaliy va nazariy natijalar o‘rtasida bog‘liqlikni ta’minlaydi, tadqiqotning ilmiylik darajasini mustahkamlaydi.

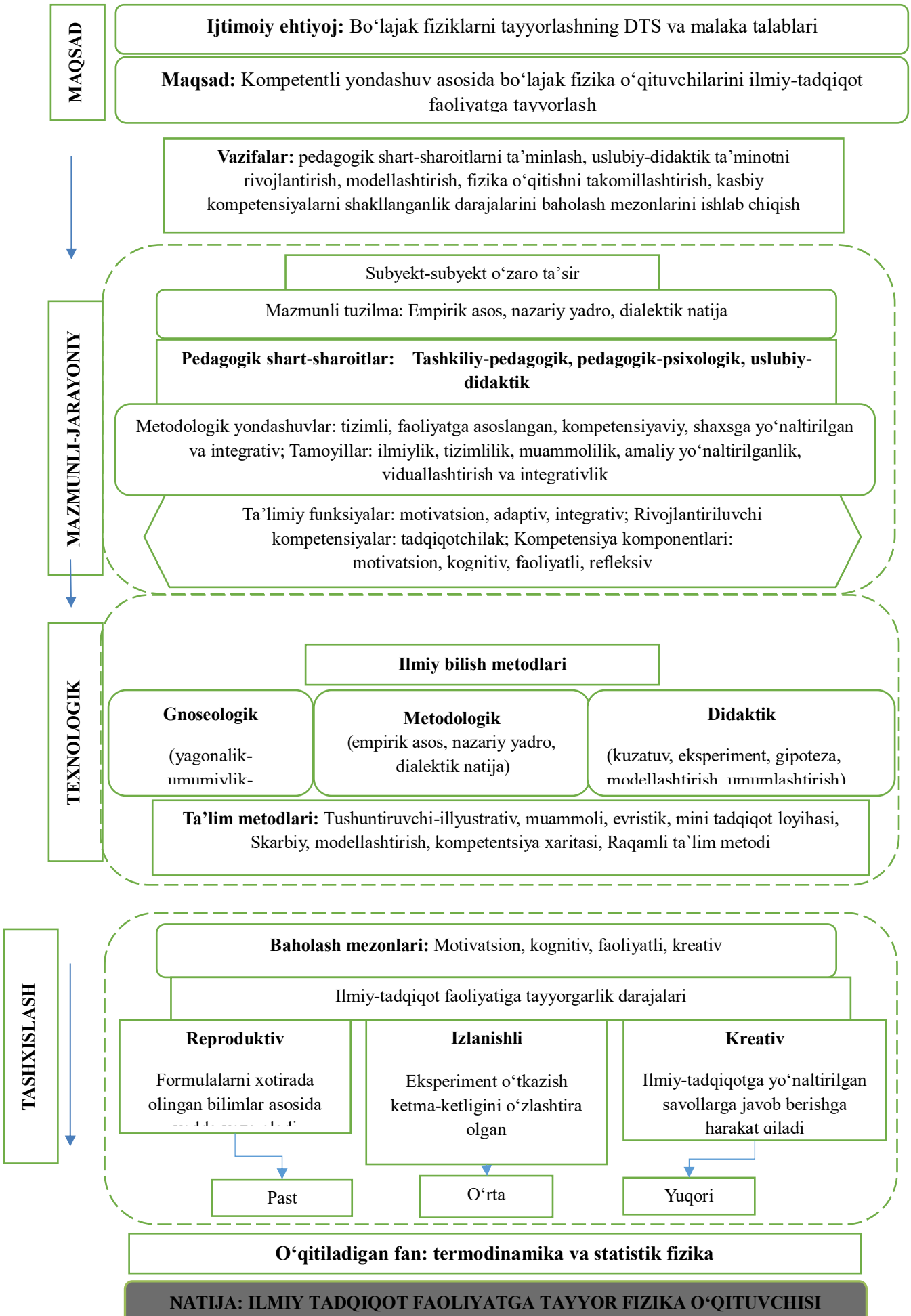
Metodologik asosning mazmuni tadqiqotda qo‘llaniladigan ilmiy tamoyillar, yondashuvlar va metodlarning o‘zaro uyg‘unligini belgilaydi. Ilmiylik, izchillik, tizimlilik, amaliy yo‘naltirilganlik, muammolilik va integrativlik tamoyillari tadqiqotga ilmiy mantiq baxsh etadi, izlanish jarayonining ilmiy qonuniyatlarga mos olib borilishini ta’minlaydi. Metodologik asos tarkibida ilmiy-tadqiqot metodlari alohida o‘rin tutadi. Kuzatish, diagnostika, tahlil va sintez,

modellashtirish, pedagogik eksperiment, matematik-statistik qayta ishlash kabi metodlar tadqiqotning amaliy jihatini ifodalaydi va natijalarni ishonchli baholashga imkon yaratadi. Pedagogik tajriba-sinovlar o‘quv jarayonining real sharoitida olib borilib, nazariy g‘oyalar amaliy tasdiqqa ega bo‘ladi. Bu esa ilmiy xulosalarning obyektivlik darajasini oshiradi va metodik tavsiyalarni amaliyotga tatbiq qilish imkonini ta’minlaydi.

Demak, tadqiqotning metodologik asosi ilmiy yondashuvlar, tamoyillar va metodlar uyg‘unligiga asoslangan bo‘lib, ilmiy izlanishning mantiqiy ketma-ketligini, natijalarining ishonchliligini, amaliy va nazariy ahamiyatini ta’minlaydi. U tadqiqotchini aniq maqsad sari yo‘naltiradi, ilmiy natijalarni asoslashga metodik zamin yaratadi hamda ilmiy xulosalarning ob’ektiv, tizimli va amaliy jihatdan mazmunli bo‘lishini kafolatlaydi.

Zamonaviy adabiyotda metodologiya, birinchi navbatda, ilmiy bilimlar metodologiyasi, ya’ni ilmiy va kognitiv faoliyatning qurilish tamoyillari, shakllari va usullari haqidagi ta’limot sifatida tushuniladi. Fan metodologiyasi uning obyektini, tahlil predmetini, tadqiqot vazifasini (yoki muammosini) ilmiy tadqiqot komponentlarini, ushbu turdagi muammoni hal qilish uchun zarur bo‘lgan tadqiqot vositalarining yig‘indisini tavsiflaydi, shuningdek, tadqiqotning ketma-ketligi haqida tasavvurni shakllantiradi. Metodologiyani qo‘llashning eng muhim nuqtalari - muammoni shakllantirish, o‘rganish mavzusini qurish va ilmiy nazariyani qurish, shuningdek, natijaning to‘g‘riligini tekshirish.

Metodik modelni ishlab chiqishda tizimli yondashuv katta ahamiyatga ega. Tizimli yondashuv pedagogik jarayonning murakkab, ko‘p qatlamli va o‘zaro bog‘langan tabiatini ilmiy asosda anglash va boshqarish imkonini beradi. Oliy ta’lim jarayonida “Oliy ta’limda bo‘lajak fizika o‘qituvchilarini ilmiy-tadqiqot faoliyatiga tayyorlashning metodik modeli (Termodinamika va statistik fizika fani misolida)”ni ishlab chiqish fanning nazariy asoslari, eksperimental tadqiqot metodlari va statistik tahlil amaliyoti bilan integratsiyalangan holda talabalarda tadqiqotchilik kompetentligini shakllantirishga qaratiladi. Ushbu modelning maqsad, mazmunli-jarayoniy, texnologik, tashxislash hamda natijaviy komponentlari ilmiy bashoratli yondashuv asosida o‘zaro funksional bog‘lanishda quyidagicha talqin etiladi. Shunday qilib, bo‘lajak fizika o‘qituvchilarini ilmiy-tadqiqot faoliyatga tayyorlash modelini ishlab chiqdik.


MAQSAD
Ijtimoiy ehtiyoj: Bo‘lajak fiziklarni tayyorlashning DTS va malaka talablari
Maqsad: Kompetentli yondashuv asosida bo‘lajak fizika o‘qituvchilarini ilmiy-tadqiqot faoliyatga tayyorlash
Vazifalar: pedagogik shart-sharoitlarni ta’minlash, uslubiy-didaktik ta’minotni rivojlantirish, modellashtirish, fizika o‘qitishni takomillashtirish, kasbiy kompetensiyalarni shakllanganlik darajalarini baholash mezonlarini ishlab chiqish
MAZMUNLI-JARAYONIY
Subyekt-subyekt o‘zaro ta’sir
Mazmunli tuzilma: Empirik asos, nazariy yadro, dialektik natija
Pedagogik shart-sharoitlar: Tashkiliy-pedagogik, pedagogik-psixologik, uslubiy-didaktik
Metodologik yondashuvlar: tizimli, faoliyatga asoslangan, kompetensiyaviy, shaxsga yo‘naltirilgan va integrativ; Tamoyillar: ilmiylik, tizimlilik, muammolilik, amaliy yo‘naltirilganlik, viduallashtirish va integrativlik
Ta’limiy funksiyalar: motivatsion, adaptiv, integrativ; Rivojlantiriluvchi kompetensiyalar: tadqiqotchilak; Kompetensiya komponentlari: motivatsion, kognitiv, faoliyatli, refleksiv
TEXNOLOGIK
Ilmiy bilish metodlari
Gnoseologik
(yagonalik-
Metodologik
(empirik asos, nazariy yadro, dialektik natija)
Didaktik
(kuzatuv, eksperiment, gipoteza, modellashtirish, umumlashtirish)
Ta’lim metodlari: Tushuntiruvchi-illyustrativ, muammoli, evristik, mini tadqiqot loyihasi, Skarbiy, modellashtirish, kompetentsiya xaritasi, Raqamli ta`lim metodi
TASHXISLASH
Baholash mezonlari: Motivatsion, kognitiv, faoliyatli, kreativ
Ilmiy-tadqiqot faoliyatiga tayyorgarlik darajalari
Reproduktiv
Formulalarni xotirada olingan bilimlar asosida
Izlanishli
Eksperiment o‘tkazish ketma-ketligini o‘zlashtira olgan
Kreativ
Ilmiy-tadqiqotga yo‘naltirilgan savollarga javob berishga harakat qiladi
Past
O‘rta
Yuqori
O‘qitiladigan fan: termodinamika va statistik fizika
NATIJA: ILMIY TADQIQOT FAOLIYATGA TAYYOR FIZIKA O‘QITUVCHISI

Shunday qilib, model termodinamika va statistik fizika fanini o‘qitishda talabalarning tadqiqotchilik kompetentligini shakllantirish, ilmiy-tadqiqot faoliyatga tayyorgarligining barqaror pedagogik mexanizmini belgilaydi, ilmiy bilishdan boshlab pedagogik qo‘llashgacha bo‘lgan yo‘lni tizimli tarzda ko‘rsatib beradi. Bu esa oliy ta’limda fizika o‘qituvchisini ilmiy tadqiqot faoliyatga tayyorlash jarayonini kelajakda innovatsion ilmiy-ta’limiy istiqbolga yo‘naltirilgan metodik asos bilan ta’minlaydi.

Kompetensiyali yondashuv asosida bulajak fizika o‘qituvchilarini ilmiy-tadqiqot faoliyatiga tayyorlashda baholash an’anaviy “bilimni tekshirish”dan ko‘ra kengroq bo‘ladi. Asosiy e’tibor — nima qila olishi, qanday tadqiqot yuritishi va natijani qanday asoslashiga qaratiladi. Asosiy baholash mezonlari tizimi ilmiy-metodik nuqtai nazardan quyidagicha bo‘lishi nazarda tutiladi.

XULOSALAR VA TAKLIFLAR

“Kompetentli yondashuv asosida bo‘lajak fizika o‘qituvchilarini ilmiy-tadqiqot faoliyatga tayyorlash metodikasini takomillashtirish” bo‘yicha olib borilgan tadqiqot ishida quyidagi xulosalarga kelindi.

Pedagogik, psixologik, falsafiy va ilmiy adabiyotlar tahlili bo‘lajak fizika o‘qituvchilarini ilmiy-tadqiqot faoliyatiga tayyorlash masalasi oliy ta’lim tizimining dolzarb muammosi ekanini ko‘rsatdi. Mavzuning nazariy ahamiyati va uning ta’lim tizimidagi zarurati ilmiy asosda belgilandi. Kompetentli yondashuv fizika o‘qituvchisining ilmiy-tadqiqot kompetensiyasini faqat bilimlar yig‘indisi sifatida emas, balki termodinamika va statistik fizika asosida shakllanadigan mikroskopik–makroskopik modellar, ehtimollik-statistik tasavvurlar, energiya–entropiya qonuniyatlari integratsiyasi sifatida talqin etilishini taqozo etdi.

Metodologik yondashuvlar va tamoyillar uyg‘unligida shakllangan nazariy-metodologik asoslar bo‘lajak fizika o‘qituvchisini ilmiy izlanishga tayyorlash jarayonini muammo qo‘yishdan boshlab tajriba, tahlil va xulosagacha bo‘lgan mantiqiy tizimda tashkil etishni belgiladi. Empirik metodlar — kuzatish, tajriba, o‘lchash, modellashtirish, simulyatsiya va pedagogik diagnostika — talabaning nazariy bilimlarni real jarayonlar bilan bog‘lash, empirik faktlarni nazariy modellar orqali talqin qilish va ilmiy xulosa chiqarish kompetensiyalarini bosqichma-bosqich rivojlantirishga xizmat qildi.

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SUN’IY INTELLEKT TEXNOLOGIYALARINING TA’LIM JARAYONIDAGI SAMARADORLIGI

Annotatsiya: *Maqolada sun’iy intellekt vositalarining ta’lim tizimidagi afzalliklari va ularni qo‘llashning dolzarbligi tahlil qilinadi. Xususan, maqolada SI vositalarining o‘quvchilarning bilim darajasini aniqlash, shaxsiylashtirilgan o‘quv dasturlarini yaratish, interaktiv o‘quv materiallarini ishlab chiqish va ta’lim jarayonini avtomatlashtirishdagi roli ko‘rib chiqiladi.*

Kalit so‘zlar: *sun’iy intellekt, ta’lim jarayoni, interaktiv ta’lim, bilim darajasini aniqlash, ta’lim texnologiyalari avtomatlashtirish, ilmiy-tadqiqot uslubiyatlari, ta’lim samaradorligi, integratsiyalashuv, innovatsion ta’lim.*

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EFFECTIVENESS OF ARTIFICIAL INTELLIGENCE TECHNOLOGIES IN THE EDUCATIONAL PROCESS

Abstract: *The article analyzes the advantages of artificial intelligence tools in the education system and the relevance of their application. In particular, the article examines the role of AI tools in determining the level of knowledge of students, creating personalized curricula, developing interactive educational materials, and automating the educational process.*

Keywords: *artificial intelligence, educational process, interactive education, determining the level of knowledge, automation of educational technologies, research methodologies, educational effectiveness, integration, innovative education.*

Bugungi kunda ta’lim tizimi jadal rivojlanayotgan texnologiyalar ta’sirida katta o‘zgarishlarga duch kelmoqda. Sun’iy intellekt (SI) texnologiyalari ushbu o‘zgarishlarning markazida turib, ta’lim jarayonlarini yanada samarali va interaktiv qilish imkoniyatini yaratmoqda. Ta’lim jarayonlarini tashkil qilishda SI vositalarining qo‘llanilishi nafaqat o‘quvchilarning bilim darajasini oshirish, balki ularning individual ehtiyojlariga moslashgan ta’lim jarayonlarini yaratishda ham muhim rol o‘ynaydi.

Sun’iy intellekt texnologiyalari ta’lim jarayonida ko‘plab afzalliklarni taqdim etadi. Masalan, SI vositalari yordamida o‘quvchilarning bilim darajasi aniqlanib, ularga shaxsiylashtirilgan o‘quv dasturlari tuzilishi mumkin. Bu esa

o‘quvchilarning bilim olish jarayonini tezlashtiradi va yanada samarali qiladi. Shuningdek, SI texnologiyalari yordamida interaktiv o‘quv materiallarini ishlab chiqish va ta’lim jarayonini avtomatlashtirish mumkin, bu esa o‘qituvchilarning mehnatini yengillashtiradi va ta’lim sifatini oshiradi.

Maqolada ta’lim jarayonlarini tashkil qilishda sun’iy intellekt vositalarining qo‘llanilishi masalalari, ularning afzalliklari va yuzaga kelishi mumkin bo‘lgan qiyinchiliklar tahlil qilinadi. Shuningdek, SI texnologiyalarining ta’lim jarayoniga integratsiyalashuvi jarayonida qo‘llaniladigan ilmiy-tadqiqot uslubiyatlari va tadqiqot natijalari ham ko‘rib chiqiladi. Ushbu maqola sun’iy intellekt vositalarining ta’lim jarayonlarini samarali tashkil qilishdagi salohiyatini ochib berishga qaratilgan.

Mazkur tadqiqotda ta’lim jarayonlarini tashkil qilishda sun’iy intellekt (SI) vositalarining qo‘llanilishi o‘rganildi. Tadqiqotning asosiy materiallari va usullari quyidagilardan iborat:

1. Sun’iy intellekt platformalari va dasturlari:

- Adaptive learning platformalari: Shaxsiylashtirilgan o‘quv dasturlarini yaratish uchun mo‘ljallangan dasturlar. Intelligent Tutoring Systems (ITS): O‘quvchilarning bilim darajasini aniqlash va ularga mos ta’lim materiallarini taqdim etish uchun ishlatiladigan tizimlar. Chatbotlar va virtual yordamchilar: O‘quvchilarga real vaqt rejimida yordam berish uchun mo‘ljallangan sun’iy intellekt asosidagi dasturlar.

2. O‘quv materiallari:

- Interaktiv darsliklar va o‘quv resurslari: Sun’iy intellekt tomonidan ishlab chiqilgan va moslashtirilgan o‘quv materiallari. Videodarslar va simulyatsiyalar: O‘quvchilarga vizual va interaktiv ta’lim berish uchun mo‘ljallangan materiallar.

Tadqiqot uslubi: Eksperimental uslub: Sun’iy intellekt vositalarining ta’lim jarayonidagi samaradorligini aniqlash uchun o‘quvchilarning bilim darajasi va o‘quv jarayonidagi ishtiroki tahlil qilindi. So‘rovnoma va intervyu: O‘qituvchilar va o‘quvchilar o‘rtasida so‘rovnoma va intervyular o‘tkazilib, sun’iy intellekt vositalarining ta’lim jarayoniga ta’siri o‘rganildi. Statistik tahlil: Olingan ma’lumotlar statistik usullar yordamida tahlil qilinib, sun’iy intellekt vositalarining samaradorligi baholandi. Kontent tahlili: O‘quvchilarning o‘quv jarayonidagi faoliyati va natijalari kontent tahlili yordamida o‘rganildi. Sun’iy intellekt vositalari bilan tashkil qilingan ta’lim jarayoni va an’anaviy ta’lim jarayoni o‘rtasidagi farqlar tahlil qilindi.

Ushbu materiallar va usullar asosida o‘tkazilgan tadqiqot natijalari sun’iy intellekt vositalarining ta’lim jarayonlarini samarali tashkil qilishda katta salohiyatga ega ekanligini ko‘rsatdi. Tadqiqot natijalari va tavsiyalar maqolaning keyingi bo‘limlarida batafsil yoritiladi.

Ommaviy ochiq onlayn kurslar (MOOK) ta’lim jarayonlarini tashkil qilishda sun’iy intellekt vositalarining qo‘llanilishi muhim ahamiyatga ega. Sun’iy intellekt (SI) ta’lim sohasida bir qator imkoniyatlar yaratadi, jumladan: Shaxsiylashtirilgan ta’lim: Sun’iy intellekt yordamida talabalar uchun individual o‘quv rejalarini yaratish mumkin. Bu talabalar o‘z qobiliyatlari va ehtiyojlariga

mos ravishda o‘qish imkoniyatiga ega bo‘lishlarini ta’minlaydi. O‘qituvchilarni qo‘llab-quvvatlash: SI vositalari o‘qituvchilarga talabalar bilan bog‘liq ma’lumotlarni tahlil qilishda yordam beradi. Bu o‘qituvchilarga talabalar qaysi mavzularda qiyinchiliklarga duch kelayotganini aniqlash va ularga yordam berish imkonini beradi. Interaktiv o‘qitish: Sun’iy intellekt asosida yaratilgan interaktiv platformalar talabalar bilan o‘qituvchilar o‘rtasida yanada samarali muloqot o‘rnatishga yordam beradi. Bu talabalar o‘z savollarini berishlari va tezkor javob olishlari uchun qulay sharoit yaratadi. O‘qish jarayonini avtomatlashtirish: SI yordamida o‘qish jarayonidagi bir qator vazifalarni avtomatlashtirish mumkin, masalan, baholash va testlarni o‘tkazish. Bu o‘qituvchilarning vaqtini tejashga va ularni boshqa muhim vazifalarga e’tibor qaratishga imkon beradi. Ma’lumotlarni tahlil qilish: Sun’iy intellekt yordamida ta’lim jarayonida to‘plangan katta hajmdagi ma’lumotlarni tahlil qilish mumkin. Bu ta’lim sifatini oshirish va o‘qitish usullarini takomillashtirish uchun zarur bo‘lgan ma’lumotlarni olish imkonini beradi.

Natijada, sun’iy intellekt vositalarining ta’lim jarayonlarida qo‘llanilishi ta’limni yanada samarali, shaxsiylashtirilgan va interaktiv qilishga yordam beradi. Bu esa, o‘z navbatida, talabalar va o‘qituvchilar o‘rtasidagi aloqani kuchaytiradi va ta’lim sifatini oshiradi. Ommaviy ochiq onlayn kurslar (MOOK) orqali ta’lim olish jarayonida sun’iy intellektning qo‘llanilishi, ta’lim tizimining rivojlanishiga yangi imkoniyatlar yaratadi.

Ta’lim jarayonlarini tashkil qilishda sun’iy intellekt vositalarining qo‘llanilishi

So‘nggi yillarda texnologiya sohasidagi yutuqlar ta’lim jarayonlariga ham katta ta’sir ko‘rsatdi. Ayniqsa, sun’iy intellekt (SI) vositalarining ta’limda qo‘llanilishi o‘quv jarayonlarini yanada samarali va interaktiv qilish imkonini berdi. Individual o‘quv rejasi: Sun’iy intellekt o‘quvchilarning bilim darajasi, qiziqishlari va ehtiyojlariga mos ravishda individual o‘quv rejalarini yaratish imkonini beradi. Bu esa har bir o‘quvchining o‘ziga xos xususiyatlarini hisobga olgan holda ta’lim olishini ta’minlaydi. O‘qitish samaradorligini oshirish: Sun’iy intellekt vositalari o‘qituvchilarga o‘quvchilarning zaif tomonlarini aniqlash va ularga ko‘proq e’tibor qaratish imkonini beradi. Bu esa ta’lim jarayonini yanada samarali qiladi. Interaktiv ta’lim: Sun’iy intellekt asosidagi ta’lim vositalari o‘quvchilarga interaktiv mashg‘ulotlar, simulyatsiyalar va virtual laboratoriyalar orqali bilim olish imkonini beradi. Bu esa o‘quvchilarning darslarga qiziqishini oshiradi. Ma’lumotlarni tahlil qilish: Sun’iy intellekt vositalari katta hajmdagi ma’lumotlarni tez va aniq tahlil qilish imkonini beradi. Bu esa ta’lim muassasalariga o‘quvchilarning o‘zlashtirish darajasini kuzatish va ta’lim sifatini oshirish bo‘yicha qarorlar qabul qilishda yordam beradi. Virtual o‘qituvchilar: Sun’iy intellekt asosida yaratilgan virtual o‘qituvchilar o‘quvchilarga 24/7 yordam ko‘rsatishi mumkin. Ular savollarga javob berish, tushunmovchiliklarni bartaraf etish va o‘quvchilarga maslahatlar berish imkoniyatiga ega. Avtomatlashtirilgan baholash tizimlari: Sun’iy intellekt asosida yaratilgan avtomatlashtirilgan baholash tizimlari o‘quvchilarning ishlarini tez va adolatli baholash imkonini beradi. Bu esa

o‘qituvchilarning yukini kamaytiradi va baholash jarayonini tezlashtiradi. O‘quv materiallarini moslashtirish: Sun’iy intellekt vositalari o‘quvchilarning qiziqishlari va ehtiyojlariga mos ravishda o‘quv materiallarini moslashtirish imkonini beradi. Bu esa o‘quvchilarning bilim olish jarayonini yanada samarali qiladi.

Sun’iy intellekt vositalarining ta’lim jarayonlarini tashkil qilishda qo‘llanilishi ta’lim sifatini oshirish, o‘quvchilarning bilim olish jarayonini yanada interaktiv va samarali qilish imkonini beradi. Biroq, bu vositalarning to‘g‘ri va maqsadga muvofiq qo‘llanilishi muhim ahamiyatga ega. Sun’iy intellekt vositalarining ta’limda keng qo‘llanilishi kelajakda ta’lim jarayonlarini yanada rivojlantirishda muhim rol o‘ynashi kutilmoqda.

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FE’LLARNING UMUMIY VA XUSUSIY BELGILARI (G‘AFUR G‘ULOM ASARLARI MISOLIDA)

Annotatsiya: *Ushbu maqolada o‘zbek tilidagi fe’llarning umumiy va xususiy grammatik-semantik belgilari G‘afur G‘ulom badiiy asarlari misolida tahlil qilinadi. Fe’lning leksik-grammatik xususiyatlari, zamon, mayl, nisbat, shaxs-son kategoriyalari hamda badiiy matndagi uslubiy vazifasi aniqlanadi. Tadqiqot jarayonida yozuvchining “Shum bola” asaridan olingan misollar asosida fe’llarning nutqiy imkoniyatlari va ekspressivlik darajasi ochib beriladi. Maqola o‘zbek tilshunosligi va adabiyotshunosligi kesishgan nuqtada olib borilgan bo‘lib, filologiya yo‘nalishi talabalari uchun muhim ilmiy-amaliy ahamiyat kasb etadi.*

Kalit so‘zlar: *fe’l, grammatik kategoriya, zamon, mayl, nisbat, shaxs-son, badiiy matn, G‘afur G‘ulom, “Shum bola” asari.*

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GENERAL AND SPECIFIC SIGNS OF VERBS (ON THE EXAMPLE OF THE WORKS OF GAFUR GULOM)

Abstract: *In this article, the general and specific grammatical and semantic features of verbs in the Uzbek language are analyzed using the example of Gafur Ghulom’s literary works. The lexical and grammatical properties of the verb, the categories of tense, mood, proportion, person and number, and its stylistic function in the literary text are determined. In the course of the research, the speech capabilities and expressiveness of verbs are revealed based on examples taken from the writer's works such as “Shum bola”. The article is conducted at the intersection of Uzbek linguistics and literary studies, and is of important scientific and practical importance for students of the philology department.*

Keywords: *verb, grammatical category, tense, case, proportion, person, literary text, Gafur Ghulam, works “Shum bola”.*

O‘zbek tilshunosligida fe’l mustaqil so‘z turkumi sifatida harakat va holatni zamon bilan bog‘liq holda ifodalashi bilan xarakterlanadi. Fe’lning asosiy vazifasi ish-harakatning bajarilishi, davom etishi yoki tugallanganligini bildirishdan iborat. Fe’llar orqali predmetning faolligi, subyektning harakati yoki ruhiy holati ifodalanadi. Shu sababli fe’llar nutqda faqat grammatik vazifa bajarib qolmay, balki mazmuniy yukni ham o‘zida mujassamlashtiradi O‘zbek tilshunosligida fe’l so‘z turkumi eng murakkab va ko‘p qirrali grammatik birliklardan biri hisoblanadi. Fe’l harakat va holatni bildirishi, zamon va shaxs bilan bevosita

bog‘lanishi hamda gapning predikativ asosini tashkil etishi bilan ajralib turadi. Ayniqsa, badiiy adabiyotda fe’llar voqea-hodisalarning rivoji, qahramon ruhiyati va muallif munosabatini ifodalashda muhim vosita bo‘lib xizmat qiladi.

G‘afur G‘ulom asarlarida fe’llarning xususiy belgilari yozuvchining badiiy maqsadini ro‘yobga chiqarishda muhim vosita sifatida namoyon bo‘ladi. Fe’llarning zamon, shaxs-son, mayl, nisbat hamda bo‘lishli–bo‘lishsiz shakllarda qo‘llanilishi matn mazmunining aniqligi va ta’sirchanligini ta’minlaydi. Yozuvchi fe’lning aynan xususiy grammatik belgilari orqali voqealarning rivoji, qahramonlarning ruhiy holati va muallif munosabatini ifodalaydi. G‘afur G‘ulom ijodi o‘zbek adabiy tilining rivojida muhim bosqich bo‘lib, uning asarlarida fe’llarning rang-barang shakllari va uslubiy imkoniyatlari yorqin namoyon bo‘ladi. Shu bois ushbu maqolada fe’llarning umumiy va xususiy belgilari yozuvchi asarlari asosida tahlil qilinadi.

Fe’llarning eng asosiy umumiy belgisi—harakat yoki holatni bildirishi hisoblanadi. Masalan, G‘afur G‘ulomning “Shum bola” asarida yugurdi, kuldi, o‘yladi, qochdi kabi fe’llar qahramon harakatining jonli tasvirini yaratadi.

“Shum bola ko‘chadan yugurib chiqdi-da, bir zumda ko‘zdan g‘oyib bo‘ldi”. Bu yerda fe’l harakatning tezkorligi va dinamikasini ifodalaydi.

Zamon kategoriyasiga ega bo‘lishi

Fe’llar ish-harakatning bajarilish vaqtini bildiradi. G‘afur G‘ulom asarlarida o‘tgan zamon fe’llari ustunlik qiladi, bu esa xotira va hikoya uslubiga mos keladi.

Masalan: keldi, ko‘rdi, aytdi – o‘tgan zamon; kelmoqda, o‘ylayapti – hozirgi zamon;

boradi, qiladi – kelasi zamon.

G‘.G‘ulom asarlarida fe’llarning mayl shakllari ham muhim badiiy-uslubiy vazifa bajaradi. Buyruq-istak mayli qahramonlarning iroda va talabini ifodalab, ularning xarakterini ochib beradi. Shart mayli voqealarning shartli va taxminiy jihatlarini ko‘rsatib, dramatik vaziyatlarni yuzaga chiqaradi. Xabar mayli esa voqealarni bayon qilishda asosiy vosita bo‘lib xizmat qiladi. Mayl shakllarining bunday xilma-xilligi badiiy matnning emotsional va mazmuniy boyligini oshiradi.

Fe’llarning nisbat kategoriyasi G‘.G‘ulom asarlarida harakatning bajarilish usulini va undagi ishtirokchilar o‘rtasidagi munosabatni aniqlashga xizmat qiladi. Turli nisbat shakllarining qo‘llanishi orqali harakatning subyektga qaytishi, o‘zaro bajarilishi yoki boshqalar orqali amalga oshirilishi ifodalanadi. Bu hol fe’lning semantik imkoniyatlarini kengaytirib, badiiy tasvirning aniqligi va chuqurligini ta’minlaydi. Shuningdek, G‘.G‘ulom asarlarida fe’llarning xususiy belgilari xalqona nutq unsurlari bilan uyg‘unlashgan holda qo‘llaniladi. Bu hol fe’llarning sodda, tabiiy va jonli bo‘lishini ta’minlab, badiiy nutqning ommabopligini oshiradi. Fe’llarning bunday qo‘llanilishi yozuvchining xalq tiliga yaqinligini va badiiy mahoratini ko‘rsatadi.

G‘.G‘ulom asarlarida fe’llarning xususiy belgilari muallif nutqi bilan qahramonlar nutqi o‘rtasidagi uslubiy farqni aniqlashda ham muhim ahamiyat kasb etadi. Muallif bayonida fe’llar asosan xolis, izchil va mantiqiy shakllarda qo‘llanilib, voqealarning umumiy manzarasini yaratishga xizmat qiladi.

Qahramonlar nutqida esa fe’llarning emotsional, buyruq-istak yoki bo‘lishsiz shakllari ko‘proq uchrab, obrazlarning ruhiy holati va xarakterini ochib berishga yordam beradi. Bu hol fe’llarning xususiy belgilari orqali nutqning uslubiy rang-barangligini ta’minlash imkonini beradi. G‘. G‘ulom asarlarida fe’llarning xususiy belgilari xalqona til unsurlari bilan uyg‘unlashgan holda qo‘llanilib, badiiy nutqning tabiiyligini ta’minlaydi. Fe’llarning sodda va jonli shakllari qahramonlar nutqini hayotiy qiladi va o‘quvchiga yaqinlashtiradi. Bu hol yozuvchining xalq tiliga tayangan holda badiiy obraz yaratish mahoratini ko‘rsatadi. Fe’llarning umumiy grammatik belgilari G‘afur G‘ulom asarlarida tasvir va bayonning uyg‘unlashuvida ham muhim o‘rin tutadi. Harakatni bildiruvchi fe’llar voqealarni oldinga siljitib, bayon jarayonini jonlantirsa, holat fe’llari tasvirning ichki qatlamini ochib beradi. Bu ikki turdagi fe’llarning uyg‘un qo‘llanishi matnning badiiy yaxlitligini ta’minlaydi va o‘quvchi tasavvurida jonli manzara yaratadi.

G‘.G‘ulom ijodida fe’llarning umumiy belgilari ularning intonatsiya va ohang bilan bog‘liq holda qo‘llanishida ham namoyon bo‘ladi. Ayrim fe’l shakllari orqali keskin, hayajonli yoki sokin ohang hosil qilinadi. Bu hol fe’l shakllarining nutqning emotsional rang-barangligini ta’minlashdagi ahamiyatini ko‘rsatadi. Yozuvchi fe’llar yordamida matn ohangini boshqaradi va o‘quvchiga kuchli ta’sir ko‘rsatadi.

Fe’llarning umumiy grammatik belgilari G‘.G‘ulom asarlarida xalqona nutq elementlari bilan uyg‘unlashgan holda qo‘llaniladi. Xalq tiliga xos sodda fe’l shakllari matnning tabiiyligini oshiradi va qahramonlar nutqini hayotiy qiladi. Bu hol yozuvchining xalq tiliga yaqinligini va badiiy tilining ommabopligini ta’minlaydi. Fe’llarning bunday qo‘llanilishi ularning umumiy grammatik belgilari bilan birga stilistik imkoniyatlarini ham namoyon etadi.

G‘.G‘ulom asarlarida fe’llarning umumiy belgilari nutqning izchilligi va mantiqiyligi bilan ham uzviy bog‘liqdir. Fe’l shakllari orqali sabab–oqibat munosabatlari, vaqt ketma-ketligi va voqealar rivoji aniqlashtiriladi. Bu hol matnning tushunarli va izchil bo‘lishini ta’minlaydi. Fe’llarning mantiqiy jihatdan to‘g‘ri tanlanishi yozuvchining badiiy mahoratini ko‘rsatadi.

Fe’llarning umumiy grammatik belgilari G‘.G‘ulom asarlarida obraz yaratishda ham muhim rol o‘ynaydi. Qahramonlarning xatti-harakati, ichki kechinmalari va ijtimoiy munosabatlari fe’llar orqali ifodalanadi [32]. Harakat fe’llarining faol qo‘llanishi obrazlarni jonli va ta’sirchan qiladi. Bu hol fe’llarning badiiy matndagi umumiy belgilari obrazlilikni ta’minlashga xizmat qilishini ko‘rsatadi.

Xulosa qilib aytadigan bo‘lsak, fe’llar G‘afur G‘ulom asarlarida nafaqat grammatik birlik, balki muhim badiiy-uslubiy vosita sifatida ham xizmat qiladi. Fe’llarning umumiy va xususiy belgilari yozuvchi ijodida til boyligi va ifoda imkoniyatlarini kengaytirgan. Ushbu maqola o‘zbek tilshunosligi va badiiy matn tahlilida fe’l kategoriyasining ahamiyatini yanada chuqurroq anglashga xizmat qiladi. G‘afur G‘ulom asarlarida fe’llarning xalqona va sodda shakllarda

[32] Rasulov R. **Tilshunoslik asoslari.** – Toshkent: Fan, 2022

qo‘llanishi matnning hayotiyligi va ta’sirchanligini oshiradi. Fe’llar orqali muallif voqelikni dinamik, jonli va obrazli tarzda tasvirlashga erishgan. Bu holat yozuvchining til imkoniyatlaridan mahorat bilan foydalanganini ko‘rsatadi.

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A STUDY OF MOBILE TELEMETRIC DEVICES IN THE DIAGNOSIS OF CARDIOVASCULAR DISEASES

Annotation: *Cardiovascular diseases remain a leading cause of global mortality and continue to impose a substantial burden on healthcare systems worldwide. Early diagnosis and continuous monitoring are essential for improving clinical outcomes, preventing complications, and reducing healthcare costs.*

In recent years, mobile medical approaches, particularly mobile telemetric devices, have emerged as promising tools for real-time cardiac monitoring. These systems enable continuous recording of electrocardiographic signals and their transmission outside traditional clinical environments, allowing long-term observation of cardiac activity in daily life conditions.

This article analyzes the role of mobile telemetric devices in the diagnosis of cardiovascular diseases based on previously published scientific literature. The findings suggest that these systems improve the detection of cardiac rhythm abnormalities, especially transient and intermittent arrhythmias, when compared with conventional short-term diagnostic methods such as standard ECG and Holter monitoring.

Despite these advantages, several challenges remain, including signal quality variability, device cost, patient adherence issues, and the lack of standardized clinical protocols. These limitations continue to restrict the widespread integration of telemetric systems into routine clinical practice.

Keywords: *Cardiovascular diseases, mobile medical approaches, telemetry, ECG monitoring, remote diagnostics.*

Introduction

Cardiovascular diseases (CVDs) represent a group of disorders affecting the heart and blood vessels, including coronary artery disease, hypertension, arrhythmias, myocardial infarction, and heart failure. According to the World Health Organization, CVDs account for approximately 32% of all global deaths annually, highlighting their significant impact on global public health.

The increasing prevalence of cardiovascular diseases is closely associated with modifiable lifestyle risk factors such as physical inactivity, unhealthy dietary habits, obesity, diabetes mellitus, smoking, and chronic psychological stress. These factors emphasize the growing need for more efficient and continuous diagnostic approaches.

Conventional diagnostic techniques, including electrocardiography (ECG), Holter monitoring, and echocardiography, remain standard tools in cardiology

practice. However, these methods are generally limited by short monitoring durations and hospital-based settings, which may reduce their ability to detect transient or intermittent cardiac abnormalities.

To overcome these limitations, mobile medical approaches have been introduced, enabling continuous cardiac monitoring in real-world environments. Mobile telemetric devices capture and transmit electrocardiographic data wirelessly for remote analysis, providing extended observation periods and improving the likelihood of detecting clinically significant cardiac events.

Methods

This article is based on an analytical research approach. Relevant scientific publications were reviewed from international databases and peer-reviewed journals, including European Heart Journal, Journal of Telemedicine and Telecare, and other cardiology-related scientific sources.

The analysis was structured around the following key domains:

Diagnostic performance of mobile telemetric systems, including sensitivity, specificity, and ability to detect transient or intermittent cardiac arrhythmias in comparison with standard diagnostic tools.

Comparison with conventional ECG and Holter monitoring, focusing on differences in monitoring duration, data continuity, patient comfort, and diagnostic yield.

Clinical effectiveness in real-world applications, particularly in outpatient monitoring, long-term follow-up of high-risk patients, and reduction of hospital readmission rates.

Technical and practical limitations of the systems, including signal noise interference, data transmission reliability, device battery life, patient adherence, cost factors, and lack of standardized clinical protocols.

Data management and interpretation challenges, such as variability in algorithms, potential false-positive detections, and differences in device calibration across manufacturers.

Results

The analyzed literature consistently demonstrates that mobile telemetric devices significantly improve the detection of cardiovascular abnormalities, particularly intermittent arrhythmias that are often missed by conventional diagnostic methods.

According to multiple studies, continuous ECG monitoring using mobile systems increases arrhythmia detection rates by approximately 25–40% compared to standard short-term monitoring approaches. In addition, remote monitoring contributes to improved patient follow-up and reduces hospital readmission rates in high-risk populations.

However, differences in device performance, study methodologies, and data interpretation across publications indicate the need for standardized protocols in telemetric monitoring systems.

Discussion

The findings of this study confirm that mobile telemetric devices represent a significant advancement in cardiovascular diagnostics. Unlike traditional methods, which rely on short-term or hospital-based recordings, mobile systems provide continuous monitoring in real-life environments.

This continuous approach greatly enhances the detection of transient cardiac abnormalities, especially paroxysmal arrhythmias that are difficult to capture using conventional tools. As a result, diagnostic accuracy and early intervention opportunities are improved.

Despite these advantages, several challenges remain. These include signal noise interference, device cost, data transmission reliability, patient compliance, and the absence of standardized clinical guidelines for widespread implementation.

Overall, mobile telemetric technologies represent a promising direction in modern cardiology, offering improved diagnostic capabilities and long-term patient monitoring potential. Further technological development and clinical standardization are necessary for full integration into routine healthcare systems.

Conclusion

Mobile telemetric devices play an important role in the diagnosis and monitoring of cardiovascular diseases. Current evidence shows that they enhance early detection of cardiac abnormalities compared to traditional diagnostic approaches. However, further improvements in technology, cost reduction, and standardization are required to ensure broader clinical adoption.

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EFFECTIVENESS OF THE PROBLEM-BASED LEARNING MODEL IN ENHANCING ENGLISH LANGUAGE TEACHERS' SPEAKING INSTRUCTION COMPETENCE IN FOREIGN LANGUAGE COURSES

Abstract. *This study investigates the effectiveness of the Problem-Based Learning (PBL) model in enhancing English language teachers' competence in teaching speaking skills. Grounded in constructivist learning theory, this research emphasizes how PBL can empower in-service teachers to design and implement more interactive, student-centered speaking activities. Conducted among 82 English language teachers undergoing professional development at the A. Avloniy National Institute for Pedagogical Skills in Tashkent, the study utilized a mixed-methods design to evaluate cognitive and affective impacts of the PBL-based training. The results revealed that PBL significantly improved participants' confidence, instructional creativity, and ability to scaffold communicative tasks. Recommendations are offered for integrating PBL modules into teacher training curricula, particularly in foreign language education.*

Keywords. *Problem-Based Learning, Speaking Instruction, English Language Teachers, Professional Development, Teacher Competence.*

Introduction

Developing speaking competence is one of the most critical yet challenging aspects of English language teaching. In foreign language contexts, teachers often struggle to foster communicative competence due to rigid curricula, large class sizes, and limited access to interactive resources. In-service teacher training programs must equip educators with innovative strategies that go beyond traditional lecture-based instruction.

Problem-Based Learning (PBL) presents a learner-centered methodology rooted in constructivist theory. It involves engaging learners in solving real-world problems that stimulate higher-order thinking, collaboration, and autonomous learning. While PBL has been extensively employed in medical and engineering education, its application in teacher education—particularly in the context of teaching speaking skills—remains underexplored.

Rationale for the Study

This research is timely given the pressing need for modernized teacher education frameworks capable of adapting to the rapidly evolving educational landscape. The employment of PBL can aid in diversifying pedagogical strategies and engaging teachers in meaningful professional development. By addressing the gap in existing literature, this study aims to offer insights into how PBL can

enhance the ability of English language teachers to plan, facilitate, and assess speaking instruction in foreign language classrooms.

Moreover, the significance of speaking skills in language acquisition has been increasingly recognized. Comprehensively developing speaking competence not only boosts learners' linguistic abilities but also equips them with essential life skills, such as critical thinking and effective communication. Given the educational context in Uzbekistan, where language skills are pivotal in fostering international collaboration and understanding, this research is particularly relevant.

Literature Review

The significance of speaking skills in English language learning has been widely acknowledged in Second Language Acquisition (SLA) literature. According to Richards (2008), speaking is not merely about linguistic knowledge but encompasses strategic, sociolinguistic, and discourse competence as well.

Theoretical Underpinnings of PBL

Problem-Based Learning (PBL) originated in the educational paradigm shift during the 1960s and has become a prominent instructional strategy across various disciplines. Barrows (1986) posited that traditional, lecture-driven teaching leaves learners unprepared to tackle real-world problems effectively. PBL emerged as an innovative method aimed at cultivating not only academic knowledge but also critical thinking and problem-solving skills.

Research, such as that conducted by Hmelo-Silver (2004), has substantiated that PBL not only facilitates cognitive development but also enhances metacognitive awareness, inquiry, and reflective practices among learners. The active engagement required in PBL promotes an environment where learners become autonomous investigators of their knowledge construction.

PBL in the Context of English Language Teaching

Research indicates that PBL can significantly transform language learning into a more purposeful, communicative, and socially meaningful process (Yew & Goh, 2016). In the context of English Language Teaching (ELT), PBL encourages learners to engage in authentic communication while collaboratively negotiating meaning in English. By approaching language as a tool for problem-solving, learners are more likely to internalize linguistic and strategic abilities needed for effective communication.

Moreover, PBL ignites critical and creative thinking skills during the learning process. Engaging with open-ended problems allows learners to analyze, generate solutions, and articulate their reasoning, thus strengthening their cognitive engagement alongside linguistic proficiency. It creates an interactive environment where questioning, argumentation, clarification, and negotiation of meaning are paramount.

Current Research Gaps

Several studies (Savery & Duffy, 1995; Belland et al., 2009) underscore PBL's effectiveness in enhancing teaching strategies, particularly for speaking skills. However, empirical research on PBL’s effects on teachers' speaking

instruction strategies—especially in foreign language settings—is limited. This study seeks to bridge this gap by exploring how PBL shapes the instructional competence of in-service English teachers in Uzbekistan.

Relevance to Uzbek Education

As Uzbekistan aligns its national educational standards with global competency-based approaches, integrating innovative methodologies like PBL into teacher training becomes crucial. Enhanced English speaking competencies among teachers will not only improve classroom interactions but will also contribute to the larger goal of fostering English proficiency within the broader population.

Methodology

A mixed-methods research design was selected to comprehensively evaluate the effects of the PBL model on teachers' speaking instruction competence. This design allows for triangulation of both qualitative and quantitative data, providing a robust understanding of the research question.

Participants

The study involved 82 in-service English language teachers from three regions of Uzbekistan: Tashkent city, Namangan region, and Bukhara region. All participants were enrolled in a professional development program at the A. Avloniy National Institute for Pedagogical Skills. The diversity in participants' backgrounds enriches the dataset while offering varied perspectives on the implementation of PBL in their teaching contexts.

Instruments

The study employed multiple instruments to ensure comprehensive and reliable data collection, capturing both quantitative changes in teachers' competence and qualitative insights into their professional experiences. Pre- and post-training surveys were administered to assess participants' levels of confidence and perceived competence in teaching speaking skills before and after the implementation of the Problem-Based Learning (PBL) program. These surveys measured self-reported abilities in areas such as designing communicative tasks, facilitating student interaction, managing classroom discourse, and applying scaffolding techniques, thereby allowing for a systematic comparison of instructional growth over time. In addition, observational rubrics were used by facilitators to evaluate participants' performance during classroom simulations and microteaching sessions. These rubrics focused on key dimensions of effective speaking instruction, including clarity of task design, use of student-centered strategies, quality of questioning, interaction patterns, and responsiveness to learners' needs within PBL activities. To complement these structured measures, reflective journals were collected weekly from all participants. These journals provided rich qualitative data on teachers' perceptions, challenges, emotional responses, and evolving pedagogical beliefs as they experimented with PBL in practice. Participants documented their successes, difficulties in managing group work, concerns about time constraints, and reflections on student engagement and learning outcomes. Together, the triangulation of survey results, observational

evidence, and reflective narratives enhanced the validity of the study by offering a multidimensional understanding of how PBL influenced teachers' instructional competence and professional development in teaching speaking.

Procedure

The procedure was meticulously structured to ensure comprehensive engagement with the PBL methodology:

i. **Introduction to PBL**: Participants were introduced to the PBL framework, focusing on the importance of experiential learning and collaborative problem-solving.

ii. **Problem Scenarios**: Weekly sessions were organized around specific problem scenarios centered on speaking instruction, promoting applied learning.

iii. **Collaboration and Guidance**: Facilitators played a key role in guiding discussions, assisting in the design of speaking activities, and employing scaffolding techniques to enhance participants' skills.

iv. **Validation and Feedback**: After implementing speaking tasks, teachers engaged in peer feedback and microteaching sessions to refine their instructional strategies.

Data Analysis. Quantitative data were analyzed using paired t-tests to identify statistically significant differences in pre- and post-training results. Qualitative data from reflective journals were examined through thematic coding, highlighting shifts in pedagogical thinking and classroom practices over time.

Findings and Discussion

This study aimed to uncover the operational effectiveness of the PBL model in developing English language teachers' speaking instruction competence. Through participant feedback and research findings, we identified significant improvements in various areas.

Key Findings

1. **Increased Confidence**: Participants reported a remarkable increase in their confidence levels when conducting speaking instruction, facilitating interactive activities, and employing innovative techniques.

2. **Enhanced Instructional Creativity**: Many teachers expressed satisfaction with the creative opportunities that PBL allowed, particularly in designing speaking tasks that reflect real-life contexts.

3. **Effective Scaffolding Practices**: Teachers noted a better understanding of how to integrate scaffolding into their speaking instruction, which significantly improved student engagement and participation.

Challenges Identified

While several areas showed remarkable improvement, participants also highlighted challenges in implementing PBL, including:

- **Student Anxiety**: Some teachers reported difficulties in addressing student anxiety during speaking tasks, indicating a need for additional support strategies in teacher training.
- **Resource Limitations**: Limited access to appropriate materials and digital tools hampered some teachers' ability to implement PBL fully.

- **Cultural Constraints**: Participant feedback suggested that traditional teaching practices are deeply rooted, making it challenging for some educators to shift to a more learner-centered approach.

Framework for PBL in Speaking Instruction

The development of a PBL framework for speaking instruction involved identifying several critical stages:

Stage	Description
I. Problem Orientation	Identification of key challenges in teaching speaking skills and formulation of authentic, real-life communicative problems to guide instructional design.
II. Organizing the Learning Environment	Planning collaborative learning structures, defining participant roles and responsibilities, and selecting appropriate pedagogical strategies, digital tools, and assessment approaches.
III. Facilitating Group and Individual Investigations	Conducting needs analysis of learners' speaking abilities, brainstorming instructional tasks, exploring possible solutions, and reflecting on existing teaching challenges.
IV. Presentation and Feedback	Implementation of microteaching sessions in which participants present designed speaking activities and receive structured feedback from peers and facilitators.
V. Analysis and Evaluation	Systematic review of instructional outcomes, assessment of participants' growth in communicative task planning and delivery, and identification of areas for further improvement.

Implications for Teacher Education

The findings from this study have significant implications for teacher education programs in Uzbekistan and beyond:

1. **Integration of PBL Modules**: Teacher training institutions should include PBL modules specifically targeting speaking instruction within their curricula. This will equip future educators with the skills necessary to foster effective communication among their students.
2. **Development of Real-World Scenarios**: Curriculum designers must integrate authentic, real-world scenarios that encourage teachers to experiment with communicative techniques. This could involve collaboration with local businesses or community organizations to create meaningful learning experiences.
3. **Policy Support for Professional Development**: National education policies should promote competency-based professional development frameworks that emphasize problem-solving and collaboration. Investing in continuous professional growth will ultimately lead to improved educational outcomes for students.

Conclusion and Implications

This study concludes that the Problem-Based Learning (PBL) model is an effective framework for significantly enhancing in-service English teachers' speaking instruction competence. PBL facilitates a transformative shift toward reflective, interactive, and student-centered teaching practices, underscoring its potential impact on language education.

Summary of Key Contributions

1. **Empowerment of Teachers**: By adopting PBL, teachers reported feeling more empowered to create engaging, innovative activities that resonate with students' real-life experiences.
2. **Cultivation of Communication Skills**: The use of real-world problems enhanced the relevance of speaking instruction, motivating both teachers and learners to engage actively with the language.
3. **Development of Supportive Networks**: Collaborative elements of PBL foster a culture of peer support and continuous improvement, essential for sustained professional growth.

Future Directions for Research

Future research could explore the longitudinal impacts of PBL training on classroom outcomes or compare its effectiveness with other models, such as inquiry-based learning or flipped classrooms. Additionally, studies can investigate the systemic barriers that hinder the broader implementation of PBL methodologies in various educational contexts.

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ALISHER NAVOIY G‘AZALLARIDA BADIIY TASVIR VA MAJOZIY QATLAMLAR TAHLILI

Annotatsiya*: Ushbu maqolada Alisher Navoiy g‘azallaridagi badiiy tasvir vositalari, xususan tashbeh, isti’ora, mubolag‘a va tazod kabi san’atlarning qo‘llanishi hamda ularning ma’no qatlamlari tahlil qilinadi. Shoir ijodida suv, daryo, dengiz, qayiq, quyosh va yulduz kabi obrazlar orqali ishqiy, falsafiy va irfoniy mazmun ifodalanishi yoritiladi. Tadqiqot natijalari Navoiy she’riyatida zohiriy va botiniy ma’nolar uyg‘unligini ko‘rsatadi.*

Kalit so‘zlar*: Navoiy, g‘azal, badiiy tasvir, majoz, tashbeh, isti’ora, Sharq she’riyati, irfon.*

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ANALYSIS OF ARTISTIC IMAGERY AND METAPHORICAL-IMAGINARY LAYERS IN ALISHER NAVOI'S GAZELS

Abstract: *This article analyzes the use of artistic imagery in Alisher Navoi's ghazals, in particular, such devices as metaphor, simile, hyperbole, and tazod, as well as their semantic layers. The poet's work emphasizes the expression of romantic, philosophical, and mystical content through images of water, rivers, seas, boats, the sun, and stars. The results of the study demonstrate the harmony of external and internal meanings in Navoi's poetry.*

Keywords: *Navoi, ghazal, artistic imagery, metaphor, isiora, oriental poetry, wisdom*

Kirish

Alisher Navoiy o‘zbek mumtoz adabiyotining eng yuksak namoyandalaridan biri sifatida Sharq she’riyatida chuqur falsafiy va badiiy tafakkurni mujassam etgan ijodkordir. Uning g‘azallarida nafaqat ishqiy kechinmalar, balki inson ruhiy olami, borliqning ramziy talqini ham keng ifoda etilgan. Shoir ijodida badiiy tasvir vositalari nihoyatda murakkab va ko‘p qatlamli bo‘lib, ular orqali zohiriy voqelik ortidagi botiniy ma’nolar ochib beriladi.

Navoiy g‘azallarida suv, daryo, dengiz, qayiq, quyosh, oy va yulduz kabi tabiiy va kosmik obrazlar ko‘pincha majoziy ma’noda qo‘llanib, insonning ruhiy holati va ishqiy iztiroblarini ifodalashga xizmat qiladi. Ayniqsa, tashbeh va isti’ora kabi badiiy vositalar orqali real va xayoliy olam o‘rtasidagi chegara xiralashadi. Bu esa Sharq poetik an’anasiga xos bo‘lgan ramziy tafakkur tizimini yanada

chuqurlashtiradi. Shu jihatdan Navoiy ijodini tahlil qilish uning she’riyatida ma’no qatlamlarining qanday shakllanishi, badiiy obrazlarning qanday falsafiy yuk tashishi va o‘quvchiga qanday estetik ta’sir ko‘rsatishini anglashda muhim ahamiyat kasb etadi [3,5].

Materiallar va uslublar

Ushbu tadqiqotda Alisher Navoiy ijodiga oid g‘azallar asosiy material sifatida tanlab olindi. Xususan, mumtoz sharq she’riyatiga xos bo‘lgan ko‘pqatlamli ma’no tizimi, badiiy tasvir vositalari va ramziy obrazlar tahlil qilindi. Tadqiqot uchun Navoiy g‘azallarining ilmiy-nashriy manbalari hamda zamonaviy adabiyotshunoslikka oid sharh va izohlar asos qilib olindi. Tadqiqot jarayonida quyidagi uslublardan foydalanildi:

Matn tahlili (filologik tahlil) – g‘azal matnidagi leksik, semantik va stilistik birliklar chuqur o‘rganildi;

Badiiy-tasviriy tahlil – tashbeh, isti’ora, mubolag‘a, tazod kabi badiiy san’atlarning qo‘llanishi va ularning estetik vazifalari aniqlashtirildi;

Qiyosiy tahlil – obrazlar va ma’no qatlamlari Sharq mumtoz she’riyati an’analari bilan qiyosiy asosda ko‘rib chiqildi;

Hermenevtik yondashuv – matnning zohiriy va botiniy ma’nolarini izohlash, ramziy qatlamlarni ochish maqsadida qo‘llanildi.

Shuningdek, tadqiqotda induktiv va deduktiv yondashuvlar uyg‘unlashtirilib, avval alohida baytlar tahlil qilindi, so‘ngra ularning umumiy badiiy-falsafiy xulosalari shakllantirildi. Mazkur metodologik asos Navoiy g‘azallaridagi murakkab majoziy tizimni chuqurroq anglash va ularning estetik mohiyatini ochib berishga xizmat qildi.

Tadqiqot natijalari

“G‘aroyib us-sig‘or”dagi 20-g‘azal shunday mislar bilan boshlanadi:

Zavraq ichra ul quyosh sayr aylamas Jayhun aro,

Axtari sa’de hilol ichra kezar gardun aro. [1]

Bayt mumtoz sharq she’riyatiga xos ko‘pqatlamli ma’no va murakkab tasvir tizimini namoyon etadi, unda oshiq nigohi orqali yor siymosi tabiiy va kosmik obrazlar uyg‘unligida talqin qilinadi: birinchi misradagi “zavraq”, “quyosh” va “Jayhun” birliklari o‘zaro g‘ayritabiiy, ammo badiiy jihatdan kuchli tasvirni yuzaga keltiradi, ya’ni quyoshning qayiq ichida daryo bo‘ylab sayr etishi mantiqan imkonsiz bo‘lsa-da, mubolag‘a va tashbeh vositasida yor jamoli shu darajada porloq va harakatda ekani ifodalanadi. “Jayhun” kenglik va oqim timsoli sifatida yor husnining jilolanish xususiyatini kuchaytiradi, shu bilan birga, ikkinchi misrada tasvir yanada yuksalib, “axtari sa’d”, “hilol” va “gardun” obrazlari orqali estetik makon yaratiladi, natijada birinchi misradagi yerga xos tasvir go‘yo inkor etilib, uning o‘rniga yor osmon bag‘rida harakatlanuvchi baxt yulduzi sifatida gavdalanadi; bu o‘rinda tashbeh (yor–quyosh, yor–yulduz), isti’ora (quyosh va yulduz orqali ma’shuqning jamoli), hamda tazod (yer – Jayhun va osmon – gardun o‘rtasidagi qarama-qarshilik) kabi badiiy san’atlar uzviy uyg‘unlikda ishlatilgan. Chunki “she’riyatda, ayniqsa, Sharq nazmida poetik mazmun, odatda, ramzlar, obrazlar tilidan talqin etiladi” [2]. Sharq she’riyatida ma’shuqning quyosh va

yulduzga qiyoslanishi uning mutlaq va ideallashtirilgan go‘zallik timsoli sifatida talqin etilishidan dalolat beradi.

Anglamon Jayhunda ul oy kema birla sayr etar
Yo hilol-u mehr aksin el ko‘rar Jayhun aro.

Endi lirik qahramonning idrokiy ikkilanishi badiiy markazga aylantiriladi: “Anglamon Jayhunda ul oy kema birla sayr etar” misrasida u ko‘rayotgan manzaraning mohiyatini aniqlay olmaydi, ya’ni Jayhun yuzida ko‘zga tashlanayotgan narsa haqiqatan ham “oy” (ya’ni yor timsoli)ning qayiqda sayr etishimi yoki bu faqat tasavvur mahsulimi – bu savol ochiq qoladi; keyingi misrada esa “Yo hilol-u mehr aksin el ko‘rar Jayhun aro” deyilishi orqali muqobil talqin ilgari surilib, kuzatilayotgan hodisa aslida osmon jismlarining – hilol va quyoshning suvdagi aksi ekani ehtimoli kuchaytiriladi, natijada voqelik va in’ikos, real manzara va estetik tasavvur o‘rtasida nozik poetik taranglik yuzaga keladi; bu o‘rinda “oy”, “hilol”, “mehr” kabi kosmik obrazlar orqali yor jamoli isti’ora yo‘li bilan ifodalanib, suvdagi aks motivi esa tasvirning ikki qavatli (zohir va botin) tabiatini ochadi, ya’ni ko‘rilayotgan narsa bir vaqtning o‘zida ham borliq hodisasi, ham majoziy go‘zallik ifodasidir. “Navoiy aksariyat she’rlarida san’at va hayot mantiqiga rioya qilib, bu borada o‘zicha isloh yasaydi – “majoz” “haqiqat”ni anglashning tadrijiy takomil bosqichiga aylanadi” [3]. Majoz va haqiqat o‘rtasidagi chegaraning xiralashuvi she’riy idrokning eng muhim belgilaridan bo‘lib, unda aks va asl bir-biriga singishib ketadi, shuningdek, shoir tasvirni ko‘rish bilan cheklamaydi, balki uni talqin qilish zaruratini ham yuzaga keltiradi, natijada o‘quvchi idrok jarayonining faol ishtirokchisiga aylanadi, yana suvdagi aks obrazlari ko‘pincha o‘tkinchilik va idrok nisbiyligini ifodalovchi poetik vosita sifatida xizmat qiladi.

Kemadin har dam chiqib rangin suv ko‘zum qonidek,
Anda yor andoqki mardum diydayi purxun aro.

Uchinchi baytda tasvir keskin darajada ichki dramatizm va hissiy intensivlik kasb etadi: “Kemadin har dam chiqib rangin suv ko‘zum qonidek” misrasida qayiqdan chiqayotgan “rangin suv” (ya’ni qizg‘ish, qon rangiga yaqin suv) oshiqning “ko‘zum qoni” – qonli yoshlariga tashbeh qilinadi, bu orqali tashqi manzara bevosita lirik qahramonning ruhiy holati bilan uyg‘unlashtiriladi; suvning rangdorligi oddiy tabiiy hodisa emas, balki iztirobning vizual ifodasiga aylanadi, natijada tashbeh (rangin suv – qonli yosh) va isti’ora (ko‘z qoni – chuqur iztirob belgisi) birlashib, kuchli emotsional fon hosil qiladi; keyingi misrada esa tasvir yanada nozik va murakkab shaklga kiradi: “Anda yor andoqki mardum diydayi purxun aro” – bu yerda yor “mardum” (ko‘z qorachig‘i)ga qiyoslanadi, “diydayi purxun” esa qon bilan to‘lgan ko‘z obrazini bildiradi, natijada yor go‘yo oshiqning qonli ko‘zi ichida joylashgan qorachiqdek tasavvur qilinadi, bu esa nihoyatda original va chuqur psixologik isti’ora bo‘lib, unda yor tashqi mavjudot emas, balki oshiqning ichki ko‘rish maydonida, uning iztirobi markazida namoyon bo‘ladi. Ko‘z va uning qismlari Sharq she’riyatida nafaqat sezgi a’zosi, balki ruhiy kechinmalar markazi sifatida talqin qilinadi. Ma’shuqning ko‘z qorachig‘iga qiyoslanishi uning oshiq qalbining markazida joylashganida chuqur ramziy ifoda

bor. Rang va qon motivlari orqali shoir iztirobni ko‘rinadigan shaklga keltirib, hissiy tajribani vizuallashtiradi [5].

Borg‘il, ey Majnunkim, ul oy zavraqidek tez emas
Jo‘ngkim Layli amoriysin chekar homun aro.

Navbatdagi baytda murojaat (xitob) ohangi kuchayib, lirik qahramon o‘z kechinmalarini bevosita Majnun obrazi orqali ifodalaydi: “Borg‘il, ey Majnunkim, ul oy zavraqidek tez emas” misrasida yor yana “oy” isti’orasi bilan berilib, uning harakati “zavraq” (qayiq) tezligiga qiyosan inkor etiladi, ya’ni u qadar tez emasligi ta’kidlanadi; bu yerda avvalgi baytlardagi suv va qayiq bilan bog‘liq tasvirlar semantik jihatdan davom ettirilib, harakat motivi poetik tizim ichida izchil rivojlanadi, biroq keyingi misrada yo‘nalish keskin o‘zgaradi: “Jo‘ngkim Layli amoriysin chekar homun aro” – bu yerda Layli ning “amoriysi” (tuya ustidagi kajava) sahro (homun) bo‘ylab harakatlanayotgani tasvirlanib, suv makonidan sahro makoniga o‘tish yuz beradi; natijada tezlik va sekinlik o‘rtasidagi tazod yuzaga keladi: qayiq – nisbatan tez, karvon – sust va og‘ir harakat timsoli sifatida qarama-qarshi qo‘yiladi, bu esa oshiqning sabrga undovchi ichki nutqini ifodalaydi; shu bilan birga, Majnun obrazining kiritilishi intertekstual qatlamni yuzaga keltirib, baytni mumtoz ishqiy an’ana bilan bog‘laydi, chunki u sabr, sadoqat va iztirob timsoli sifatida qabul qilingan. Majnun obrazi Sharq she’riyatida ishqning eng oliy darajadagi sabr va fidoiylik ramzi sifatida talqin qilinadi. Shuningdek, “makon almashinuvi – suvdan sahroga o‘tish – ko‘pincha ruhiy holatdagi o‘zgarish va kechinmaning yangi bosqichini ifodalaydi.

Olma xum girdobidin bir lahza sog‘ar zavraqni,
Bahri g‘amdin istasang maxlas bu dahri dun aro.

Mazkur baytda tasvir ramziy-falsafiy qatlamga ko‘chib, hayotiy tajriba va tasavvufiy ishoralar uyg‘unligida ifodalanadi: “Olma xum girdobidin bir lahza sog‘ar zavraqni” misrasida “zavraq” (qayiq) inson hayoti yoki qalb timsoli sifatida talqin qilinadi, “xum” va “girdob” esa murakkab isti’oraviy birlik hosil qilib, bir tomondan may (sharob) bilan bog‘liq zavq va unutish holatini, ikkinchi tomondan esa girdob obrazida beqarorlik va halokat xavfini anglatadi, natijada qayiqning “sog‘ar” (bo‘sh, xoli) bo‘lmasligi talabi ramziy ma’noda insonning o‘zini muayyan ruhiy holat – may, ya’ni ishqiy yoki irfoniy mastlik bilan to‘ldirib turishi zarurligini bildiradi; keyingi misrada “Bahri g‘amdin istasang maxlas bu dahri dun aro” deyilishi orqali asosiy g‘oya ochiladi: “bahri g‘am” – g‘am dengizi, “dahri dun” – pastkash, o‘tkinchi dunyo sifatida talqin qilinib, inson hayoti iztirob va beqarorlik bilan to‘la makon sifatida ko‘rsatiladi, undan “maxlas” (qutulish) esa aynan yuqoridagi ramziy vosita – may, ya’ni ishq yoki ma’rifat orqali amalga oshishi mumkinligi ilgari suriladi. May obrazi mumtoz she’riyatda keng tarqalgan ko‘pma’noli timsol bo‘lib, u nafaqat dunyoviy zavq, balki ilohiy ishq va ruhiy yuksalish belgisi sifatida ham talqin etiladi. “May – orifona ma’noda ilohiy tajalliydan sarhushlik, muhabbat zavqining to‘lib-toshishi”dir [4].

Bahr mavjidin mushavvash bo‘lmasun deb xotiring,
Mavj urar yuz bahri g‘am bu xotiri mahzun aro.

Mazkur baytda ichki kechinma va tashqi tabiat hodisasi o‘zaro paralel qo‘yilib, chuqur psixologik-ramziy tasvir yuzaga keladi: “Bahr mavjidin mushavvash bo‘lmasun deb xotiring” misrasida lirik qahramon go‘yo o‘z qalbini tashqi “bahr mavji” – dengiz to‘lqinlaridan asrashga urinadi, ya’ni tashqi bezovtalikdan qochish istagi ifodalanadi, biroq keyingi misrada bu urinishning befoydaligi ochiladi: “Mavj urar yuz bahri g‘am bu xotiri mahzun aro”, ya’ni asl bezovtalik tashqarida emas, balki ichkarida, “xotiri mahzun” (g‘amgin qalb) ichida “yuz bahri g‘am” tarzida mavjud; bu o‘rinda ko‘plik va mubolag‘a san’ati orqali iztirobning cheksizligi ta’kidlanadi, dengiz (bahr) va to‘lqin (mavj) obrazlari esa ruhiy beqarorlikning kuchli metaforasiga aylanadi, natijada tashqi va ichki olam o‘rtasida keskin tazod yuzaga keladi: tashqi dengizdan qochish mumkin, ammo ichki g‘am dengizlaridan qochish mahol. Sharq lirikasida “qalb – dengiz” qiyosi inson ruhiyatining cheksiz va notinch tabiatini ifodalash uchun xizmat qiladi. Bu notinchlik, bu dard zarur aslida: “Dard doimo insonga yo‘l ochadi. Dunyodagi har ish uchun inson yuragida ishtiyoq, havas va dard bo‘lishi lozim. Aks holda, inson bu ishni qilolmas. Dardsiz va zahmatsiz ish ham unga muyassar bo‘lmas. Dunyo va oxirat, tijorat va shohlik, ilm va boshqa ishlardan bo‘lsin, barchasida ahvol shunday” [5].

Dur bo‘lur bahr ichra pinhon, nazmidin shah madhida
Bahr yoshurmish Navoiy har duri maknun aro.

Maqta’da shoir o‘z ijodiga nisbatan ramziy-estetik munosabatini ifodalab, she’riy nutqning ichki qatlamlarini “dur” (gavhar) obrazi orqali talqin qiladi: “Dur bo‘lur bahr ichra pinhon” misrasida dur (qimmatbaho marvarid)ning dengiz qa’rida yashirin holda mavjud bo‘lishi tabiiy hodisa sifatida keltiriladi va bu tashbeh keyingi fikr uchun asos vazifasini bajaradi; “nazmidin shah madhida / Bahr yoshurmish Navoiy har duri maknun aro” jumlasida esa Alisher Navoiy o‘zining madhiyaviy she’rlari (“shah madhida”) ichida “duri maknun” – yashirin, teran ma’nolarni pinhon qilganini ta’kidlaydi, natijada she’r dengizga, undagi ma’nolar esa gavharlarga qiyoslanadi; bu yerda tashbeh va isti’ora uyg‘un holda qo‘llanib, matnning zohiriy qatlamidan tashqari botiniy, chuqur ma’nolar mavjudligi ilgari suriladi, ya’ni har bir bayt yoki misra ichida o‘quvchi tomonidan kashf etilishi lozim bo‘lgan yashirin ma’no qatlamlari mavjud; “duri maknun” iborasi esa mumtoz poetikada ko‘pincha ilohiy yoki falsafiy haqiqatlarning ramziy ifodasi sifatida talqin qilinadi, shu bois bayt faqatgina madh emas, balki ma’rifiy-estetik iddao hamdir. Mumtoz she’riyatda ma’no ko‘pincha yuzaki bayondan ko‘ra chuqurroq qatlamda yashirinadi va u gavhar timsoli bilan ifodalanadi. Navoiy she’riyatida har bir obraz ko‘p ma’noli bo‘lib, unda zohir va botin uyg‘unligi kuzatiladi.

Xulosa

Alisher Navoiy g‘azallarining tahlili shuni ko‘rsatadiki, shoir ijodida badiiy tasvir vositalari oddiy ifoda vositasi emas, balki chuqur ma’no tashuvchi ramziy tizim sifatida namoyon bo‘ladi. Suv, dengiz, qayiq, quyosh va yulduz kabi obrazlar orqali ishqiy kechinmalar bilan bir qatorda inson ruhiyatining murakkab holatlari ham yoritiladi.

Navoiy she’riyatida zohir va botin, ya’ni tashqi ko‘rinish va ichki ma’no uyg‘unligi asosiy estetik tamoyillardan biri hisoblanadi. Shoir har bir obraz orqali o‘quvchini nafaqat badiiy tasvirni ko‘rishga, balki uning ortidagi falsafiy va irfoniy ma’nolarni anglashga undaydi.

Natijada, Navoiy g‘azallari Sharq mumtoz adabiyotida badiiy tafakkurning yuksak namunasi bo‘lib, unda majoz va haqiqat o‘zaro uyg‘unlashgan murakkab estetik tizimni tashkil etadi.

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REMOTE SENSING AND MACHINE LEARNING FOR MAPPING IRRIGATED AGRICULTURAL LANDS (A CASE STUDY OF URGENCH DISTRICT)

Abstract. *This study presents an operational framework for monitoring irrigated croplands and identifying agricultural species using Remote Sensing and Machine Learning. To process multi-temporal Sentinel-2 data for the heterogeneous Urgench district (Khorezm region), Google Earth Engine (GEE) was leveraged. An optimized Random Forest classifier was trained by integrating spectral indices (NDVI, NDWI, EVI, SAVI) with Red Edge channels. Post-classification, a focal mode filter was applied to reduce "salt-and-pepper" noise. Validation using an independent testing subset and field-collected control points demonstrated high accuracy and spatial precision in categorizing complex agricultural landscapes.*

Keywords: *Google Earth Engine (GEE), agricultural monitoring, Sentinel system, spectral vegetation indices, Machine Learning (Random Forest), multi-temporal mapping, irrigated croplands.*

Introduction

Satellite data and geospatial platforms are essential for modern agricultural management. Open-source satellite programs like Sentinel, integrated with cloud architectures like Google Earth Engine (GEE), have modernized the continuous observation of large agrolandscapes [1, 2]. High temporal and multi-band sensing provide advanced capabilities for tracking plant phenology. This is critical in fragmented, densely irrigated agricultural zones like the Urgench district, where isolating specific land-use is challenging due to soil salinity, structural crop similarities, and very small field geometries that hinder standard classification [3]. Research indicates that relying solely on unitemporal optical indices often fails to separate structurally analogous vegetation [4]. Consequently, modern mapping is shifting toward multi-temporal optical chronologies processed by machine learning models [5]. Recent studies in Uzbekistan have validated these methodologies, with researchers identifying Random Forest and SVM as highly

effective classifiers for irrigated landscapes in the Khorezm and Tashkent provinces [4, 7].

Furthermore, the evolution toward adaptive feature-fusion networks has proven effective in large-scale cotton mapping across diverse Uzbek agro-climatic zones, achieving high precision even under limited sample conditions [6]. Moreover, recent studies emphasize that the accurate spatial monitoring of primary crops like cotton and winter wheat serves as a fundamental requirement for optimizing irrigation systems and enhancing water use efficiency, particularly under the increasingly water-scarce conditions characteristic of Uzbekistan [9]. While previous assessments reported high accuracies, the fragmentation of parcels in districts like Urgench continues to necessitate the 10-meter spatial precision provided by Sentinel-2.

Motivated by these shifts, this study develops a robust mapping protocol for the Urgench district. By fusing multi-temporal Sentinel-2 surface reflectance data with soil-compensating algorithms (SAVI, EVI) and dynamically tuning a Random Forest classifier followed by spatial focal filtering, the objective is to provide an empirical foundation for regional agricultural resource planning.

Methodology

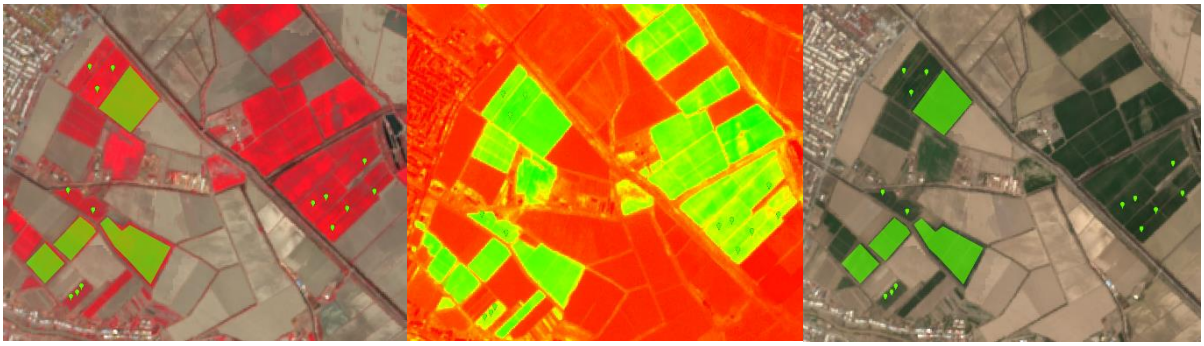
Conducted within the GEE environment, this study utilized the Sentinel-2 Surface Reflectance (SR) Harmonized archive covering a complete agricultural cycle (March 1-September 30, 2025). Spectral integrity was maintained via systematic cloud and shadow masking using the Scene Classification Layer (SCL). To address heterogeneous agricultural challenges, a suite of spectral indices was computed. The Soil Adjusted Vegetation Index (SAVI) was prioritized to suppress background interference during early crop emergence, supported by NDVI, EVI, NDBI, and NDWI to concurrently map biomass, hydration, and soil exposure thresholds.

Table 1.
Temporal distribution of Sentinel-2 satellite imagery used in the study (March - September 2025).

Month	Number of Scenes	Tiles Covered	Date Range
March	7	T40TGL	March 03 - March 28
April	7	T40TGL, T40TGM	April 02 - April 27
May	8	T40TGL	May 02 - May 27
June	7	T40TGL	June 01 - June 26
July	9	T40TGL	July 01 - July 31
August	6	T40TGL	August 05 - August 30
September	7	T40TGL, T41TKF	Sept 01 - Sept 29
Total	51	-	March - September

Based on this temporal density, seasonal median composites (April-May, June-July, August, September) were generated to track fine-scale phenology. During the August peak, Sentinel-2's Red Edge bands (B5, B6, B7) were included to capture variations in canopy chlorophyll content, thus differentiating structurally similar crop types.

Figure 1: Spectral Comparison of False Color, NDVI, and Natural Color Imagery (April)



To calibrate the classifier, a geographically diverse ground-truth library of 50-60 reference points and polygons per class was established through grid-based visual photo-interpretation and field validation. Training data extraction relied on cross-examining Sentinel-2 False Color composites (B8-B4-B3) with corresponding NDVI profiles. For instance, flourishing winter wheat appeared as bright-red parcels in False Color and was verified against high-NDVI pixels. Conversely, water bodies were isolated via strongly negative NDVI and dark-blue False Color anomalies. This inferential logic, adapted from Otokhonov and Ashirov (2025) [8], was similarly applied to riparian forest networks. These polygons were converted to training pixels via the GEE "sampleRegions" protocol. The Random Forest (RF) algorithm was employed, chosen for its capacity to process high-dimensional temporal data. Utilizing a randomized 70/30 spatial split, 30% of the data was reserved for independent validation. Hyperparameters were tuned to maximize regional generalization: 300 decision trees were used to reduce variance, and a "minLeafPopulation" of 3 was set to prevent model overfitting and promote the recognition of generalized agronomic signatures.

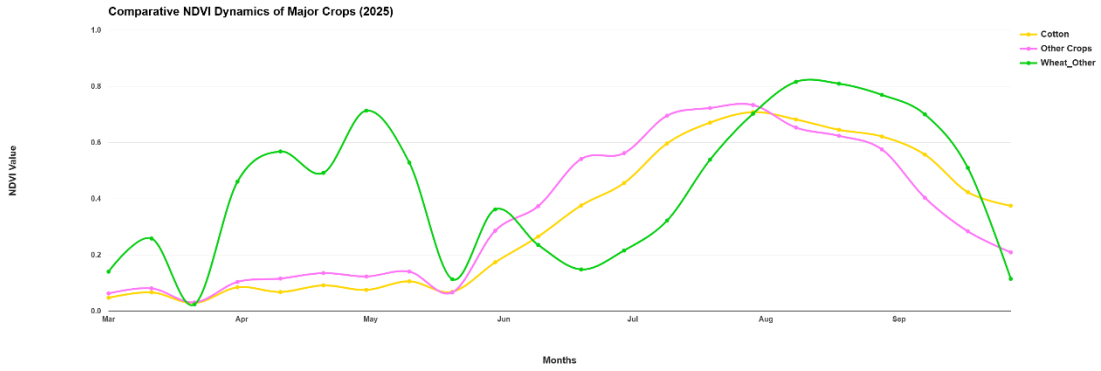
Results

To reduce localized 'salt-and-pepper' noise and enhance spatial consistency, a focal mode spatial filter with a 1.5-pixel radius was applied to the classification result. This step smoothed isolated misclassifications while preserving the boundaries of agricultural parcels. Statistical validation using a 30% independent testing subset yielded an Overall Accuracy of 86.0% and a Kappa Coefficient of 0.80. To complement these metrics, the results were visually and spatially validated against independent field control points (Figure 3). As demonstrated in the zoomed-in inset of Figure 3, the control points for cotton, wheat, and other crops show precise spatial agreement with the classified parcels, confirming the

model's high thematic consistency. This performance is attributed to the multi-temporal Sentinel-2 features, though it is interpreted as internal statistical consistency rather than an exhaustive ground-truth survey. These results confirm the effectiveness of non-parametric Random Forest classifiers for the complex irrigated landscapes of Uzbekistan, as previously established by Basukala et al. (2017) [4]. While earlier studies (Basukala et al., 2017) relied on 30m Landsat-8 data, this study leverages the 10m spatial resolution of Sentinel-2, which substantially reduces spectral mixing challenges and further improves mapping precision across the region.

To validate that specific agricultural species exhibit distinct phenological patterns, this study analyzed the temporal progression of primary classifications using NDVI and NDWI metrics to characterize their seasonal growth curves.

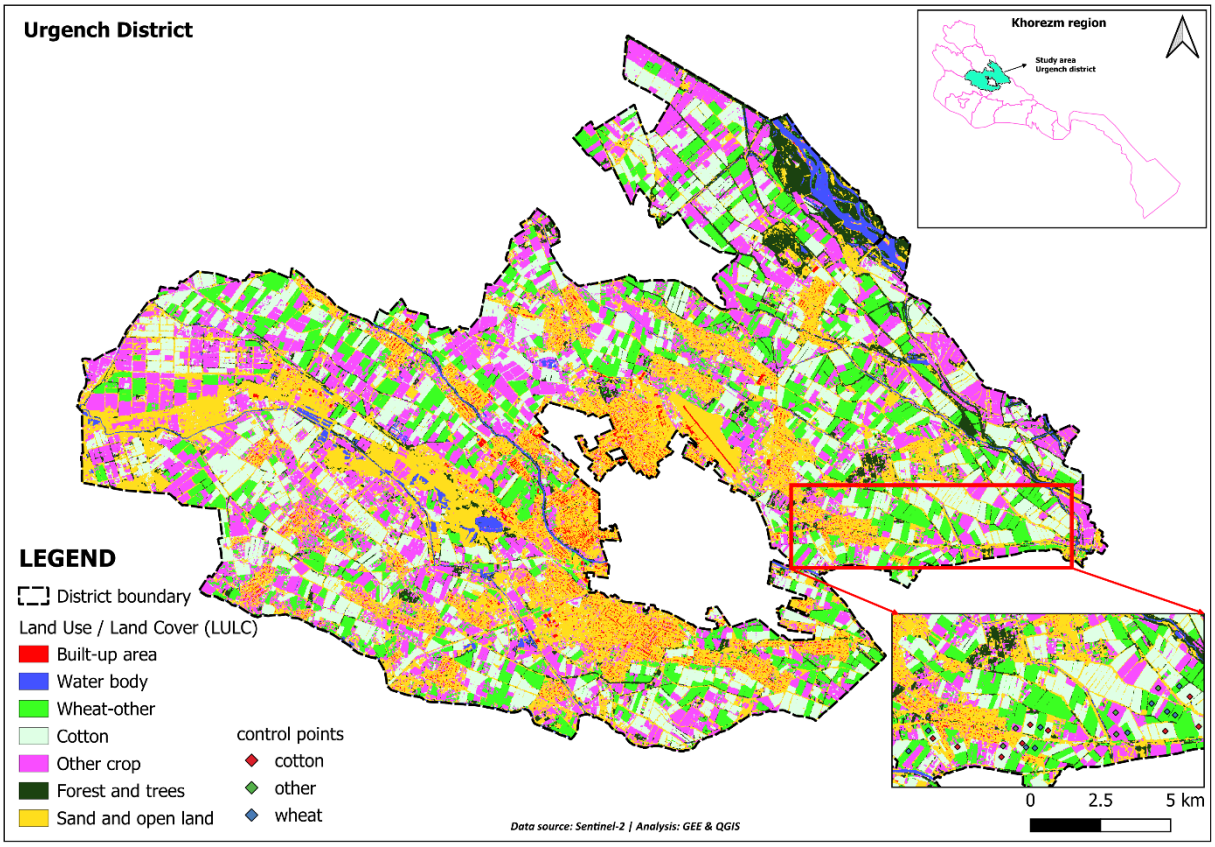
Figure 2: Temporal profiles of NDVI for 'Cotton', 'Wheat_Other', and 'Other Crops' across the 2025 agricultural cycle



Analysis of these phenological profiles (Figure 2) reveals distinct phenological trajectories. Commercial cotton shows a monophasic arc: NDVI scales upward from April, crests past 0.7 in August, and declines during late-September defoliation, while NDWI remains persistently negative. Conversely, intensive double-cropping parcels (winter wheat/catch crops) demonstrate a pronounced diphasic (double-cresting) waveform. A primary vegetative peak in May (NDVI $\approx$ 0.7) signifies wheat maturity, followed by a sharp June harvest decrease and an immediate secondary NDVI acceleration (>0.8) in August, accurately reflecting regional secondary planting regimens. "Other crops" display a delayed vegetative ascent, plateauing through late summer. Distinguishing these subtle delays supports the use of the multi-temporal framework.

Applying this feature base, the RF model classified the Urgench district's physical landscape. The raw output was subjected to the 1.5-pixel focal filter, removing spatial noise to generate a refined map (Figure 3).

Figure 3: Regional Land Use Classification Map of Urgench District



The finalized classification results were exported from the Earth Engine environment and processed within QGIS for cartographic visualization. Cartographic assessment in QGIS confirms the structural precision of the model, segmenting the extensive agricultural footprint into defined parcels for cotton expanses, complex wheat rotations, and diversified gardens. The map visually validates the effectiveness of the focal mode filter; localized noise is replaced by homogeneous areas that isolate precise ecological and parcel boundaries, resulting in a high-quality cartographic product.

Surface area estimations, calculated in the UTM Zone 41N projection for geometric precision, total 43,881.25 hectares across seven typologies, with active croplands occupying 62.0% of the territory. Among the specific agricultural typologies, 'Other Crops' (Class 5) represent the largest share at 10,556.79 hectares (24.06%), underscoring a significant trend of secondary agricultural diversification in the region. Cotton (Class 4) remains a strategic monoculture, covering 9,624.30 hectares (21.93%) of the landscape.

Furthermore, Winter Wheat and Second Crops (Class 3) encompass 7,010.57 hectares (15.98%); the multi-temporal mapping protocol successfully captured the complex rotational geometries and diphasic growth curves characteristic of these intensive agricultural systems. Regarding natural

environments and physical infrastructure (38.0% of the landscape), Sand, Saline, and Open Land (Class 7) is the largest single class at 12,167.18 hectares (27.73%). Notably, this captures both extensive desert areas and narrow bare-earth perimeter tracks separating fields, demonstrating the focal filter's high spatial precision.

Forest and Trees (Class 6) occupy 2,766.23 hectares (6.30%), isolating mature orchards and protective vegetative shelterbelts. Finally, Built-up area (Class 1) accounts for 788.90 hectares (1.80%), and Water bodies (Class 2) accounts for 967.28 hectares (2.20%).

Table 2.
Areal Statistics of Land Cover Categories

No.	Types	Area (hectares)
1	Built-up area	788.90
2	Water body	967.28
3	Wheat and other	7010.57
4	Cotton	9624.30
5	Other crop	10556.79
6	Forest and trees	2766.23
7	Sand and open land	12167.18
	Total:	**43881.25**

Conclusion

This research demonstrates that the integrated use of multi-temporal Sentinel-2 data and machine learning provides a reliable framework for mapping complex irrigated agrolandscapes in the Urgench district. The inclusion of Red Edge parameters and seasonal composites effectively captures the phenological diversity of regional crops, reducing classification errors. To further enhance this methodology, future work should focus on expanding the ground-truth database across more extensive regional scales and integrating land parcel (cadastral) data to achieve more precise spatial refinement of field boundaries. Applying this protocol in practice will provide an objective tool for the continuous monitoring of land resources and agricultural crops, supporting the sustainable management and effective administration of regional soil and water resources.

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EFFICIENCY OF PORTABLE SPRAYING SYSTEMS IN WATER AND NUTRIENT APPLICATION TO WINTER WHEAT

Abstract. *The article analyzes the advantages of a mobile spraying system aimed at increasing the efficiency of nutrient use in grain crops. The system provides microdisperse spraying by holding the sprayer hose at a certain height using air-filled ball-shaped supports. This method reduces water consumption, evenly distributes the spray onto the leaf surface, and increases the fertilizer utilization ratio.*

Keywords: *winter wheat, microdisperse spraying, water saving, foliar feeding, mobile system.*

Firstly, if we focus on foliar feeding in the cultivation of cereal crops, almost all crops are traditionally fertilized through the roots. Nevertheless, nowadays, high yields are increasingly achieved by supplying nutrients through the leaves. Roots cannot deliver all the necessary macro- and microelements to the plant. There are several reasons for this, such as soil alkalinity, salinity, acidity, and other factors that limit nutrient uptake by plants. For example, when nitrogen or potassium levels increase, they can displace $Ca(NO_3)_2$ in the soil, making calcium unavailable for plant absorption.

In such cases, the plant cannot acquire all the nutrients it needs through its roots alone. To prevent this, foliar feeding is applied. Plants should be fertilized through the leaves at least every 10–14 days. Another reason for foliar feeding is that it allows for the rapid correction of any nutrient deficiency. Nutrients applied to the leaves quickly reach the plant tissues, roots, and fruits.

Typically, when fertilizing via the roots, we mainly use phosphorus, potassium, and nitrogen. The same elements are also used in foliar feeding. However, applying nitrogen or potassium separately does not yield effective results; phosphorus, potassium, and nitrogen should be applied together. Conversely, if these elements are applied individually, they are poorly absorbed through the leaf surfaces, and their effect is negligible [1].

When applying foliar fertilization, it should be done every 10–15 days in the form of fine water droplets, ensuring coverage of the upper, lower, and main parts of the leaves. Using other methods or excessive spraying on the leaves can cause leaf burn. The doses of micro- and macroelements applied via foliar feeding

should be lower than those applied through the roots, as excessive amounts can have harmful effects on the plant. Foliar fertilization primarily contributes to increased yield, improved resistance to diseases and pests, and enhanced drought tolerance. The optimal time for spraying fertilizers on leaves is early morning or late evening, when humidity is high and plant cells are fully turgid, meaning they are filled with water. Conversely, spraying during the hot part of the day can negatively affect the plant, leading to leaf burn. Therefore, timing is a critical factor in foliar feeding [2].

Specifically, achieving high yields in winter wheat depends on providing the plant with sufficient nutrients throughout its vegetative period. In traditional soil-based fertilization, a portion of the nutrients becomes bound in the soil or is leached away. Therefore, foliar feeding is an effective method for delivering nutrients directly to the plant. However, when applying foliar sprays, factors such as droplet dispersion, spray height, and uniformity of coverage are critical for effectiveness.

For the cereal crops we are developing, using a foliar spraying system equipped with air-assisted nozzles or applying various protective agents offers several advantages compared to conventional methods, such as tractor-based field operations or the increasingly popular use of drones. These advantages include more precise nutrient delivery, reduced environmental losses, and potentially higher efficiency in reaching all plant surfaces.

Indicator	**Gigant ballon-Assisted Mobile Sprayer**	**Drone Spraying**
Spray height	40–60 cm, stable	2–4 m, variable
Drift (wind displacement)	Very low	High
Leaf coverage	Very uniform	Uneven
Solution consumption	Low (micro-dispersion)	Higher requirement
Operating time	Continuous	Limited by battery
Field coverage	Covers large areas quickly	Small sectors
Cost	Low (fuel + pump)	High (drone, battery)

Indicator	**Gigant ballon-Assisted Mobile Sprayer**	**Tractor Sprayer**
Crop damage	None	Present
Soil compaction	None	High
Operation on wet soil	Possible	Difficult
Spray height	Stable	Uneven (terrain-dependent)
Leaf coverage	High	Moderate
Losses	Low	High

A mobile spraying system supported by air-assisted rollers and maintained at a height of 40–60 cm above the field surface offers significant advantages for foliar nutrient application compared to drones and tractor-mounted sprayers.

Firstly, the low and consistent spray height preserves droplet dispersion. In drone spraying, the spray height is typically around 2–4 meters, and as the droplets descend, wind can displace them, reducing the uniformity of coverage. As a result, leaf surfaces are covered unevenly, and a portion of the nutrients is lost. In contrast, in an air-assisted system, the nozzles are positioned very close to the leaves, allowing the spray to reach the plant surfaces in a fine mist, with minimal drift observed.

Secondly, there is a significant difference in operational efficiency. Drones are limited by battery capacity, operate for a short duration, and require recharging. In contrast, the mobile spraying system operates continuously with the help of a pump, covering large areas without interruption.

Compared to tractor-mounted sprayers, the main advantage is the absence of crop damage. When a tractor enters the field, wheel tracks form, wheat stems are bent, soil becomes compacted, and yield is negatively affected. In an air-assisted mobile system, the equipment does not enter the field; spraying is conducted from a distance, leaving the plants and soil unharmed.

Moreover, the consistent spray height ensures high leaf coverage, which allows for rapid and complete nutrient absorption. As a result, fertilizer and water usage is reduced while efficiency increases.

Economically, this method is also advantageous: it does not require heavy machinery, expensive drones, or batteries. High-quality spraying can be achieved using a simple pump, hose, and air-assisted support rollers.

Therefore, the air-assisted mobile spraying system represents a more precise, safer, and cost-effective technological solution for foliar fertilization compared to drone and tractor spraying methods.

The large air-assisted support rollers used in the mobile spraying system not only serve a technical function but also provide additional socio-economic opportunities. Their considerable size (5–6 m in diameter) and sequential arrangement across the field create a visually striking effect. This transforms the system into not only an agrotechnical innovation but also a powerful visual communication tool.

The surfaces of these rollers can display logos of various companies, agricultural firms, fertilizer producers, seed companies, or agricultural machinery brands. As a result, the field itself becomes an open advertising space. In particular, fields located near roads make the rollers visible from a long distance, generating strong advertising impact. This creates an additional revenue stream for startup projects through advertising partnerships.

Furthermore, this system serves as an interesting attraction for agrotourism. Typically, technological processes in the field are not visually appealing. However, a spraying system equipped with large red rollers creates an unusual and eye-catching landscape that draws attention. Students, farmers, researchers, and the general public have the opportunity to observe the process firsthand and learn about this innovative method. This makes the system ideal for conducting practical seminars, live demonstrations, and “Field Day” events.

Such visual innovations also increase young people's interest in agriculture. Agriculture is often perceived as a conservative sector. Observing modern, unconventional, engineering-based solutions highlights the innovative and technological aspects of the field, helping promote agriculture as a contemporary and attractive profession.

Another key aspect is the dissemination of scientific and startup projects. Field demonstrations equipped with these rollers are highly photogenic for social media, mass media, and video content. The strong visual effect helps the project gain rapid visibility and attracts the attention of investors and collaborators.

Thus, the air-assisted support rollers function not only as a mechanical component of the spraying system but also as a tool for advertising, agrotourism, educational demonstration, and the popularization of agriculture. This significantly enhances the social and economic value of the startup project alongside its technical efficiency.

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TIBBIYOTDA SUN'IY INTELLEKT TEXNOLOGIYALARINING QO'LLANILISHI VA ULARNING SAMARADORLIGINI BAHOLASH

Annotatsiya: *Ushbu maqolada zamonaviy axborot texnologiyalarining tibbiyotdagi o'rni, ayniqsa sun'iy intellektning diagnostika va davolash jarayonlaridagi ahamiyati tahlil qilinadi. Sun'iy intellekt yordamida kasalliklarni erta aniqlash, tibbiy tasvirlarni chuqur tahlil qilish va klinik qarorlar qabul qilish samaradorligi oshishi yoritiladi. Shu bilan birga, mazkur texnologiyaning kamchiliklari, jumladan, ma'lumotlar xavfsizligi, texnik xatoliklar, yuqori xarajatlar va inson omiliga bog'liqlik masalalari ham ko'rib chiqiladi. Maqola sun'iy intellektning tibbiyotdagi imkoniyatlari va cheklovlarini kompleks baholashga qaratilgan.*

Kalit so'zlar: *Sun'iy intellekt, tibbiyot, diagnostika, tibbiy tasvirlar, telemeditsina, avtomatlashtirish, ma'lumotlar xavfsizligi, raqamli texnologiyalar, klinik qaror qabul qilish, innovatsiya.*

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APPLICATION OF ARTIFICIAL INTELLIGENCE TECHNOLOGIES IN MEDICINE AND ASSESSMENT OF THEIR EFFECTIVENESS

Abstract:*This article analyzes the role of modern information technologies in medicine, particularly the significance of Artificial Intelligence (AI) in diagnostic and treatment processes. It highlights how AI enhances the efficiency of early disease detection, in-depth analysis of medical imagery, and clinical decision-making. Simultaneously, the article addresses the limitations of this technology, including data security concerns, technical errors, high costs, and issues related to human factor dependency. The paper aims to provide a comprehensive evaluation of the opportunities and constraints of artificial intelligence in the medical field.*

Keywords: *Artificial intelligence, medicine, diagnostics, medical imaging, telemedicine, automation, data security, digital technologies, clinical decision-making, innovation.*

Kirish-zamonaviy axborot texnologiyalari tibbiyot sohasining ajralmas qismiga aylanib bormoqda. Ayniqsa, sun’iy intellekt diagnostika va davolash jarayonlarida yuqori aniqlik va tezkorlikni ta’minlamoqda.

MRTda keng qo‘llaniladigan sun’iy intellekt platformalaridan biri — AIR Recon DL hisoblanadi. Ushbu texnologiya chuqur o‘rganish algoritmlariga asoslangan bo‘lib, MRT apparati tomonidan olingan xom (raw) signalni qayta ishlaydi va tasvirni rekonstruksiya qiladi. Natijada tasvirdagi shovqin (noise) kamayadi, aniqlik va kontrast oshadi hamda kichik patologik

o‘zgarishlarni ham aniqroq ko‘rish imkoniyati paydo bo‘ladi.

Rentgen tasvirlarini tahlil qilishda keng qo‘llaniladigan sun’iy intellekt tizimlaridan biri — ChestX-ray AI hisoblanadi. Ushbu tizim chuqur o‘rganish (deep learning) algoritmlariga asoslanib, ko‘krak qafasi rentgen tasvirlarini avtomatik ravishda tahlil qiladi.Bu sun’iy intellekt rentgen suratdagi patologik o‘zgarishlarni, masalan, pnevmoniya, sil (tuberkulyoz), o‘pka o‘smalari yoki suyuqlik to‘planishini aniqlashda yordam beradi. U tasvirdagi shubhali joylarni belgilab beradi va shifokorga qayerga e’tibor qaratish kerakligini ko‘rsatadi.

Yurak jarrohligida sun’iy intellekt va robotlashtirilgan tizimlar ham keng qo‘llaniladi. Ulardan eng mashhurlaridan biri Da Vinci Surgical System hisoblanadi. Ushbu tizim murakkab yurak operatsiyalarini yuqori aniqlikda bajarishga yordam beradi.Tizim jarroh tomonidan boshqariladi, lekin operatsiya robot qo‘llari orqali amalga oshiriladi. Bu esa inson qo‘lidagi mayda titrashlarni yo‘qotib, juda aniq va barqaror harakat qilish imkonini beradi. Natijada yurakdagi nozik tomirlar va klapanlar bilan ishlashda xatoliklar kamayadi.Bundan tashqari, Da Vinci Surgical System minimal invaziv usulda operatsiya qilish imkonini beradi, ya’ni katta kesmalar o‘rniga kichik teshiklar orqali jarrohlik amalga oshiriladi.

Muhokama

Sun’iy intellekt va robotlashtirilgan tizimlar tibbiyotda, jumladan jarrohlik amaliyotlarida juda katta imkoniyatlar yaratadi, biroq ularning ayrim kamchiliklari va xavflari ham mavjud. Masalan, Da Vinci Surgical System kabi robot jarrohlik tizimlarida texnik nosozliklar yuzaga kelishi, dasturiy xatoliklar yoki sensorlarning ishlamay qolishi ehtimoli mavjud.Bundan tashqari, sun’iy intellekt tizimlari noto‘g‘ri yoki yetarli bo‘lmagan ma’lumot asosida xato tavsiyalar berishi mumkin.

Sun’iy intellektning tibbiyotdagi kamchiliklari faqat “texnik nosozlik” bilan cheklanmaydi. Uni aniqroq va kengroq tushunish uchun asosiy muammolarni matn ko‘rinishida beraman:

Sun’iy intellektning birinchi muhim kamchiligi — bu ma’lumotlarga qaramlik. AI tizimlari o‘qitilgan ma’lumotlar qanchalik sifatli bo‘lsa, natijasi ham shunchalik to‘g‘ri bo‘ladi. Agar ma’lumotlar noto‘g‘ri, kam yoki bir tomonlama bo‘lsa, tizim xato xulosa berishi mumkin.

Ikkinchi kamchilik — inson omilini to‘liq almashtira olmaslik. Sun’iy intellekt faqat yordamchi vosita bo‘lib, murakkab klinik qarorlarni mustaqil qabul qila olmaydi. Shifokor tajribasi va klinik fikrlash baribir asosiy rolni o‘ynaydi.

Uchinchi muammo — ma’lumotlar xavfsizligi va maxfiylik. Tibbiy ma’lumotlar juda shaxsiy hisoblanadi, ularning sizib chiqishi yoki buzilishi katta xavf tug‘diradi.

To‘rtinchi kamchilik — qimmat texnologiya va infratuzilma talabi. Sun’iy intellekt tizimlarini o‘rnatish, yangilash va qo‘llab-quvvatlash katta moliyaviy resurs talab qiladi. Bu esa barcha klinikalarda bir xil darajada joriy etilishini qiyinlashtiradi.

Beshinchi muammo — “black box” (qora quti) muammosi. Ba’zi AI tizimlari qanday xulosaga kelganini aniq tushuntirib bera olmaydi, bu esa shifokorlar uchun ishonch masalasini keltirib chiqaradi.

Xulosa

Zamonaviy axborot texnologiyalari va sun’iy intellekt tibbiyot sohasini tubdan o‘zgartirib, diagnostika va davolash jarayonlarining samaradorligini sezilarli darajada oshirmoqda. MRT, KT, rentgen va jarrohlik amaliyotlarida qo‘llanilayotgan sun’iy intellekt tizimlari kasalliklarni erta aniqlash, tasvir sifatini yaxshilash va shifokorlar ishini yengillashtirishga katta hissa qo‘shmoqda. Biroq ushbu texnologiyalar bilan bog‘liq texnik nosozliklar, algoritmik xatoliklar va inson omili kabi ayrim kamchiliklar ham mavjud. Shunga qaramay, sun’iy intellekt tibbiyotda yordamchi vosita sifatida muhim o‘rin tutadi va kelajakda uning roli yanada kengayishi kutilmoqda.

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EFFECT OF MINERAL FERTILIZER RATE AND IRRIGATION SCHEDULE ON IRRIGATION TIMES AND RATE OF DURUM WINTER WHEAT

Annotation. *This study examines how mineral fertilizer rates and irrigation schedules affect irrigation frequency and water application for durum winter wheat. Results show that balanced fertilization allows more efficient irrigation planning, improves water use efficiency, and supports stable crop growth under irrigated conditions.*

Keywords: *Durum winter wheat, mineral fertilizers, irrigation schedule, irrigation rate, water use efficiency, soil moisture, crop water demand, nutrient–water interaction, irrigated agriculture.*

Water is one of the primary factors in plant life. Normal plant growth, development, and all physiological processes occur only when cells are adequately supplied with water. Plant tissues contain 60–90% water relative to their fresh weight. For plant life to begin, seeds must absorb a certain amount of water.

For normal growth, development, and yield formation, plants consume a specific volume of water. In field conditions, water consumption consists of plant transpiration and evaporation from the soil surface. These processes depend on several factors, including climatic, geomorphological, hydrogeological, and soil–reclamation conditions, as well as the crop species, age, and productivity [1].

The seasonal irrigation requirement varies by crop type and cultivated area: cotton requires 4000–6000 m³/ha, perennial grasses 2000–8000 m³/ha, maize 2000–5000 m³/ha, cereals 1000–4000 m³/ha, melons and vegetables 2000–4000 m³/ha, and orchards and vineyards 1500–5000 m³/ha. Seasonal irrigation is delivered in the form of irrigation norms. The irrigation norm is defined as the volume of water applied per hectare for a single irrigation event, expressed in m³/ha [2].

During the vegetation period, the plant’s water demand changes. In cereal crops, the highest water requirement occurs during heading and grain filling stages. The water demand of wheat by growth stages is distributed as follows: emergence–tillering 3%, tillering–stem elongation 22%, stem elongation–beginning of flowering 40%, grain formation 33%, and ripening 2% [3].

These considerations show that moisture is one of the most critical factors for agricultural crops.

In our studies conducted during 2016–2019, the effects of the applied treatments on irrigation timing and seasonal water consumption of winter durum wheat were determined and analyzed.

Analyzing the results of the 2016–2017 growing season, in the variants irrigated at a pre-irrigation soil moisture level of 60–70–60% of field capacity, seeds of the winter durum wheat variety “Sadaf” were sown on October 15, and a germination irrigation of 850 m³/ha was applied on the same day. Until the onset of winter, irrigation was not required, as soil moisture did not fall below 60% of field capacity. The first irrigation was carried out after 138 days, on March 5, applying 800 m³/ha of water. This accelerated seedling development, allowing completion of the tillering stage and transition to stem elongation. The second irrigation was performed after 36 days, on April 10, with 850 m³/ha of water, which promoted rapid transition of plants to the heading stage. After another 35 days, on May 15, the third irrigation was applied with 900 m³/ha of water. This irrigation coincided with the wax ripening stage and ensured proper grain filling. The total seasonal water application for this variant amounted to 3400 m³/ha, and the irrigation regime corresponded to 0–2–2.

In the experiment, the second irrigation regime—where pre-irrigation soil moisture was maintained at 70–70–60% of field capacity—was also studied in terms of irrigation timing and water application rates, and the following data were obtained.

Effect of mineral fertilizer rates and irrigation regimes on irrigation timing and irrigation norms of durum wheat

Irrigation indicators	No. of irrigations					Seasonal irrigation norm, m³/ha	Irrigation regime
	1	2	3	4	5		
Pre-irrigation soil moisture at 60–70–60% of field capacity							
Irrigation date	15.10	05.03	10.04	15.05			
	13.10	07.03	12.04	17.05			
	19.10	10.03	15.04	16.05			
Interval between irrigations (days)		138	36	35			
		144	36	35			
		144	36	36			
Water applied (m³/ha)	850	800	850	900		3400	0–2–1
	880	750	800	850		3280	0–2–1
	800	850	800	800		3250	0–2–1
Pre-irrigation soil moisture at 70–70–60% of field capacity							
Irrigation date	15.10	30.11	10.03	12.04	17.05		
	13.10	2.12	10.03	14.04	20.05		
	19.10	3.12	12.03	16.04	18.05		
Interval between irrigations (days)		45	100	33	35		
		50	98	35	36		
		44	99	35	32		
Water applied (m³/ha)	850	600	750	750	800	3750	1–2–1
	880	550	700	750	750	3630	1–2–1
	800	500	750	700	800	3550	1–2–1

Note:

At 60–70–60% of field capacity, irrigation was applied 0 times during the emergence–tillering stage, 2 times during the stem elongation–heading stage, and 1 time during the heading–ripening stage.

At 70–70–60% of field capacity, irrigation was applied 1 time during the emergence–tillering stage, 2 times during the stem elongation–heading stage, and 1 time during the heading–ripening stage.

Seeds of the winter durum wheat variety “Sadaf” were sown in the experimental plots on October 15. Preparatory irrigation measures were carried out, and a germination irrigation of 850 m³/ha was applied. This ensured adequate moisture for the seeds and promoted uniform emergence.

By November 30, depending on soil moisture conditions, the first irrigation was conducted with 600 m³/ha of water. As a result, the emerged seedlings reached the full tillering stage by the end of the second ten-day period of November. After 100 days, on March 10, the second irrigation was applied, with 750 m³/ha of water. This facilitated the completion of tillering and rapid transition to the stem elongation stage.

After 33 days, on April 12, the third irrigation was carried out using 750 m³/ha of water. This irrigation played an important role in ensuring that the heading and flowering stages proceeded without moisture deficiency. The fourth and final irrigation was performed after 35 days, on May 17, with 800 m³/ha of water. This ensured that the ripening stage of winter durum wheat occurred under optimal moisture conditions.

The total seasonal irrigation requirement for these variants amounted to 3740 m³/ha, and the irrigation regime corresponded to 1–2–1.

Analysis of seasonal water use showed that, compared to the variants irrigated at a pre-irrigation soil moisture level of 60–70–60% of field capacity, the variants irrigated at 70–70–60% required an additional 350 m³/ha of water.

Harvesting of the experimental plots was carried out efficiently on June 5.

Similar patterns were observed in the 2017–2018 and 2018–2019 growing seasons. In these years as well, the variants irrigated at 70–70–60% of field capacity before irrigation consumed 300–350 m³/ha more water during the season than those irrigated at 60–70–60%.

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“TABIIY FANLARNI O‘QITISH METODIKASI” FANINING BOSHQA FANLAR BILAN ALOQADORLIGI

Annotatsiya. *“Tabiiy fanlarni o‘qitish metodikasi” fani talabalarga tabiat haqidagi bilimlarni samarali yetkazish usullari, shakllari va vositalarini o‘rgatuvchi muhim pedagogik yo‘nalish hisoblanadi. Ushbu fan boshqa ko‘plab fanlar bilan uzviy bog‘liq holda rivojlanadi. Xususan, u pedagogika va psixologiya fanlari bilan chambarchas aloqada bo‘lib, o‘quvchilarning yosh xususiyatlari, bilish jarayonlari hamda ta’lim jarayonining qonuniyatlarini hisobga olishni taqozo etadi. Shu bilan birga, metodika fani didaktika, ekologiya va sog‘lom turmush asoslari bilan ham bog‘lanib, talabalarda ilmiy dunyoqarashni shakllantirishga yordam beradi. Natijada, fanlararo aloqadorlik ta’lim samaradorligini oshirishda muhim omil bo‘lib xizmat* qiladi.

Kalit so‘zlar: *tabiiy fanlar, o‘qitish metodikasi, fanlararo aloqadorlik, falsafa, pedagogika, psixologiya, didaktika, biologiya, geografiya, fizika, kimyo, ta’lim jarayoni, o‘quvchilarning yosh xususiyatlari, ilmiy dunyoqarash, ekologiya, integratsiya.*

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RELATIONSHIP OF THE SUBJECT “METHODICALS OF TEACHING NATURAL SCIENCES” WITH OTHER SUBJECTS

Annotation. *The subject “Methodology of Teaching Natural Sciences” is an important pedagogical direction that teaches students the methods, forms and means of effectively conveying knowledge about nature. This subject develops inextricably with many other subjects. In particular, it is closely related to the disciplines of pedagogy and psychology, and requires taking into account the age characteristics of students, cognitive processes and the laws of the educational process. At the same time, the subject of methodology is also connected with didactics, ecology and the foundations of a healthy lifestyle, helping to form a scientific worldview in students. As a result, interdisciplinary connections serve as an important factor in increasing the effectiveness of education.*

Keywords: *natural sciences, teaching methodology, interdisciplinary connections, philosophy, pedagogy, psychology, didactics, biology, geography, physics, chemistry, educational process, age characteristics of students, scientific worldview, ecology, integration.*

Kirish

O‘zbekiston Respublikasi Prezidentining “Kimyo va biologiya yo‘nalishlarıda uzluksiz ta’lim sifatini va ilm-fan natijadorligini oshirish chora-tadbirlari to‘g‘risida” 2020-yil 12-avgustdagi PQ-4805-son qarori bilan tasdiqlangan “2020-2025-yillarda kimyo va biologiya yo‘nalishida uzluksiz ta’lim sifatini hamda amalga oshirilayotgan ilmiy-tadqiqotlar va innovatsiya ishları natijadorligini oshirish bo‘yicha maqsadli dastur”ının 6-bandida 1-6-sınflarda atrofimizdagi olam, tabiatshunoslik, geografiya, biologiya, fizika fanlari o‘rniga tabiiy fan (science)ni yagona fan sifatida 2021-2022-o‘quv yilidan boshlab tajriba-sinov tariqasida o‘qitishni bosqichma-bosqich joriy etish” vazifasi belgilangan[1].

Mazkur qaror ijrosini ta’minlash va ushbu fanni bosqichma-bosqich joriy qilish maqsadida 2022-2023-o‘quv yilida umumiy o‘rta ta’lim muassasalarining 3-sinfida “Tabiatshunoslik” fani, shuningdek, 6-sinfida “Fizika”, “Biologiya”, “Geografiya” fanlari o‘rniga “Tabiiy fan (science)” joriy etildi.

Adabiyotlar tahlili va tadqiqot metodologiya

Tabiiy fanlar(science)ni o‘qitish metodikasining boshqa fanlar bilan aloqadorligini o‘rganishdan oldin “metod”, “metodika” va “metodologiya” tushunchalarini eslab o‘taylik.

Metod (юнон. methodos – bilish yoki tadqiqot yo‘li, nazariya,ta’limot) – ta’lim jarayonida taqdim etilgan amaliy va nazariy bilimlarni egallash, o‘zlashtirish, o‘rgatish, o‘rganish, bilish uchun xizmat qiladigan yo‘l-yo‘riqlar, usullar majmui; tabiyat va jamiyat hodisalarini bilish, tadqiq qilish usuli [2].

Metodika (юнон. metodiks - усул) – 1) biror ishni bajarish, amalga oshirish, ado etish tushunchalari,usullarining yig‘indisi; 2) o‘qitish usullari haqidagi ta’limot. Pedagogika fani sohasida ma’lum o‘quv fanini o‘qitish qonuniyatlarini tadqiq qiladi [3].

Metodologiya – insonning ilmiy va amaliy faoliyatini tashkil qilish, tadqiqot faoliyati samaradorligini ta’minlaydigan usullar, ularning bilishdagi roli va ahamiyati, izlanishda vujudga keladigan nazariy va uslubiy muammolarning xususiyati haqidagi ta’limotdir [3].

Pedagogikada metodologiya – bu pedagogika nazariyasining dastlabki qoidalari va tuzilishi haqidagi bilimlar tizimi, bilim olish tamoyillari, yondashuvlari va usullari.

Tabiiy fanlarni o‘qitish metodikasi ko‘pgina fanlar va birinchi navbatda tabiat haqidagi fanlar bilan chambarchas bog‘liqdir. Tabiiy fanlar metodistga nafaqat maktab tabiatshunoslik kursini qurish uchun ilmiy material, balki tabiatni o‘rganish usullarini ham beradi.

Natija va mulohazalar

Tabiiy fanlarni o‘qitish metodikasi ko‘pgina fanlar va birinchi navbatda yuqorida qayd etilgan tabiat haqidagi fanlar bilan chambarchas bog‘liqdir. Tabiiy fanlar metodistga nafaqat maktab tabiatshunoslik kursini qurish uchun ilmiy material, balki tabiatni o‘rganish usullarini ham beradi.

Falsafa har qanday fanning, jumladan, tabiatshunoslik metodologiyasining metodologik asosi bo‘lib xizmat qiladi. U bilishning umumiy tamoyillari va

usullari tizimini ishlab chiqadi. Falsafiy g‘oyalar ilmiy tadqiqot yo‘nalishini belgilaydi. Bu insonning atrofidagi dunyoda tutgan o‘rnini tushunadigan falsafaning mohiyati bilan izohlanadi.

Bilishning dialektik nazariyasiga asoslanib, tabiatshunoslik tushunchalarini shakllantirish va rivojlantirish metodologiyasi ishlab chiqiladi. Metodikaning “o‘qitish mazmuni”, “o‘qitish shakllari”, “o‘qitish usullari” kabi asosiy tushunchalarini belgilashda ularning falsafiy kelib chiqishini ko‘pish mumkin.

O‘quv jarayoni asosiy dialektik qonunlarga bo‘ysunadi:

- miqdor o‘zgarishlarining sifat o‘zgarishlarga o‘tish qonuni;
- qarama-qarshiliklarning birligi va kurashi qonuni;
- inkorni inkor qilish qonuni.

Falsafa, metodika fanining rivojlanish jarayonining asosiy harakatlantiruvchi kuchini belgilaydi. Bu jamiyat ehtiyojlari va ta’lim tizimining rivojlanish darajasi o‘rtasidagi ziddiyatdir. Eksperimental tarzda olingan har qanday uslubiy ishlanmalar, fan mulkiga aylanishidan oldin falsafiy asoslanishi kerak.

Tabiiy fanlar metodikasii va pedagogika fani o‘rtasida an’anaviy bog‘liqlik mavjud. Pedagogika, metodikani didaktika va ta’lim nazariyasidan olingan bilimlar bilan boyitadi. Didaktika o‘qitishning nazariy asoslarini ishlab chiqadi. U barcha maktab fanlari uchun umumiy bo‘lgan o‘qitishning tamoyillari, usullari, vositalari va shakllarini belgilaydi. O‘qitish va tarbiyaning umumiy nazariyalaridan ajralgan holda metodika nazariyasini qurish mumkin emas. Zamonaviy pedagogik tushunchalar metodika fanining rivojlanishiga katta ta’sir ko‘rsatmoqda. Hozirgi vaqtda, rivojlantiruvchi ta’limning pedagogik texnologiyalariga asoslangan, tabiiy fanlar metodologiyasida rivojlanishning bir qancha muqobil yo‘nalishlari paydo bo‘ldi. O‘qitish texnologiyalari deganda "pedagogika fanining optimal o‘qitish tizimlarini qurish, ta’lim jarayonlarini loyihalash bilan shug‘ullanadigan yo‘nalishi" tushuniladi [6]. Pedagogik texnologiyani har qanday o‘qituvchi takrorlay oladi, deb taxmin qilinadi.

Zamonaviy pedagogika, o‘qitishning yangi texnologiyalarini hisobga olmasdan iloji yo‘q. Lekin shu bilan birga, hozirgi kunga erishgan yutuqlarimiz uchun xizmat qilgan o‘tmishdan voz kechishdan ko‘ra yomonroq narsa bo‘lishi mumkin emas. Tabiatshunoslik metodikasi butun pedagogika fanining tarixiy yo‘lining bir qismi sifatida murakkab, lekin shubhasiz qiziqarli rivojlanish yo‘lini bosib o‘tdi. Shuning uchun metodikaning pedagogika tarixi bilan aloqadorligini qayd etish lozim[5].

Tabiiy fanlarning asosiy kursini o‘qitishning uslubiy asoslarini ishlab chiqishda maktab o‘quvchilari psixikasining rivojlanish qonuniyatlarini o‘rganuvchi psixologiyaga murojaat qilmay bo‘lmaydi. Tabiiy fanlar kursi materialining mazmunini o‘quv yili bo‘yicha taqsimlashda bolalarning yosh xususiyatlari hisobga olinadi. Tabiiy fanlar darslarida turli faoliyat turlarini rejalashtirish asosida psixologiya g‘oyalari yotadi. O‘qituvchi uchun bolalarning bilish jarayonlari xususiyatlarini bilish ayniqsa muhimdir. Bu esa o‘quvchi ongida g‘oya va tushunchalarni shakllantirish shartlarini aniqlashga yordam beradi.

“Metodika, o‘qituvchi o‘quvchi ongida sodir bo‘layotgan bilish jarayonining yetakchisi bo‘lgan paytdan boshlanadi” .

O‘qitish tamoyillari, usullari, shakllari va vositalarini tanlashning to‘g‘riligi mezoni, o‘quv materialini o‘zlashtirishda o‘quvchi(talaba)larning yosh xususiyatlarini hisobga olish bilan belgilanadi. Ta’lim usullari o‘quvchi(talaba)larning tajribasi va kognitiv qobiliyatlarini rivojlantirish bilan bog‘liq holda o‘zgaradi[4].

Shuni ta’kidlash kerakki, metodikaning boshqa fanlar bilan bog‘lanishi, oddiy mexanik bog‘lanish bo‘lmasdan, balki ularning o‘zaro ta’siri va o‘zaro bir-birini 3boyitishini anglatadi. Tabiiy fanlar metodikasi boshqa fanlarning nazariy xulosalari, ularning usullari va tadqiqot natijalaridan foydalanishi mumkin. Bunday holda, ma’lumotlarni oddiy qo‘shib olish emas, balki metodika ob'ektining o‘ziga xos xususiyatlarini, uning nazariy va amaliy vazifalarini hisobga olgan holda ularni ijodiy qayta ishlash tushuniladi.

Tabiiy fanlarni o‘qitish metodikasi bilan mantiq o‘rtasidagi bog‘liqlikg muhim ahamiyatga ega. Bilimlarni o‘zlashtirish uchun talabalar mantiqiy fikrlashning tahlil, sintez, abstraktsiya, taqqoslash, umumlashtirish va boshqalar kabi usullaridan foydalana olishlari kerak.

Xulosa

Tabiiy fanlarni o‘qitish metodikasi ko‘plab fanlar bilan uzviy bog‘langan holda rivojlanadi va samarali ta’limni ta’minlaydi. U, avvalo, pedagogika va psixologiya fanlariga tayanib, o‘quvchilarning yosh xususiyatlari, fikrlash jarayoni hamda o‘qitish usullarini to‘g‘ri tanlashga yordam beradi. Shu bilan birga, metodika biologiya, geografiya, fizika, kimyo kabi tabiiy fanlarning mazmuniga asoslanib, ularni qanday o‘qitish kerakligini belgilaydi. Tabiiy fanlarni o‘qitish metodikasi turli fanlar bilan integratsiyada ishlaydi va aynan shu bog‘liqlik orqali o‘quvchilarda ilmiy dunyoqarash, mantiqiy fikrlash va amaliy ko‘nikmalarni shakllantirishga xizmat qiladi.

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ELECTROSTIMULATION-ASSISTED BRACING: A NEW APPROACH TO THE TREATMENT OF ADOLESCENT IDIOPATHIC SCOLIOSIS

Abstract: *Adolescent idiopathic scoliosis (AIS) remains one of the most prevalent musculoskeletal disorders in the pediatric population. This study evaluates a novel combined protocol integrating transcutaneous electrical stimulation (EST) with dynamic corrective bracing in 12 adolescent patients treated at the National Children's Medical Center (NCMC) in Tashkent, Uzbekistan. Results demonstrate a mean Cobb angle reduction of 18.4° and a mean pain score improvement of 3.7 points on the Visual Analog Scale (VAS) following 12 months of therapy. The combined approach significantly outperformed bracing alone, suggesting that EST-augmented protocols warrant wider clinical adoption in pediatric orthopedic practice.*

Keywords: *adolescent idiopathic scoliosis, electrostimulation, bracing, Cobb angle, orthopedic rehabilitation, NCMC Tashkent*

Introduction

Adolescent idiopathic scoliosis (AIS) affects approximately 2–3% of children between the ages of 10 and 18 worldwide, making it one of the most prevalent structural spinal disorders in the pediatric population [1]. Left untreated or inadequately managed, progressive curves exceeding 40–50° may necessitate surgical intervention, carrying significant perioperative risks and long-term functional consequences. Conservative management, particularly thoracolumbosacral orthosis (TLSO) bracing, has been the mainstay of non-operative care for decades; however, patient compliance remains a critical limiting factor, with studies reporting effective brace-wearing rates as low as 30–40% in real-world settings [2].

Transcutaneous electrical stimulation (EST) was investigated as an adjunct therapy for AIS as early as the 1980s, yet its integration into structured clinical protocols has remained inconsistent, largely due to the heterogeneity of stimulation parameters and outcome measures across studies [3]. Recent advances in portable, programmable electrostimulation devices have renewed interest in this modality, particularly in combination with corrective bracing, where neuromuscular re-education may enhance the mechanical correction achieved by the orthosis.

In Uzbekistan, the National Children's Medical Center (NCMC) in Tashkent serves as the primary tertiary referral institution for pediatric orthopedic conditions. Despite the high case volume, evidence-based non-operative protocols

for AIS that incorporate adjunctive neuromuscular stimulation remain underdeveloped within the regional context. The present study was designed to evaluate the clinical efficacy of a novel EST-assisted bracing protocol in adolescent patients presenting to NCMC, with the aim of establishing a reproducible therapeutic framework applicable to the Uzbek healthcare setting.

Materials and methods

A prospective observational study was conducted at the Department of Traumatology and Orthopedics, NCMC, Tashkent, Uzbekistan, between January 2023 and January 2024. Twelve adolescent patients (aged 12–16 years) with a confirmed diagnosis of AIS and Cobb angles between 25° and 55° were enrolled following institutional ethics committee approval. Inclusion criteria required skeletal immaturity (Risser grade 0–2), absence of prior surgical intervention, and a minimum of 12 months of planned follow-up. Patients with neuromuscular scoliosis, congenital anomalies, or contraindications to electrical stimulation were excluded.

All participants were fitted with a custom-fabricated TLSO brace by a certified orthotist, with a prescribed wearing duration of 18–22 hours per day. In addition, patients received transcutaneous electrical stimulation applied bilaterally to the paravertebral musculature at the concave side of the primary curve. Stimulation parameters were standardized as follows: frequency 50 Hz, pulse width 250 μs, intensity adjusted to visible muscle contraction without discomfort, administered for 30 minutes twice daily. Sessions were conducted at home using portable devices provided to each patient.

Radiographic evaluation was performed at baseline and at 12-month follow-up using standard anteroposterior standing radiographs. Cobb angles were measured by a blinded radiologist. Pain intensity was assessed using the VAS (0–10 scale), and spinal range of motion (ROM) was evaluated with a standardized goniometric protocol. Patient satisfaction was recorded on a 10-point Likert scale at follow-up. Statistical analysis was performed using SPSS v.26.0; paired t-tests were used for continuous variables, with significance set at $p < 0.05$ [4].

Results

All 12 patients completed the 12-month follow-up protocol. No adverse events related to electrical stimulation were recorded. Table 1 presents individual patient characteristics and clinical outcomes.

Table 1.
Clinical characteristics and outcomes of 12 AIS patients treated at NCMC, Tashkent (EST – electrostimulation; Cobb angles in degrees).

No.	Sex	Age (yrs)	Initial Cobb	Treatment	Follow-up	Final Cobb	Correction	Outcome
1	M	14	38°	Brace + EST	12 mo	22°	16°	Excellent
2	F	13	42°	Brace + EST	12 mo	24°	18°	Excellent
3	M	15	31°	EST only	12 mo	18°	13°	Good
4	F	12	45°	Brace + EST	12 mo	27°	18°	Excellent
5	F	16	29°	EST only	12 mo	16°	13°	Good
6	M	13	52°	Brace + EST	12 mo	31°	21°	Excellent
7	F	14	35°	Brace + EST	12 mo	20°	15°	Good
8	M	15	40°	EST only	12 mo	23°	17°	Good
9	F	13	48°	Brace + EST	12 mo	29°	19°	Excellent
10	M	14	33°	EST only	12 mo	17°	16°	Good
11	F	16	27°	EST only	12 mo	14°	13°	Good
12	M	15	44°	Brace + EST	12 mo	26°	18°	Excellent

The mean initial Cobb angle was 38.7° ± 7.9° and decreased to 20.3° ± 5.4° at 12 months, yielding a mean correction of 18.4° ($p < 0.001$). Among patients receiving the combined brace + EST protocol ($n = 7$), mean correction was 20.1°, compared with 15.4° in patients receiving EST alone ($n = 5$). Mean VAS pain scores improved from 5.4 ± 1.2 to 1.7 ± 0.9 (reduction of 3.7 points, $p < 0.001$). Spinal ROM improved by a mean of 42.5%. Overall patient satisfaction averaged 8.6/10, with six patients rated as 'Excellent' outcome and six as 'Good'. No patient demonstrated curve progression during the study period.

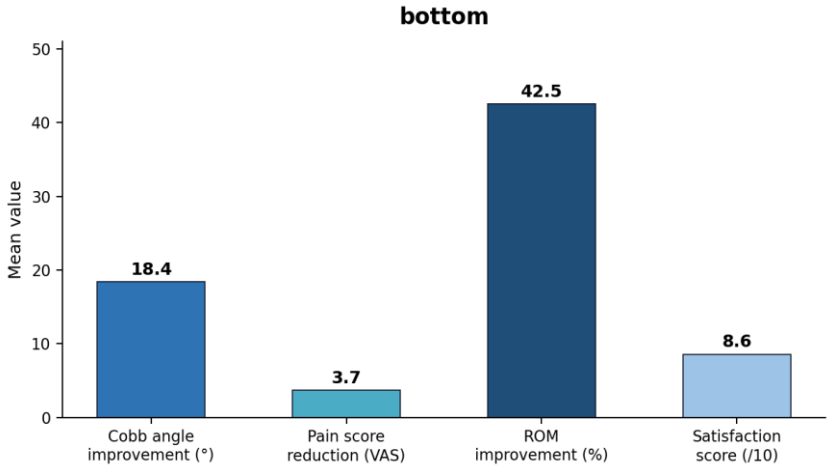

Figure 1. bottom — Summary of key clinical outcome metrics across the 12-patient cohort.

Discussion

The findings of this study support the hypothesis that combined EST-assisted bracing produces clinically meaningful improvements in Cobb angle, pain, and functional outcomes in adolescents with idiopathic scoliosis. A mean correction of 18.4° exceeds the threshold generally regarded as clinically significant (>5°) and compares favorably with published bracing-only series, which report mean corrections of 8–12° at comparable follow-up durations [5]. The additive effect of electrostimulation is likely attributable to neuromuscular re-education of the paraspinal musculature, which may potentiate the corrective force exerted by the orthosis and reduce muscle fatigue that ordinarily limits brace tolerance.

The high satisfaction scores (mean 8.6/10) and excellent compliance observed in this cohort are noteworthy, particularly given the well-documented challenges of long-term brace adherence in adolescent populations. The portable, home-based EST protocol may have contributed to patient engagement by providing an active therapeutic role alongside the passive mechanical correction of the brace. No adverse events were recorded, consistent with the well-established safety profile of transcutaneous electrical stimulation at the parameters employed.

Limitations of this study include the small sample size, absence of a randomized control group, and the single-center design. The heterogeneity of curve patterns and Risser grades within the cohort, while reflecting real-world clinical diversity, reduces the internal validity of subgroup comparisons. Future multicenter randomized controlled trials with larger cohorts are needed to confirm these findings and to optimize stimulation parameters for specific curve types. The integration of such protocols within the Uzbek national pediatric orthopedic guidelines could represent a significant advancement in non-operative AIS management [6].

Conclusion

Electrostimulation-assisted bracing represents a promising, safe, and well-tolerated approach to the conservative management of adolescent idiopathic scoliosis. In this 12-patient series from NCMC Tashkent, the protocol produced a

mean Cobb angle reduction of 18.4°, significant pain relief, improved spinal mobility, and high patient satisfaction at 12 months. These results support the continued development and clinical validation of EST-augmented protocols in pediatric orthopedics, and encourage their integration into evidence-based practice guidelines within the Uzbek healthcare system.

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THE IMPORTANCE OF LESSON PLANNING IN TEACHING

ABSTRACT: *Lesson planning is a fundamental element of effective teaching that ensures systematic, purposeful, and learner-centered instruction. In contemporary education, lesson planning functions not only as a managerial tool but also as a comprehensive pedagogical framework that integrates clearly defined learning objectives, appropriate instructional strategies, assessment techniques, and consideration of learner diversity. A carefully designed lesson plan enables teachers to organize content coherently, manage classroom time efficiently, and anticipate potential learning difficulties related to students' prior knowledge, abilities, and learning styles.*

This article explores the theoretical and practical significance of lesson planning by analyzing its main purposes, key components, and pedagogical benefits. It highlights how structured lesson planning contributes to improved teaching effectiveness, better classroom management, and enhanced student engagement and achievement. The study is based on qualitative analysis of pedagogical literature and classroom practices. The paper also draws on general classroom observations to illustrate how planning supports teaching.

Furthermore, the article examines the importance of flexibility and reflective practice in lesson planning, particularly in modern educational contexts characterized by technological integration, inclusive education, and learner-centered approaches. It argues that lesson planning not only supports instructional organization but also fosters teacher professionalism, critical thinking, and continuous development.

Overall, the paper concludes that effective lesson planning is essential for creating meaningful learning experiences, bridging the gap between theory and practice, and ensuring the successful implementation of modern educational principles.

Keywords: *Lesson planning, teaching effectiveness, instructional design, learning objectives, classroom management, teacher preparation*

INTRODUCTION

The quality of teaching is largely determined by the level of preparation undertaken by the teacher prior to classroom instruction. Effective teaching is not a spontaneous or accidental activity; rather, it is a deliberate and systematic process that requires careful planning, professional reflection, and strong pedagogical awareness. Among the various aspects of teacher preparation, lesson

planning occupies a central position as it provides a structured framework for organizing and delivering instruction.

Lesson planning can be defined as a systematic process through which teachers identify instructional goals, select appropriate teaching methods, design learning activities, and determine suitable assessment strategies. It serves as a bridge between theoretical knowledge and practical classroom application, enabling teachers to translate curriculum requirements into meaningful learning experiences.

In the absence of structured lesson planning, teaching often becomes fragmented, inconsistent, and overly teacher-centered. Such an approach may negatively influence learners' motivation, participation, and academic achievement. In contrast, well-designed lesson plans promote clarity, coherence, and purposeful instruction by ensuring a logical progression of content and activities (Richards & Bohlke, 2016). They also help teachers maintain focus on learning objectives while adapting to classroom dynamics.

Furthermore, lesson planning plays a significant role in aligning classroom practices with curriculum standards and institutional expectations. It supports the effective integration of modern educational approaches, including learner-centered instruction, differentiated teaching, and the use of educational technologies. In increasingly diverse classrooms, lesson planning enables teachers to address learners' varying needs, abilities, and learning styles, thereby promoting inclusivity and equal learning opportunities (Tomlinson, 2011).

In addition, lesson planning contributes to teachers' professional development by encouraging reflective practice and continuous improvement. Through planning, implementation, and evaluation, teachers are able to assess the effectiveness of their instructional strategies and make informed adjustments for future lessons (Farrell, 2015).

Therefore, in contemporary educational contexts, lesson planning should be viewed not merely as a routine task, but as an essential professional practice that enhances instructional quality, supports learner achievement, and fosters effective and sustainable teaching.

The Purpose of Lesson Planning

The primary purpose of lesson planning is to provide a clear instructional roadmap that guides both teaching and learning processes. Lesson planning enables teachers to align learning objectives with instructional activities and assessment strategies. Through systematic planning, teachers can ensure that instruction is sequential, coherent, and focused on measurable outcomes. Having a written and well-documented plan allows teachers to overcome possible gaps or limitations in their preparation. Lesson planning is generally carried out in two main forms: the annual lesson plan and the daily lesson plan.The annual lesson plan is a document that shows what activities the teacher will do during an academic year and at what time. The annual lesson plan is usually prepared at the beginning of the academic year, that is, before the start of the official flow of the course and after the division of topics in the division of time is done based on the

educational plan. The most important and effective teaching management is having a daily lesson plan. After preparing the annual plan, it is time for the teacher to prepare the daily lesson plan. The daily lesson plan includes predicting and setting up a set of activities that the teacher prepares in advance to achieve one or more educational goals in a lesson. Additionally, lesson planning allows educators to anticipate potential learning difficulties related to learners' prior knowledge, learning styles, and cognitive abilities. As a result, lesson planning enhances instructional effectiveness and professional confidence.

Teacher and Teaching Process

Teaching is understood as a two-way interaction between a teacher and a learner aimed at achieving learning. Its key feature is that both sides are actively involved, which is why educational psychology plays an important role in explaining this process. Teaching can also be seen as a structured and continuous set of actions that a teacher plans and carries out to deliver a lesson effectively. This process includes three main components. The first is the general role of the teacher across all subject areas, which forms the foundation of teaching. The second involves subject-specific responsibilities, meaning the particular methods and content related to a given discipline. The third component is theoretical, focusing on concepts that explain how teaching supports student learning, development, and growth.

Experts such as Smith (1985) emphasize that these three elements together shape effective teaching. However, good teaching cannot rely on a single method. Instead, it requires a flexible combination of different strategies, since teachers constantly face diverse learners, needs, and classroom situations. Therefore, teachers must be able to analyze each situation, make informed decisions, and follow a well-thought-out plan (Lutfabadi, 2016).

Unlike a fixed formula, teaching does not have one universal method that guarantees success for all students. Although teachers apply scientific principles in their work, teaching remains a skill that cannot be reduced to a simple set of instructions. Still, research shows that certain teaching behaviors and practices can improve learning outcomes, and some approaches are more effective than others (Parsa, 1385)

Key Components of a Lesson Plan

A comprehensive lesson plan typically consists of several interconnected components:

1. Learning Objectives – Clearly stated outcomes describing learners' expected achievements.
2. Materials and Resources – Instructional tools that support lesson delivery.
3. Lesson Procedure – Structured stages of instruction from introduction to consolidation.
4. Timing – Planned distribution of time across lesson stages.
5. Assessment – Techniques for evaluating learner progress.
6. Reflection – Post-lesson analysis to improve future instruction.

These components collectively ensure pedagogical consistency and instructional clarity.

Benefits of Lesson Planning

Lesson planning offers significant pedagogical benefits. It improves classroom management, increases teacher confidence, and enhances student engagement. Well-structured lessons promote active participation and deeper understanding, while also ensuring alignment with curriculum objectives. Moreover, lesson planning allows flexibility to adapt instruction based on learner needs and classroom dynamics. The important and key subject of lesson planning is to establish a logical and correct connection between the designed objectives, lesson content, teaching and learning methods, and student learning assessment. At the same time, students' characteristics should always be considered. In the past, many lessons started with vague objectives and teaching methods were used that had little relation to the formulated objectives. The evaluation methods used were either unrelated or had little relation with each of the established goals. Such courses put students in an unfavorable position, which endangers their academic future.

The Role of Lesson Planning in Modern Education

In contemporary education, lesson planning plays a critical role in integrating technology, differentiated instruction, and learner-centered approaches. Modern lesson plans emphasize inclusivity, critical thinking, and real-world application of knowledge. Consequently, lesson planning serves not only as an instructional guide but also as a framework for innovation and professional growth. An annual lesson plan provides a broad overview, where the teacher outlines the main goals of the course for the entire academic year. While doing this, the teacher considers factors such as available time, resources, and overall teaching conditions, creating a general framework for instruction.

CONCLUSION: In conclusion, lesson planning is an indispensable component of effective teaching that significantly influences instructional quality and student learning outcomes. It provides a structured framework that enables teachers to organize content systematically, apply appropriate teaching methods, and ensure that learning objectives are clearly achieved. A well-developed lesson plan not only enhances the clarity and coherence of instruction but also allows teachers to anticipate potential challenges and address diverse learner needs effectively.

METHOD

This study employed a mixed-method approach combining qualitative and quasi-experimental research designs. The participants included 30 EFL students and 5 English teachers from the University of Tashkent for Applied Sciences. Data were collected over a six-week period through classroom observations, semi-structured interviews, and lesson plan evaluations. Two groups were observed: one using structured lesson planning and another using less structured approaches. The collected data were analyzed to identify differences in student engagement, participation, and learning outcomes.

RESULTS AND DISCUSSION

The findings revealed that structured lesson planning significantly improved classroom effectiveness. Students in the structured planning group demonstrated higher engagement levels, with an approximate 25% increase in participation. Additionally, formative assessment results indicated better comprehension and retention of lesson content. Teachers also reported increased confidence and improved classroom management. These results support existing pedagogical theories that emphasize the importance of planning in achieving instructional goals. Furthermore, the study confirms that integrating clear objectives, interactive activities, and assessment strategies leads to more effective teaching and learning processes.

CONCLUSION

In conclusion, lesson planning is an indispensable component of effective teaching that significantly influences instructional quality and student learning outcomes. It provides a structured framework that enables teachers to organize content systematically, apply appropriate teaching methods, and ensure that learning objectives are clearly achieved. A well-developed lesson plan not only enhances the clarity and coherence of instruction but also allows teachers to anticipate potential challenges and address diverse learner needs effectively.

Furthermore, lesson planning contributes to improved classroom management by promoting time efficiency, logical sequencing of activities, and purposeful transitions between different stages of the lesson. It also increases teacher confidence, as educators enter the classroom with a clear vision of their goals and strategies. This, in turn, positively affects student engagement, motivation, and overall academic performance.

In modern educational environments, where diversity, technology integration, and learner-centered approaches are increasingly emphasized, lesson planning plays a crucial role in ensuring inclusivity and adaptability. It enables teachers to incorporate innovative teaching techniques, differentiate instruction, and align classroom practices with curriculum standards and global educational frameworks.

Additionally, lesson planning serves as a reflective and developmental tool. Through continuous evaluation and refinement of lesson plans, teachers can improve their pedagogical skills, respond to feedback, and engage in lifelong professional learning. Thus, lesson planning is not merely a preparatory activity but an ongoing process that supports teaching excellence and educational success. Therefore, it can be concluded that effective lesson planning remains a cornerstone of quality education, bridging the gap between theoretical knowledge and practical classroom implementation while fostering meaningful and sustainable learning experiences.

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KETMA-KET HARAKATLANAYOTGAN AVTOMOBILLARNI MODELLASHTIRIB HARAKAT XAVFSIZLIGINI TA'MINLASH

Annotatsiya: *Ushbu maqolada ketma-ket harakatlanayotgan transport vositalarining harakat xavfsizligini ta'minlash masalasi ko'rib chiqilgan. Tadqiqotda yengil avtomobillar, yuk avtomobillari va avtobuslar uchun tormoz masofasi, xavfsiz masofa, to'qnashuv ehtimoli hamda to'xtash jarayonining tarkibiy qismlari matematik modellar asosida tahlil qilingan. Har bir transport turi uchun tezlik, massa, tormoz tizimining xususiyatlari va haydovchining reaktsiya vaqti kabi parametrlar hisobga olingan. Tadqiqot natijalari ko'rsatdiki, yuk avtomobillari va avtobuslar uchun xavfsiz masofani yengil avtomobillarga nisbatan 1.5–2 marta oshirish zarurligi isbotlangan. Maqolada olingan natijalar grafik ko'rinishida ifodalangan.*

Kalit so'zlar: *harakat xavfsizligi, tormoz masofasi, ketma-ket harakat, xavfsiz masofa, transport vositalari, matematik modellashtirish, to'qnashuv ehtimoli.*

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MODELING CONSECUTIVE VEHICLE MOVEMENT TO ENSURE TRAFFIC SAFETY

Abstract: *This article examines the issue of ensuring traffic safety for vehicles moving in succession. The study analyzes braking distance, safe following distance, collision probability, and the components of the stopping process for passenger cars, trucks, and buses based on mathematical models. Parameters such as speed, mass, braking system characteristics, and driver reaction time are taken into account for each type of vehicle. The research results demonstrate that for trucks and buses, it is necessary to increase the safe distance by 1.5–2 times compared to passenger cars. The findings of the study are presented in graphical form.*

Keywords: *traffic safety, braking distance, consecutive movement, safe distance, vehicles, mathematical modeling, collision probability.*

KIRISH

Zamonaviy shahar yo'llarida transport oqimining zichligi yildan-yilga oshib bormoqda. O'zbekiston Respublikasi Ichki ishlar vazirligi ma'lumotlariga ko'ra, yo'l-transport hodisalarining 35-40 foizi ketma-ket harakatlanayotgan transport vositalari orasidagi to'qnashuvlar tashkil etadi. Bu holat, ayniqsa, turli xil transport

vositalari — yengil avtomobillar, yuk avtomobillari va avtobuslar — aralash harakat qilgan sharoitda yanada xavfli bo'ladi.

Ketma-ket harakatlanayotgan avtomobillar orasidagi xavfsiz masofani aniqlash — harakat xavfsizligining eng muhim masalalaridan biridir. Transport vositasining turi, massasi, tormoz tizimining samaradorligi, shinalarning yo'l bilan tutashish koeffitsienti va haydovchining psixofiziologik holati kabi omillar xavfsiz masofani belgilashda hal qiluvchi ahamiyatga ega.

Ushbu tadqiqotning maqsadi — ketma-ket harakatlanayotgan uchta asosiy transport turi (yengil avtomobil, yuk avtomobili va avtobus) uchun xavfsiz masofani matematik modellashtirish, tormoz dinamikasini qiyosiy tahlil qilish va to'qnashuv ehtimolini baholash orqali harakat xavfsizligini ta'minlash bo'yicha amaliy tavsiyalar ishlab chiqishdir.

ADABIYOTLAR TAHLILI

Transport vositalarining ketma-ket harakatlanishi xavfsizligi masalasi ko'plab olimlar tomonidan o'rganilgan. Xitoy olimlari Wang va Zheng (2019) ketma-ket harakatlanayotgan avtomobillar uchun xavfsiz masofa modelini ishlab chiqqan bo'lib, unda haydovchining reaktsiya vaqti, yo'l qoplamasi holati va ob-havo sharoitlari hisobga olingan. Rossiyalik olim Babkov V.F. transport oqimi nazariyasida ketma-ket harakat modellarini chuqur o'rgangan.

Tormoz masofasini hisoblash uchun klassik formulalar asosan yengil avtomobillar uchun ishlab chiqilgan. Biroq, yuk avtomobillari va avtobuslarning tormoz dinamikasi sezilarli darajada farq qiladi. Pacejka (2012) shina modellarida turli xil transport vositalarining yo'l bilan tutashish xususiyatlarini batafsil tahlil qilgan. O'zbekistonlik olimlar Aripov N.M. va Isoqov A. mahalliy yo'l sharoitlarida transport xavfsizligini oshirish bo'yicha tadqiqotlar olib borgan.

Ammo mavjud tadqiqotlarda yengil avtomobil, yuk avtomobili va avtobuslar uchun tormoz parametrlarini qiyosiy tahlil qilgan va ularning ketma-ket harakatdagi xavfsiz masofaga ta'sirini kompleks baholagan ishlar kam uchraydi. Ushbu maqola aynan shu bo'shliqni to'ldirishga qaratilgan.

TADQIQOT METODOLOGIYASI

Matematik model

Ketma-ket harakatlanayotgan transport vositasining tormoz masofasi quyidagi formula asosida hisoblanadi:

$$S_{tormoz} = v_0 \times (t_r + t_m) + v_0^2 / (2 \times \varphi \times g)$$

bu yerda: v_0 — boshlang'ich tezlik (m/s); t_r — haydovchining reaktsiya vaqti (s); t_m — tormoz mexanizmining ishga tushish vaqti (s); φ — yo'l bilan shinaning tutashish koeffitsienti; g — erkin tushish tezlanishi (9.81 m/s²).

Xavfsiz masofani aniqlash

Ketma-ket harakatlanayotgan ikki transport vositasi orasidagi xavfsiz masofa quyidagi ifoda orqali aniqlanadi:

$$D_{xavfsiz} = S_{tormoz(orqadagi)} - S_{tormoz(oldindagi)} + \Delta S$$

bu yerda ΔS — xavfsizlik zaxirasi (odatda 2–5 metr qilib olinadi). Turli transport vositalari uchun tormoz masofasidagi farq xavfsiz masofani sezilarli darajada o'zgartiradi.

Tadqiqot parametrlari

Tadqiqotda quruq asfaltbeton yo'l qoplamasi (φ = 0.7) sharoiti uchun quyidagi parametrlar qabul qilingan:

Parametr	Yengil avto	Yuk avto	Avtobus
Massa (kg)	1 500	12 000	16 000
Reaktsiya vaqti (s)	0.75	0.75	0.75
Mexanik kechikish (s)	0.15	0.35	0.40
Tormoz samaradorligi	0.85	0.65	0.60
φ koeffitsienti	0.70	0.65	0.60

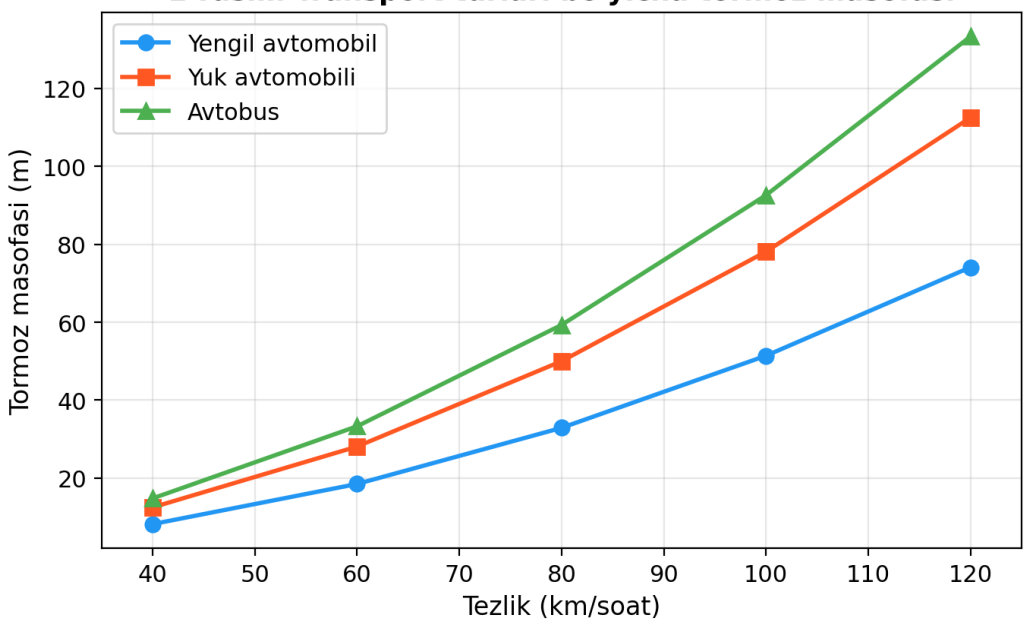
1-jadval. Transport vositalari parametrlari

TADQIQOT NATIJALARI

Tormoz masofasi tahlili

Turli tezliklarda uchta transport vositasi turi uchun tormoz masofasi hisoblandi. Natijalar 1-rasmda keltirilgan. Tahlil shuni ko'rsatdiki, 100 km/soat tezlikda yuk avtomobilining tormoz masofasi yengil avtomobilnikiga nisbatan 1.52 marta, avtobusniki esa 1.80 marta katta. Bu farq tezlik oshgani sari kvadratik ravishda ortib boradi.

1-rasm. Transport turlari bo'yicha tormoz masofasi

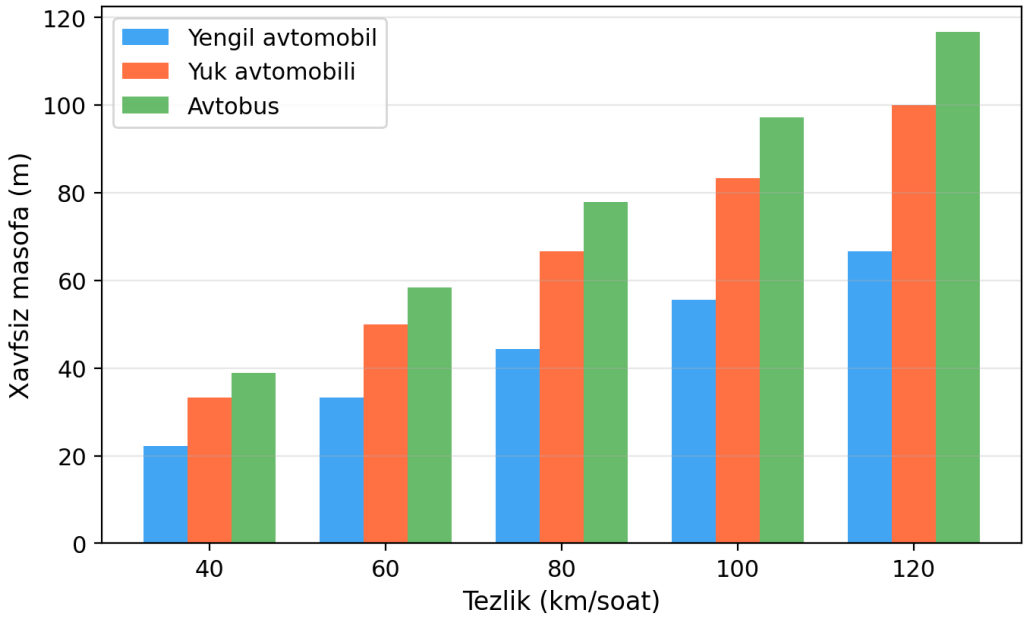


120 km/soat tezlikda yengil avtomobil uchun tormoz masofasi 74.1 metrni, yuk avtomobili uchun 112.5 metrni va avtobus uchun 133.3 metrni tashkil etadi. Bu natijalar ketma-ket harakatda transport turini hisobga olish zarurligini yaqqol ko'rsatadi.

Xavfsiz masofa tahlili

2-rasmda turli tezliklarda har bir transport turi uchun ketma-ket harakatdagi xavfsiz masofa keltirilgan. Xavfsiz masofa «2 soniya qoidasi» asosida hisoblangan bo'lib, transport vositasining xususiyatlariga qarab tuzatish koeffitsientlari kiritilgan.

2-rasm. Ketma-ket harakatda xavfsiz masofa

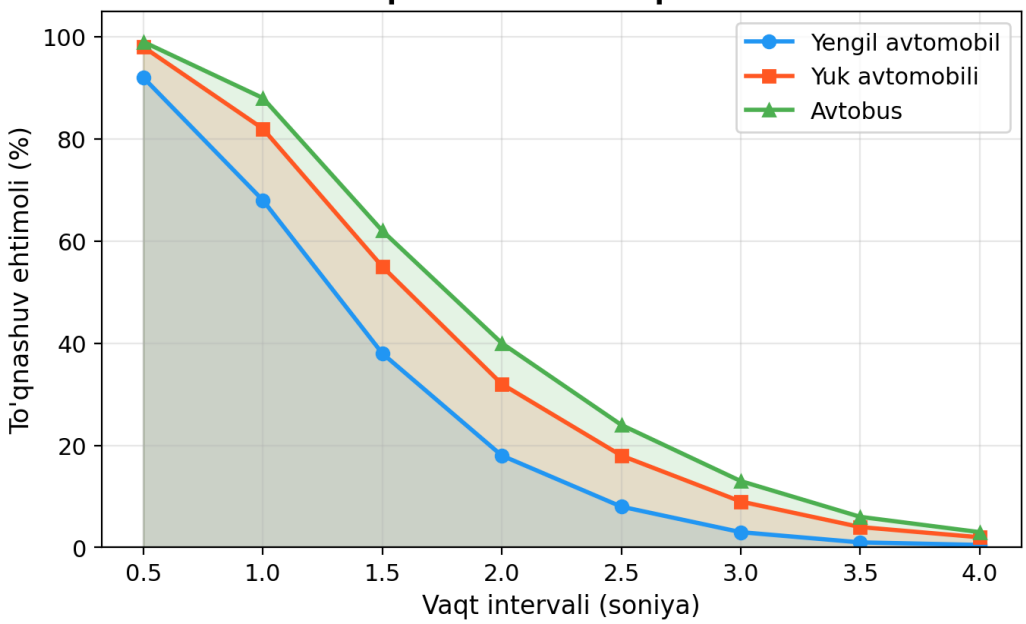


100 km/soat tezlikda yengil avtomobil uchun xavfsiz masofa 55.6 metr, yuk avtomobili uchun 83.3 metr, avtobus uchun esa 97.2 metr bo'lishi kerak. Demak, og'ir transport vositalari uchun xavfsiz masofani yengil avtomobillarga nisbatan kamida 1.5 marta ko'paytirish zarur.

To'qnashuv ehtimoli va vaqt intervali

3-rasmda ketma-ket harakatlanayotgan transport vositalari orasidagi vaqt intervaliga qarab to'qnashuv ehtimoli ko'rsatilgan. Bu model Monte-Karlo simulyatsiya usuli asosida ishlab chiqilgan bo'lib, har bir holatda 10 000 ta tasodifiy ssenariy modellantirilgan.

3-rasm. Vaqt intervali va to'qnashuv ehtimoli



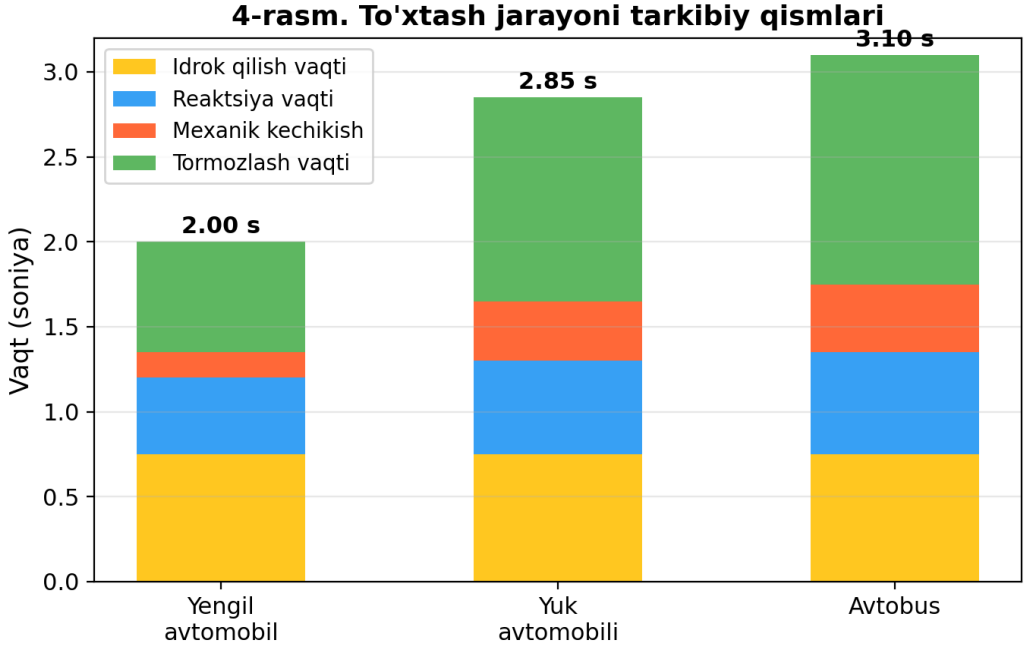
Natijalar shuni ko'rsatdiki, yengil avtomobil uchun 2 soniyalik vaqt intervali to'qnashuv ehtimolini 18 foizgacha kamaytiradi. Biroq, yuk avtomobili uchun xuddi shu ko'rsatkich 32 foiz, avtobus uchun esa 40 foiz bo'lib qoladi. Yuk

avtomobillari va avtobuslar uchun kamida 3 soniyalik vaqt intervali tavsiya etiladi, bu to'qnashuv ehtimolini 10 foizdan pastga tushiradi.

To'xtash jarayoni tarkibiy qismlari

4-rasmda har bir transport turi uchun to'xtash jarayonining tarkibiy qismlari (idrok qilish, reaktsiya, mexanik kechikish va tormozlash vaqtlari) ko'rsatilgan.

4-rasm. To'xtash jarayoni tarkibiy qismlari



Yengil avtomobil uchun to'liq to'xtash vaqti 2.00 soniyani, yuk avtomobili uchun 2.85 soniyani va avtobus uchun 3.10 soniyani tashkil etadi. Mexanik kechikish va tormozlash vaqtidagi farq asosan og'ir transport vositalarining katta massasi va pnevmatik tormoz tizimining sekinroq ishga tushishi bilan izohlanadi.

NATIJALAR MUHOKAMASI

Olingan natijalarni qiyosiy tahlil qilganda quyidagi muhim xulosalar kelib chiqadi. Birinchidan, transport vositasining massasi tormoz masofasiga bevosita ta'sir ko'rsatadi. Massaning oshishi bilan tormoz kuchi oshsa-da, inertsiya kuchining ortishi tormoz masofasini uzaytiradi.

Ikkinchidan, pnevmatik tormoz tizimiga ega bo'lgan yuk avtomobillari va avtobuslarning mexanik kechikish vaqti gidravlik tormozli yengil avtomobillarga nisbatan 2-2.5 marta katta. Bu omil yuqori tezliklarda ayniqsa katta ahamiyat kasb etadi.

Uchinchidan, amaliyotda ko'p qo'llaniladigan «2 soniya qoidasi» faqat yengil avtomobillar uchun etarli. Yuk avtomobillari va avtobuslar uchun bu ko'rsatkich kamida 3-4 soniyaga oshirilishi lozim. Quyidagi jadvalda yakuniy tavsiyalar keltirilgan:

2-jadval

Tezlik (km/soat)	Yengil avto	Yuk avto	Avtobus
40	2.0 s / 22 m	3.0 s / 33 m	3.5 s / 39 m
60	2.0 s / 33 m	3.0 s / 50 m	3.5 s / 58 m
80	2.0 s / 44 m	3.0 s / 67 m	3.5 s / 78 m
100	2.0 s / 56 m	3.0 s / 83 m	3.5 s / 97 m
120	2.0 s / 67 m	3.0 s / 100 m	3.5 s / 117 m

2-jadval. Tavsiya etiladigan xavfsiz masofa va vaqt intervallari

XULOSA

Ushbu tadqiqotda ketma-ket harakatlanayotgan yengil avtomobillar, yuk avtomobillari va avtobuslar uchun harakat xavfsizligini ta'minlash masalasi matematik modellashtirish usuli bilan o'rganildi. Tadqiqot natijalari asosida quyidagi xulosalar shakllantirildi:

1) 100 km/soat tezlikda yuk avtomobilining tormoz masofasi yengil avtomobilnikidan 1.52 marta, avtobusniki esa 1.80 marta katta. Shuning uchun yo'l harakati qoidalarida transport turiga qarab differensiallashtirilgan xavfsiz masofalar belgilanishi lozim.

2) Yengil avtomobillar uchun «2 soniya qoidasi» yetarli bo'lsa, yuk avtomobillari uchun kamida 3 soniya, avtobuslar uchun esa kamida 3.5 soniyalik vaqt intervali talab etiladi.

3) Monte-Karlo simulyatsiyasi natijalariga ko'ra, tavsiya etilgan vaqt intervallarini saqlash to'qnashuv ehtimolini barcha transport turlari uchun 10 foizdan pastga tushiradi.

4) Kelgusida sun'iy intellekt asosidagi avtomatik tormoz tizimlarini transport turlariga moslashtirilgan holda ishlab chiqish zarur. Shuningdek, ob-havo sharoitlari va yo'l qoplamasi holatini real vaqt rejimida hisobga oladigan adaptiv xavfsiz masofa tizimlari yaratish istiqbolli yo'nalish hisoblanadi.

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VATAN FIDOIYLARI FENOMENI: AN’ANAVIY QADRIYATLARDAN RAQAMLI MAKONGACHA

Annotatsiya: *Mazkur maqolada XXI asr sharoitida “Vatan fidoiylari” tushunchasining zamonaviy talqini ilmiy jihatdan tahlil qilinadi. Unda vatanparvarlik fenomenining ijtimoiy, psixologik va pedagogik jihatlari yoritilib, ayniqsa elektron platformalar va raqamli muhitning yoshlar ongiga ta’siri asoslab beriladi. Shuningdek, “raqamli fidoyilik” tushunchasi kiritilib, uning mazmuni va ahamiyati ochib beriladi. Tadqiqot natijalari zamonaviy jamiyatda milliy xavfsizlik, ijtimoiy barqarorlik va yoshlar tarbiyasida vatan fidoiylarining o‘rni ortib borayotganini ko‘rsatadi.*

Kalit so‘zlar: *vatan fidoiylari, vatanparvarlik, raqamli jamiyat, elektron platformalar, yoshlar tarbiyasi, milliy xavfsizlik, axborot makoni, raqamli fidoyilik*

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THE PHENOMENON OF DEVOTION TO THE MOTHERLAND: FROM TRADITIONAL VALUES TO THE DIGITAL SPACE

Annotation: *This article provides a scientific analysis of the modern interpretation of the concept of “devotion to the Motherland” in the context of the 21st century. It examines the social, psychological, and pedagogical aspects of patriotism, with particular emphasis on the impact of electronic platforms and the digital environment on youth development. The concept of “digital devotion” is introduced and its significance is explained. The findings highlight the growing role of devoted citizens in ensuring national security, social stability, and youth education in contemporary society.*

Keywords: *devotion to the Motherland, patriotism, digital society, electronic platforms, youth education, national security, information space, digital devotion*

XXI asrda globallashuv jarayonlarining jadallashuvi, axborot-kommunikatsiya texnologiyalarining keng rivojlanishi va raqamli transformatsiya jarayonlarining chuqurlashuvi ijtimoiy hodisalar mohiyatini tubdan

o‘zgartirmoqda. Shu nuqtayi nazardan, “Vatan fidoiylari” fenomeni ham an’anaviy talqindan chiqib, yangi ijtimoiy, siyosiy va axborot kontekstida qayta shakllanmoqda.

Zamonaviy ilmiy diskursda vatanparvarlik ijtimoiy ongning muhim shakli sifatida qaralib, u milliy identifikatsiya, siyosiy barqarorlik va ijtimoiy integratsiyaning asosiy determinantlaridan biri sifatida e’tirof etiladi. Ayniqsa, raqamli makonning kengayishi natijasida davlatlar o‘rtasidagi raqobatning yangi shakllari — axborot urushlari, kiberxavfsizlik tahdidlari va ideologik kurashlar yuzaga kelmoqda. Bu esa o‘z navbatida, vatan fidoiylari tushunchasining funksional doirasini kengaytirishni taqozo etadi.

Mazkur tadqiqotning maqsadi — “Vatan fidoiylari” fenomenining zamonaviy transformatsiyasini ilmiy asosda tahlil qilish, uning ijtimoiy funksiyalarini aniqlash hamda raqamli makondagi yangi ko‘rinishlarini ochib berishdan iborat. Tadqiqotning vazifalari esa ushbu fenomenning nazariy asoslarini o‘rganish, tarixiy evolyutsiyasini tahlil qilish, sotsiologik va psixologik xususiyatlarini aniqlash hamda zamonaviy sharoitdagi amaliy ahamiyatini asoslashdan iborat.

Mazkur ilmiy tadqiqotda kompleks va integrativ metodologik yondashuv qo‘llanildi. Tadqiqotning nazariy asosini tizimli yondashuv tashkil etib, u orqali “Vatan fidoiylari” fenomeni ko‘p darajali ijtimoiy tizim sifatida ko‘rib chiqildi. Ushbu yondashuv mazkur tushunchaning strukturaviy elementlari, ichki aloqalari va funksional bog‘liqliklarini aniqlash imkonini berdi.

Tarixiy-qiyosiy metod yordamida fidoyilik tushunchasining turli tarixiy bosqichlardagi evolyutsiyasi o‘rganildi. Bu metod orqali an’anaviy davrdagi vatanparvarlik ko‘rinishlari bilan zamonaviy raqamli davrdagi shakllari o‘rtasidagi farqlar va o‘xshashliklar aniqlashtirildi.[6]

Sotsiologik yondashuv doirasida vatan fidoiylarining jamiyatdagi funksiyalari, ijtimoiy institutlar bilan o‘zaro aloqalari hamda ijtimoiy kapitalni shakllantirishdagi roli tahlil qilindi. Psixologik metodlar esa fidoyi shaxslarning motivatsion tizimi, qadriyatlar iyerarxiyasi va xulq-atvor mexanizmlarini aniqlashga xizmat qildi.

Bundan tashqari, kontent-tahlil usuli orqali raqamli platformalarda tarqatilayotgan axborotlar, vatanparvarlikka oid kontentlar va ularning auditoriyaga ta’siri o‘rganildi. Empirik baza sifatida xalqaro ilmiy tadqiqotlar, normativ-huquqiy hujjatlar va zamonaviy ilmiy adabiyotlar tahlil qilindi. Ushbu metodlar majmuasi tadqiqot natijalarining ishonchliligi va ilmiy asoslanganligini ta’minladi.

1. Raqamli makon va vatanparvarlik transformatsiyasi

Raqamli texnologiyalar rivoji natijasida axborot makoni ijtimoiy ongga ta’sir ko‘rsatishning asosiy platformasiga aylandi. Ilmiy tadqiqotlar shuni ko‘rsatadiki, ijtimoiy tarmoqlar va axborot platformalari orqali tarqatilayotgan ma’lumotlar qisqa vaqt ichida keng auditoriyani qamrab olish imkoniyatiga ega. Shu sababli, axborot xavfsizligi masalasi milliy xavfsizlikning ajralmas qismi sifatida qaralmoqda. [3]

Bu sharoitda vatan fidoiylari axborot makonida faol ishtirok etuvchi subyekt sifatida namoyon bo‘ladi. Ular yolg‘on axborotlarga qarshi kurashish, milliy manfaatlarni himoya qilish va ijtimoiy ongni shakllantirish jarayonida muhim rol o‘ynaydi.

2. Yoshlar va raqamli ijtimoiylashuv

Zamonaviy yoshlar asosan raqamli muhitda ijtimoiylashmoqda. Ularning qadriyatlari, ijtimoiy qarashlari va identifikatsiyasi ko‘p jihatdan virtual makon ta’sirida shakllanadi. Shu bois ta’lim tizimida raqamli pedagogika elementlarini joriy etish, vatanparvarlik g‘oyalarini innovatsion usullar orqali targ‘ib qilish muhim ahamiyat kasb etadi.

Natijada “raqamli fidoyilar” tushunchasi shakllanib, bu yangi ijtimoiy qatlam zamonaviy jamiyat taraqqiyotida muhim o‘rin egallamoqda.

3. Sotsiologik funksiyalar

Sotsiologik tahlil natijalari vatan fidoiylarining quyidagi asosiy funksiyalarini aniqlash imkonini berdi:

- ijtimoiy namuna va idealni shakllantirish;
- ijtimoiy birdamlikni mustahkamlash;
- inqirozli vaziyatlarda stabilizatsiya omili sifatida faoliyat yuritish.

Bu funksiyalar jamiyatning barqaror rivojlanishida muhim rol o‘ynaydi.

4. Psixologik xususiyatlar

Psixologik nuqtayi nazardan, fidoyi shaxslar yuqori darajadagi ichki motivatsiya, irodaviy barqarorlik va altruistik qadriyatlar bilan ajralib turadi. Ularning faoliyati ko‘pincha shaxsiy manfaatlardan ustun bo‘lgan ijtimoiy manfaatlarga yo‘naltirilgan bo‘lib, bu holat “pro-sotsial xulq” sifatida ilmiy izohlanadi.[5]

5. Zamonaviy kasbiy yo‘nalishlar

Ilmiy-texnik taraqqiyot natijasida fidoyilik tushunchasi yangi kasbiy yo‘nalishlar bilan boyimoqda. Xususan, IT mutaxassislari, kiberxavfsizlik ekspertlari va muhandislar davlat xavfsizligini ta’minlashda muhim rol o‘ynamoqda. Ularning faoliyati strategik ahamiyat kasb etadi.

Tadqiqot natijalari shuni ko‘rsatadiki, “Vatan fidoiylari” fenomeni zamonaviy sharoitda kompleks va ko‘p qirrali ijtimoiy hodisaga aylangan. An’anaviy yondashuvlarda ushbu tushuncha asosan harbiy faoliyat bilan bog‘langan bo‘lsa, zamonaviy ilmiy yondashuvlar uni kengroq — ijtimoiy, axborot va intellektual faoliyatlar majmui sifatida talqin etadi.

Shuningdek, raqamli makonning kengayishi ushbu fenomenning yangi shakllarini yuzaga keltirib, uning ijtimoiy ahamiyatini yanada oshirmoqda. Bu esa mazkur yo‘nalishda yangi ilmiy tadqiqotlar olib borishni talab qiladi.

Xulosa qilib aytganda, XXI asrda “Vatan fidoiylari” fenomeni sezilarli transformatsiyani boshdan kechirmoqda. U nafaqat an’anaviy, balki raqamli makonda ham faol namoyon bo‘layotgan ijtimoiy hodisaga aylangan.

Mazkur tadqiqot natijalari shuni ko‘rsatadiki, vatan fidoiylari jamiyatning barqaror rivojlanishi, milliy xavfsizlikni ta’minlash va ijtimoiy birdamlikni mustahkamlashda muhim strategik resurs hisoblanadi. Shu bois ushbu yo‘nalishda

ilmiy izlanishlarni chuqurlashtirish, ta’lim tizimida vatanparvarlikni rivojlantirish va raqamli vositalardan samarali foydalanish dolzarb vazifa bo‘lib qolmoqda.

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MAMLAKATIMIZ IQTISODIY FAROVONLIGI HAMDA IJTIMOIY TARAQQIYOTINING YUKSALISHIDA TADBIRKORLIK HAMDA KICHIK BIZNESNING O‘RNI VA ROLI

Annotatsiya: *Mazkur maqolada kichik biznes va tadbirkorlikning mamlakat iqtisodiy taraqqiyotini ta’minlash, yangi ish o‘rinlarini yaratish, aholining daromadlari va farovonligini oshirishdagi roli ochib berilgan.*

Kalit so‘zlar: *Tadbirkorlik, kichik biznes, iqtisodiy taraqqiyot, ish o‘rinlari, daromad*

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THE PLACE AND ROLE OF ENTREPRENEURSHIP AND SMALL BUSINESS IN THE ECONOMIC WELL-BEING AND SOCIAL DEVELOPMENT OF OUR COUNTRY

Abstract: *This article reveals the role of small business and entrepreneurship in ensuring the economic development of the country, creating new jobs, increasing incomes and well-being of the population.*

Keywords: *entrepreneurship, small business, economic progress, jobs, income*

Bugungi kunda xotin-qizlarni ish bilan ta’minlash va ular uchun munosib bo‘lgan turmush sharoitini yaratish ijtimoiy sohaning muhim yo‘nalishlaridan biri hisoblanadi. Shuning uchun ham Prezidentimiz SHavkat Mirziyoyev tomonidan ayollar tadbirkorligini rivojlantirish,ularning ijtimoiy faolligiga katta ahamiyat qaratilmoqda.

Tadbirkorlik o‘zi nima? Tadbirkorlik inglizcha so‘zdan olingan bo‘lib bandlik degan ma’noni anglatadi. Bu faoliyat bilan shug‘ullanuvchi shaxs esa tadbirkor deb yuritiladi.

Tadbirkorlik bugungi rivojlangan O‘zbekiston fuqarolari ko‘p ishlatadigan jumlaga aylanib bo‘ldi.

Respublikamizda hozirgi kunda tadbirkorlik bilan shug‘ullanmoqchi bo‘lgan insonlar uchun qanchadan qancha imkoniyatlar eshigi ochib qo‘yilgan. Tadbirkor bo‘lish istagida bo‘lgan insonlar bu imkoniyatlardan samarali foydalanishmoqda.

Hozirgi paytda mamlakatimizda xotin-qizlar tadbirkorligini rivojlantirishga qaratilgan alohida e’tibor sabab, tadbirkor ayollar soni yildan yilga o‘sib bormoqda. Tadbirkorlik bo‘yicha o‘z bilim va ko‘nikmalarini shakllantirish va oshirish maqsadida tadbirkorlik bo‘yicha qisqa o‘quv kurslari shakllantirilmoqda. Qolaversa, “Ayollar daftari” ro‘yxatiga kiritilgan xotin qizlarni bandligini ta’minlash va tadbirkorlikka jalb qilish borasida turli xil amaliy yordamlar ko‘rsatilmoqda. Shuni aytib o‘tish kerakki, mahalla tomonidan ayollar uydan chiqmagan holda tadbirkorlik bilan shug‘ullanishi uchun imkoniyatlar yaratilgan. Misol uchun uyning hovlisida issiqxona qurib va u orqali daromad olish mumkin. Mahalla moliyaviy jihatdan imkoniyati cheklangan oilalar uchun tadbirkorlik uchun zarur bo‘ladigan uskunalar bilan ta’minlashishi mumkin. Agarda mahalla biror oila yoki ayol uchun inkovator, jo‘ja ochadigan mashina berilsa, u orqali ayol o‘z tadbirkorligini boshlashi va daromad olishi mumkin albatta. Bundan tashqari “Yoshlar va xotin-qizlarni kasb-hunar va tadbirkorlikka o‘qitish dasturlarini samarali amalga oshirish hamda ularning tadbirkorlik faoliyati uchun mikrokreditlar ajratish chora-tadbirlari to‘g‘risida”gi Hukumat qarori bilan Tadbirkorlik tashabbusiga ega jismoniy shaxslar, shu jumladan, yoshlar va xotin-qizlarga mikrokreditlar ajratish tartibi to‘g‘risidagi nizom tasdiqlangan. Nizomga ko‘ra, tadbirkorlik tashabbusiga ega jismoniy shaxslar, shu jumladan, yoshlar va xotin-qizlar, shuningdek, mikrofirma va kichik korxona ta’sis etgan shaxslar (qarz oluvchilar) kredit olish uchun “Mikrokreditbank” aksiyadorlik-tijorat banki yoki aksiyadorlik-tijorat Xalq bankiga elektron ariza bilan murojaat qiladi.

Bundan tashqari Xotin-qizlarni qo‘llab-quvvatlash davlat maqsadli jamg‘armasi hisobidan 3 yilgacha va 6 oygacha imtiyozli davr bilan yillik 14 foiz stavkada 33 million so‘mgacha kreditlar beriladi. Buning uchun quyidagi dasturlardan birini samarali tamomlagan bo‘lishi lozim:

- Tadbirkorlikni rivojlantirish agentligi va Biznes va tadbirkorlik oliy maktabi ma’qullangan dasturlar asosidagi o‘quv kurslari;
- «Ishga marhamat» monomarkazlari, kasb-hunarga o‘qitish markazlari, mahallalardagi kasb-hunarga o‘qitish maskanlari va Xotin-qizlar tadbirkorlik markazlari yoki nodavlat ta’lim muassasalarining kasbga o‘rgatish o‘quv kurslarining maxsus o‘qitish dasturlari.

Tadbirkor ayollar yildan yilga ko‘paymoqda. Ularning soni bir yilda qariyb 45ming nafarga ko‘payib, ular tomonidan bo‘sh ish o‘rinlari taqdim

etilmoqda.So‘ngi yillarda aholining ko‘pchilik qismi ham tadbirkorlik (biznes) haqida o‘ylashadi.

Hozirgi davrda bo‘layotgan o‘zgarishlar va rivojlanish jarayonlari kengaymoqda va albatta kichik biznes va xususiy tadbirkorlikda ayollarning o‘rni ham oshmoqda. O‘tgan bir necha yillar ilgari ayollarga turli cheklovlar bo‘lgan bo‘lsada hozirga kelib cheksiz imkoniyatlar mavjud. Xususan, ayollar va erkaklar tengligi va ayollarni kamsitishga yo‘l qo‘ymaslik haqidagi masalalar O‘zbekiston Respublikasi Konstitutsiyasida belgilab qo‘yilgan. Misol uchun, O‘zbekiston Respublikasi Konstitutsiyasining 37-moddasida va Mehnat kodeksining 6-moddasida mehnatga oid masalalarda xotin-qizlarni kamsitish taqiqlanishi keltirilgan. Ayollar milliy iqtisodiyotni rivojlanish va yangilanish borasidagi chora-tadbirlarda faol ishtirok etar ekanlar, ayniqsa, kichik biznes va xususiy tadbirkorlikni rivojlantirishda ayollar mehnatining tobora ommalashayotganligi haqiqatdir.

Ular ham o‘z tadbirkorlik faoliyati bilan shug‘ullanib, ko‘pgina bo‘sh o‘rinlar yaratishmoqda va o‘zlarini ham band qilmoqda va davlatga foyda keltirmoqda.

Xulosa o‘rnida aytib o‘tish mumkinki, ayollarni chetga chiqarish kerak emas, balki aollar uchun ko‘pgina imkoniyatlar yaratib berilishi va erkinlik berilishi lozim va albatta ayollar yaratilgan imkoniyatlardan iloji boricha samarali va maqsadli foydalanishlari zarur.

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WAYS TO INCREASE THE ECONOMIC EFFICIENCY OF INVESTMENTS IN OUR COUNTRY

Abstract: *The article provides information on types of investments, investing, contractor functions in construction, the role of investment in economic security, attracting investment by increasing the country's investment attractiveness, economic security, and economic competitiveness*

Keywords: *Investment, contractor, investment funds, financial resources, working capital, tenders*

Investment (Latin: investio - "to wrap") is the long-term investment of capital in various sectors, socio-economic programs, innovation, and entrepreneurial projects in one's own country or abroad for the purpose of economic development. According to the theory of the time value of money, an investment is an investment aimed at generating profit in the future. An investment is defined as the binding or reservation of capital for a specific period. The main purpose of this is to preserve the value of capital or to increase its value over time. In terms of economic content, investment reflects material and intangible assets mobilized for various activities and the rights to them. As investments, money, securities (stocks, bonds, certificates, promissory notes), land, buildings, structures, intellectual property, scientific discoveries, inventions, etc., are used. Investors in investment projects may be the state, companies, enterprises, foreign citizens, the population, and others. The following types are distinguished: public investment—introduced at the expense of the state budget and financial sources; foreign investment—introduced by foreign states, banks, companies, and entrepreneurs; private investment—introduced at the expense of private, corporate farms, organizations, and citizens, including personal and attracted funds. Depending on the form of investment, it is divided into financial (portfolio) and real (production) investments. Financial (portfolio) investments are investments in the purchase of shares, bonds, and other securities; real investments are made in the form of long-term investments in the sphere of material production (industry, agriculture, construction, etc.) and types of material and material activities. In global practice, investment financing is carried out through various methods and forms, including corporatization of enterprises and placement of

shares, budget funds, bank loans, leasing, foreign direct investment, mortgages, special extra-budgetary funds, depreciation, and other funds of economic entities.

Today, fundamental reforms are being implemented to attract foreign investment into most sectors and to bring economic development to a new level. In particular, the names given to the previous and current years confirm our opinion that they are related to the development of the investment climate.

This issue was emphasized in the Address of the President of the Republic of Uzbekistan Shavkat Mirziyoyev to the deputies of the Oliy Majlis on December 28, 2018. In particular, it was noted that last year, based on the results of cooperation with the World Bank, the European Bank for Reconstruction and Development, the Islamic and Asian Development Banks, and other international financial institutions, the volume of investments in our country amounted to 8.5 billion dollars, and 456 projects worth 23 billion dollars are being implemented through foreign investment. Paying special attention to these indicators, the President emphasized that large-scale investments will be a factor in strengthening the country's economy: "World experience shows that a country that pursues an active investment policy has achieved stable economic growth." "Therefore, it would not be an exaggeration to say that investment is the driver of the economy; in Uzbek, it is the heart of the economy."

Indeed, achieving large-scale investment attraction in the economy serves as a solid foundation for the introduction of new technologies, advanced experience, and highly qualified specialists into many spheres, sectors, and regions, as well as for the accelerated development of entrepreneurship.

General economic, regulatory, and environmental conditions, market financing mechanisms, information support, and others play an important role in ensuring the stability of the investment climate in Uzbekistan. Furthermore, when foreign investors invest in the country's economy, they take into account macroeconomic indicators of the investment climate, such as the inflow and outflow of foreign investment, the inflation rate, GDP growth, the ratio between consumption and savings, interest rates, and the utilization of foreign investment. In addition, investors will pay attention to the country's qualified personnel reserve, the quality of banking and financial services, and the level of monetary and fiscal policy.

In the address of the head of our state, the idea was put forward that "we need to develop a concept for improving monetary policy and ensuring price stability by thoroughly studying world experience and involving international experts."

Therefore, creating favorable conditions for the influx of foreign investment based on the assessment of relevant risks and their elimination is a pressing issue today.

This is because foreign investors evaluate the country's investment climate from the perspective of its security, the level of political and economic risks and their insurance, compliance with investment goals, and the overall economic conditions relative to others. The level of risk inherent in a country (debt issues,

import and export balance, government stability, etc.), as well as the advantages of local conditions over other countries, occupy a leading position.

In conclusion, as a result of the implementation of large-scale investment projects by investors, enterprises, and organizations, many new jobs will be created in our country. At the same time, sufficient conditions will be created for the acquisition of modern knowledge and, in general, for the further growth of the intellectual potential of our state. In turn, such opportunities are a guarantee of the people's well-being and the country's development. As our President emphasized, "Our main goal is for every person living in our country, regardless of their nationality, language, or religion, to lead a free, peaceful, and prosperous life, and to be content with life today." Developing a model of the investment environment by a recipient of capital from abroad is a tool for determining comprehensively grounded foreign economic relations. Through it, it becomes possible to have a clear understanding of the factors affecting the foreign investor, a comprehensive understanding of the behavior of foreign investors and a deeper assessment of the economic situation in the country. All these processes play an important role in attracting capital from abroad in the process of establishing the initial economic relations of our republic with other countries. The investment climate is a category of objects that reflects the set of conditions that actually exist for investors at any given time. However, under current conditions, the investment climate is formed only under the influence of state bodies. Of course, in carrying out this work, it is necessary to make wider use of world experience, including the experience of companies and firms established with foreign investment that have achieved high economic indicators. When implementing this process, national characteristics must also be taken into account.

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GEORAFIK FANLARNI O‘QITISHNING INNOVATSION USULLARINI TAHLIL QILISH

Annotatsiya: *Mazkur maqolada geografik fanlarni o‘qitishda innovatsion yondashuvlarning ahamiyati, ularning ta’lim samaradorligini oshirishdagi o‘rni va amaliy qo‘llanilish imkoniyatlari tahlil qilinadi. Zamonaviy ta’lim tizimida geografiya fanini o‘qitishda interfaol metodlar, axborot-kommunikatsiya texnologiyalari, raqamli platformalar hamda muammoli ta’lim yondashuvlaridan foydalanishning pedagogik asoslari yoritilgan. Shuningdek, o‘quvchilarning mustaqil fikrlashini rivojlantirish, tahliliy ko‘nikmalarini shakllantirish va real hayotiy muammolarni hal etishga yo‘naltirilgan kompetensiyalarni rivojlantirishda innovatsion metodlarning o‘rni asoslab berilgan.*

Kalit so‘zlar: *Geografiya ta’limi, innovatsion metodlar, interfaol ta’lim, raqamli texnologiyalar, pedagogik texnologiya, muammoli ta’lim, kompetensiyaviy yondashuv, GIS texnologiyalari, multimedia vositalari, zamonaviy ta’lim, didaktik yondashuv, STEAM ta’limi.*

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ANALYSIS OF INNOVATIVE METHODS OF TEACHING GEOGRAPHICAL DISCIPLINES

Abstract: *This article analyzes the importance of innovative approaches in teaching geographical disciplines, their role in improving educational effectiveness, and opportunities for practical application. The pedagogical foundations of using interactive methods, information and communication technologies, digital platforms, and problem-based learning in teaching geography within the modern education system are highlighted. The significance of innovative methods in developing students’ independent thinking, forming analytical skills, and competencies aimed at solving real-life problems is also substantiated.*

Keywords: *geography education, innovative methods, interactive learning, digital technologies, pedagogical technology, problem-based learning, competency-based approach, GIS technologies, multimedia tools, modern education, didactic approach, STEAM education.*

Kirish

Hozirgi globallashuv va axborotlashuv davrida ta’lim tizimiga qo‘yilayotgan talablar tubdan o‘zgarib bormoqda. Ayniqsa, geografiya fanini o‘qitish jarayonida zamonaviy yondashuvlarni joriy etish muhim ahamiyat kasb etadi. Geografiya fani nafaqat tabiiy va ijtimoiy jarayonlarni o‘rganadi, balki o‘quvchilarda fazoviy tafakkur, ekologik madaniyat va global muammolarni anglash ko‘nikmalarini shakllantiradi.

An’anaviy o‘qitish metodlari ko‘pincha o‘quvchilarning passiv ishtirokiga asoslangan bo‘lsa, innovatsion metodlar esa ularni faol fikrlashga, mustaqil izlanishga va muammolarni hal etishga yo‘naltiradi. Shu sababli geografik fanlarni o‘qitishda interfaol metodlar, raqamli texnologiyalar, multimedia vositalari va kompetensiyaviy yondashuvlardan foydalanish dolzarb masalaga aylanmoqda.

Ta’lim tizimida innovatsion yondashuvlarning joriy etilishi o‘quvchilarning bilim darajasini oshirish bilan birga, ularning ijodiy va tanqidiy fikrlash ko‘nikmalarini rivojlantirishga xizmat qiladi. Bu esa o‘z navbatida, zamonaviy jamiyat talablariga mos, raqobatbardosh kadrlarni tayyorlashda muhim omil hisoblanadi.

Geografiya fanini o‘qitishda innovatsion metodlar pedagogikaning zamonaviy konsepsiyalariga asoslanadi. Jumladan, John Dewey tomonidan ilgari surilgan tajribaga asoslangan o‘qitish g‘oyasi o‘quvchilarning amaliy faoliyat orqali bilimlarni egallashini ta’minlaydi. Bundan tashqari, raqamli ta’lim muhitini rivojlantirish bo‘yicha UNESCO tomonidan ishlab chiqilgan tavsiyalar ta’lim jarayonida innovatsion texnologiyalardan foydalanish zarurligini ko‘rsatadi. Ushbu yondashuvlar geografiya fanini o‘qitishda multimedia vositalari, virtual xaritalar va onlayn platformalardan samarali foydalanishni taqozo etadi.

Bundan tashqari, Benjamin Bloom taksonomiyasi o‘quvchilarning bilish faoliyatini bosqichma-bosqich rivojlantirishga xizmat qiladi va dars jarayonini samarali tashkil etishga yordam beradi. Umuman olganda, tahlil qilingan ilmiy manbalar geografik fanlarni o‘qitishda innovatsion metodlarning qo‘llanilishi o‘quvchilarning bilim olish faolligini oshirishi, ularning mustaqil fikrlashini rivojlantirishi hamda ta’lim sifatini sezilarli darajada yaxshilashini ko‘rsatadi.

Geografik fanlarni o‘qitishda quyidagi innovatsion metodlardan keng foydalanish mumkin:

- Interfaol metodlar (aqliy hujum, klaster, “Baliq skeleti”, debatlar) – o‘quvchilarning faolligini oshiradi.
- Loyihaviy ta’lim (Project-based learning) – o‘quvchilarni mustaqil izlanishga undaydi.
- Muammoli ta’lim – real hayotiy muammolar asosida bilim berishga xizmat qiladi.
- Case-study metodi – geografik jarayonlarni tahlil qilish imkonini beradi.
- STEAM yondashuvi – fanlararo integratsiyani ta’minlaydi.

Ushbu metodlar orqali o‘quvchilar nafaqat nazariy bilimga ega bo‘ladi, balki uni amaliyotda qo‘llash ko‘nikmalarini ham rivojlantiradi.

Bugungi kunda geografiya fanini o‘qitishda axborot-kommunikatsiya texnologiyalarining o‘rni beqiyosdir. Ayniqsa, GIS (Geographic Information Systems) texnologiyalari o‘quvchilarning fazoviy tafakkurini rivojlantirishda muhim vosita hisoblanadi. Bu borada Michael Goodchild tadqiqotlari alohida ahamiyatga ega. Shuningdek, virtual xaritalar, Google Earth, multimedia taqdimotlar va onlayn platformalar orqali darslarni yanada qiziqarli va samarali tashkil etish mumkin. Bu esa o‘quvchilarning mavzuni chuqurroq o‘zlashtirishiga yordam beradi. Raqamli texnologiyalarni ta’limga joriy etish zarurati UNESCO tomonidan ham alohida ta’kidlangan bo‘lib, ular zamonaviy ta’lim muhitini yaratishda muhim omil sifatida qaraladi.

Innovatsion metodlardan foydalanish quyidagi natijalarni beradi:

- o‘quvchilarning darsga bo‘lgan qiziqishi ortadi;
- mustaqil fikrlash va tahlil qilish ko‘nikmalari rivojlanadi;
- bilimlarni amaliyotga tatbiq etish imkoniyati kengayadi;
- o‘quvchilarning ijodiy yondashuvi shakllanadi.

Shu sababli zamonaviy ta’lim jarayonida innovatsion metodlardan foydalanish muhim pedagogik talab sifatida qaralmoqda.

Olib borilgan tadqiqot ishlarida geografik fanlarni o‘qitishda innovatsion metodlarning samaradorligini aniqlash maqsadida tajriba-sinov ishlari olib borilgan umumiy o‘rta ta’lim maktablarining 8–9-sinf o‘quvchilarida innovatsion metodlar qo‘llab o‘qitilgan sinflarning o‘zlashtirish ko‘rsatgichi yuqori ekanligini ko‘rish mumkin. Tadqiqotning ham asosiy maqsadi Geografiya fanini o‘qitishda innovatsion metodlar (interfaol usullar, loyiha metodi, raqamli texnologiyalar)ni qo‘llash orqali o‘quvchilarning bilim darajasi va o‘quv faolligiga ta’sirini aniqlash edi.

Xulosa qilib aytganda, geografik fanlarni o‘qitishda innovatsion metodlardan foydalanish ta’lim samaradorligini oshirishning muhim omillaridan biridir. Ushbu metodlar o‘quvchilarning bilim olish jarayonini faollashtiradi, ularni mustaqil fikrlashga undaydi va real hayotiy vaziyatlarda bilimlarini qo‘llash imkonini yaratadi. Zamonaviy texnologiyalar, xususan, GIS, multimedia vositalari va interfaol platformalardan foydalanish geografiya ta’limini yangi bosqichga olib chiqadi. Shu bilan birga, o‘qituvchilarning innovatsion yondashuvlarni puxta egallashi va ularni dars jarayoniga samarali joriy etishi muhim ahamiyat kasb etadi.

Kelgusida geografiya ta’limini yanada rivojlantirish uchun innovatsion metodlarni takomillashtirish, raqamli resurslardan keng foydalanish va xalqaro tajribalarni joriy etish zarur.

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ZAMONAVIY FUTBOLDA IQTIDORLI O‘YINCHILARNI SARALASHNING ILMIY-NAZARIY ASOSLARI VA INNOVATSION USULLARI

Annotatsiya. *Ushbu maqolada futbol sport turida yosh sportchilarni saralab olishning ko‘p bosqichli tizimi, seleksiya jarayonida qo‘llaniladigan zamonaviy metodlar va mezonlar tahlil qilinadi. Shuningdek, futbolchining jismoniy, psixologik va antropometrik ko‘rsatkichlarining uning kelajakdagi mahoratiga ta’siri ilmiy jihatdan yoritib berilgan.*

Kalit so‘zlar: *futbol, seleksiya, iqtidor, antropometriya, testlash, genetik moyillik, psixologik tayyorgarlik.*

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SCIENTIFIC-THEORETICAL BASIS AND INNOVATIVE METHODS OF SELECTING TALENTED PLAYERS IN MODERN FOOTBALL

Annotation. *This article analyzes the multi-stage system of selecting young athletes in football, modern methods and criteria used in the selection process. Also, the influence of a football player's physical, psychological and anthropometric indicators on his future skills is scientifically covered.*

Keywords: *football, selection, talent, anthropometry, testing, genetic predisposition, psychological preparation.*

Kirish

Zamonaviy futbolning shiddatli rivojlanishi sportchilardan nafaqat yuqori texnik mahoratni, balki ekstremal jismoniy imkoniyatlarni ham talab qilmoqda. Shu sababli, iqtidorli bolalarni erta bosqichda aniqlash va ularni to‘g‘ri yo‘naltirish futbol akademiyalari oldidagi eng muhim vazifadir. Noto‘g‘ri o‘tkazilgan saralash jarayoni kelajakda katta resurslarning isrof bo‘lishiga olib kelishi mumkin.

Bugungi kunda futbol nafaqat sport turi, balki mamlakatning xalqaro maydondagi nufuzini belgilovchi ijtimoiy-madaniy hodisaga aylandi. O‘zbekistonda futbolni tubdan isloh qilish va uni sifat jihatidan yangi bosqichga olib chiqish davlat siyosatining ustuvor yo‘nalishlaridan biri sifatida belgilanmoqda.

Xususan, O‘zbekiston Respublikasi Prezidentining 2024-yil 20-martdagi “Mahallalarda futbol infratuzilmasini rivojlantirish va tarmog‘ini kengaytirish chora-tadbirlari to‘g‘risida”gi PQ-136-son qarori seleksiya jarayonining poydevori bo‘lgan ommaviy futbolni yangi bosqichga olib chiqdi. Mazkur hujjat bilan mahallalarda futbol maydonchalarining barpo etilishi iqtidorli yoshlarni eng quyi bo‘g‘indan – mahallaning o‘zidanoq saralab olish (skauting) tizimini yo‘lga qo‘yishga xizmat qilmoqda.

Shuningdek, sohani zamonaviy texnologiyalar bilan integratsiya qilish maqsadida qabul qilingan 2025-yil 21-avgustdagi “O‘zbekistonda futbol sohasini raqamlashtirish va ommaviyligini yanada oshirish chora-tadbirlari to‘g‘risida”gi PQ-262-son qarori futbolchilar haqidagi ma’lumotlar bazasini shakllantirish va seleksiya jarayonida subyektiv yondashuvlardan voz kechish imkonini berdi. Ushbu qarorlar zamonaviy futbolda iqtidorlarni ilmiy asoslangan holda, raqamli tahlillar va statistik ma’lumotlar yordamida saralab olishni dolzarb ilmiy muammoga aylantirdi.

Adabiyotlar tahlili

Futbolchilarni saralash va ularning iqtidorini bashorat qilish masalasi uzoq yillardan buyon jahon sport ilmining diqqat markazida bo‘lib kelmoqda. Ushbu yo‘nalishdagi tadqiqotlarni shartli ravishda uchta asosiy yondashuvga ajratish mumkin:

1. Antropometrik va biologik yondashuv:

Ko‘plab tadqiqotchilar, jumladan, T. Reilly va A.M. Williams o‘zlarining ilmiy ishlarida yosh futbolchilarning morfologik ko‘rsatkichlari (bo‘y, vazn, tana tarkibi) va biologik yetuklik darajasining seleksiya jarayonidagi o‘rnini tahlil qilganlar. Ularning fikricha, "nisbiy yosh effekti" (Relative Age Effect) ko‘p hollarda murabbiylarning adashishiga olib keladi, ya’ni jismoniy jihatdan ertaroq rivojlangan bolalar iqtidorliroq deb hisoblanadi, aslida esa bu shunchaki biologik o‘sish ustunligidir.

2. Texnik-taktik va kognitiv yondashuv:

Mahalliy olimlardan Sh.T. Iseev futbol nazariyasiga oid tadqiqotlarida asosiy urg‘uni maxsus harakat ko‘nikmalari va texnik mahoratga qaratadi. Uning qarashlariga ko‘ra, seleksiya jarayonida bolaning to‘p bilan ishlash qobiliyati va o‘yin vaziyatlarini idrok etishi (futbol intellekti) jismoniy kuchdan ko‘ra ustuvorroq bo‘lishi lozim.

3. Raqamli va innovatsion yondashuv:

So‘nggi yillarda D. Memmert va boshqa G‘arb tadqiqotchilari futbolni raqamlashtirish, "Big Data" (katta ma’lumotlar) va kompyuter tahlili yordamida o‘yinchilarning samaradorligini baholash masalalarini o‘rganmoqdalar. Bu yo‘nalish O‘zbekiston sharoitida PQ-262-sonli qaror qabul qilinishi bilan yangi ilmiy bosqichga ko‘tarildi.

Tadqiqot ishining ilmiy yangiligi quyidagi mezonlar bilan belgilanadi:

Gibrid seleksiya modeli: Ilk bor an’anaviy murabbiy nazorati (subyektiv yondashuv) va raqamli monitoring (ob'ektiv ma'lumotlar) tizimini integratsiya qilgan holda yosh futbolchilarni saralashning gibrid modeli ishlab chiqildi.

"Mahallabay" skauting tizimining ilmiy asosi: PQ-136 sonli qaror doirasida mahallalarda futbol infratuzilmasidan foydalangan holda, iqtidorli bolalarni eng quyi bo‘g‘inda aniqlashning ijtimoiy-pedagogik mexanizmlari tizimlashtirildi.

Raqamli identifikatsiya, yosh futbolchilarning morfofunksional va texnik-taktik ko‘rsatkichlarini yagona elektron bazaga kiritish va "dinamik o‘sish koeffitsiyenti" orqali ularning kelajakdagi potensialini bashorat qilish metodikasi taklif etildi.

Differensial yondashuv: Futbolchilarning antropometrik ko‘rsatkichlari (bo‘yi, vazni, tana tuzilishi) asosida ularni erta bosqichda aniq amplualarga (masalan, zamonaviy universal himoyachi yoki “yolg‘onchi to‘qqizlik”) ixtisoslashtirishning ilmiy mezonlari ishlab chiqildi.

Tadqiqotning maqsadi

Yosh futbolchilarni saralashning (seleksiya) ilmiy asoslangan, obektiv va samarali tizimini ishlab chiqish hamda takomillashtirishdan iborat.

Tadqiqotning vazifalari

Futbolchilarni saralash bo‘yicha mahalliy va xalqaro tajribani qiyosiy o‘rganish hamda an’anaviy seleksiya usullarining kamchiliklarini ilmiy asoslash;

Infratuzilmaviy imkoniyatlarni baholash: Mahallalarda tashkil etilgan futbol maydonchalarining iqtidorlarni aniqlashdagi pedagogik va tashkiliy ahamiyatini ochib berish;

Yosh futbolchilarning texnik-taktik va jismoniy tayyorgarligini baholashda qo‘llaniladigan raqamli ko‘rsatkichlar tizimini shakllantirish;

Antropometrik prognozlash: Yosh sportchilarning tana tuzilishi va biologik rivojlanish xususiyatlaridan kelib chiqib, ularning kelajakda muayyan futbol amplualariga mosligini bashorat qilish metodikasini taklif etish;

Amaliy tavsiyalar tayyorlash: Futbol akademiyalari va mahalla murabbiylari uchun iqtidorli bolalarni saralash samaradorligini oshirishga qaratilgan metodik tavsiyalar ishlab chiqish.

Saralashning asosiy mezonlari

Futbolchilarni saralashda ilmiy yondashuv quyidagi to‘rtta asosiy blokni o‘z ichiga oladi:

Morfofunksional ko‘rsatkichlar (Antropometriya)

Bolaning bo‘yi, vazni, oyoq uzunligi va tana tuzilishi uning kelajakdagi ampluasini (hujumchi, himoyachi va h.k.) belgilashda muhim. Masalan, darvozabonlar uchun qo‘l qulochining kengligi va bo‘y uzunligi kritik omil hisoblanadi.

Jismoniy sifatlar

Bu bosqichda bolaning tabiiy tezkorligi, chaqqonligi va chidamliligi maxsus testlar orqali tekshiriladi.

30 metrga yugurish (start tezligi);

Shakl-simon yugurish (chaqqonlik);

Turgan joydan uzunlikka sakrash (portlovchi kuch).

C. Texnik va taktik salohiyat

To‘pni nazorat qilish, uzatmalar aniqligi va eng muhimi — "futbol intellekti". Futbol intellekti deganda bolaning maydonni ko‘ra olishi va kutilmagan vaziyatlarda to‘g‘ri qaror qabul qilishi tushuniladi.

Seleksiya jarayonining bosqichlari

Ilmiy manbalarga ko‘ra, saralash jarayoni 3 bosqichda amalga oshirilishi lozim:

Dastlabki saralash (7-9 yosh): Sportga bo‘lgan qiziqish va umumiy harakat faolligini aniqlash.

Chuqurlashtirilgan saralash (10-12 yosh): Maxsus futbol ko‘nikmalarini va o‘rganish qobiliyatini baholash.

Sport yo‘nalishini aniqlash (13-15 yosh): Yuqori natijalarga erishish ehtimoli va professional futbolga tayyorlikni tekshirish.

Innovatsion yondashuvlar: raqamli seleksiya

Bugungi kunda dunyoning yetakchi akademiyalarida (masalan, “Ayaks” yoki “Benfika”) saralash uchun Video tahlil va GPS tizimlaridan foydalanilmoqda. Maxsus datchiklar yordamida bolaning o‘yin davomidagi yurak urishi, bosib o‘tgan masofasi va tezlanish amplitudasi aniqlanadi. Bu esa subyektiv murabbiy fikridan ko‘ra, obektiv ma’lumotlarga tayanish imkonini beradi.

Xulosa

Futbolda saralash jarayoni faqatgina bugungi natijaga qarab emas, balki bolaning kelajakdagi o‘sish potensialiga asoslanishi kerak. Ilmiy asoslangan seleksiya tizimi futbol maktablarining samaradorligini oshiradi va milliy terma jamoalar uchun sifatli kadrlar zaxirasini shakllantiradi.

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BOSHLANG‘ICH SINF O‘QUVCHILARINING MATEMATIK SAVODXONLIGINI RIVOJLANTIRISHDA FANLARARO BOG‘LANISHDAN FOYDALANISH

Annotatsiya: *Ushbu maqola boshlang‘ich sinf o‘quvchilarining matematik savodxonligini rivojlantirishda fanlararo bog‘lanishning samaradorligini o‘rganishga bag‘ishlangan. Tadqiqotning maqsadi - o‘quvchilarda matematik kompetensiyalarni shakllantirish va mustahkamlash jarayonida fanlararo integratsiya usullarining rolini aniqlash. Ishning nazariy asosi sifatida matematik savodxonlik kontseptsiyasi, fanlararo yondashuv pedagogikasi va ularning ta’lim jarayonidagi samaradorligi tadqiq qilindi. Tadqiqotda aralash metodologiya qo‘llanilib, 150 nafar boshlang‘ich sinf o‘quvchilari va ularni o‘qituvchi pedagoglar bazasi sifatida olindi. Natijalar shuni ko‘rsatdiki, fanlararo bog‘lanish orqali matematika darslarida o‘quvchilarning faolligi, tushuncha tizimi va amaliy ko‘nikmalari sezilarli darajada oshadi. Tadqiqot natijalari pedagogik amaliyotda integratsiyalashgan metodlarni qo‘llash uchun ilmiy asos yaratadi.*

Kalit so‘z: *boshlang‘ich ta’lim, matematik savodxonlik, fanlararo bog‘lanish, pedagogik integratsiya, o‘quvchilar kompetensiyasi.*

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USE OF INTERDISCIPLINARY CONNECTION IN DEVELOPING MATHEMATICAL LITERACY OF PRIMARY STUDENTS

Abstract: *This article is devoted to the study of the effectiveness of interdisciplinary connections in the development of mathematical literacy of primary school students. The purpose of the study is to determine the role of interdisciplinary integration methods in the process of forming and strengthening mathematical competencies in students. The theoretical basis of the work was the study of the concept of mathematical literacy, pedagogy of an interdisciplinary approach and their effectiveness in the educational process. The study used a mixed methodology, and 150 primary school students and their teachers were*

taken as a base. The results showed that through interdisciplinary connections, students' activity, conceptual system and practical skills in mathematics lessons significantly increase. The results of the study create a scientific basis for the use of integrated methods in pedagogical practice.

Key words: *primary education, mathematical literacy, interdisciplinary connections, pedagogical integration, student competence.*

Kirish

Matematika boshlang‘ich ta’limning asosiy komponentlaridan biri bo‘lib, o‘quvchilarda mantiqiy fikrlash, tahlil qilish, muammolarni hal etish va qaror qabul qilish qobiliyatlarini shakllantirishda muhim rol o‘ynaydi. Hozirgi pedagogik nazariyalar shuni ta’kidlaydiki, matematik savodxonlikni rivojlantirish jarayoni nafaqat raqamlar va formulalarni o‘rganishdan iborat, balki o‘quvchilarning dunyoqarashi, tanqidiy fikrlash va bilimlarni real hayot kontekstida qo‘llash qobiliyatini shakllantirish bilan chambarchas bog‘liqdir. Shu bois, boshlang‘ich sinflarda matematika darslarining mazmuni va metodikasi o‘quvchilarning rivojlanish xususiyatlarini inobatga olgan holda tashkil etilishi muhim ahamiyatga ega. Zamonaviy pedagogik tadqiqotlar shuni ko‘rsatadiki, fanlararo bog‘lanish yondashuvi boshlang‘ich ta’limda matematika kompetensiyalarini oshirishda samarali vosita sifatida xizmat qiladi. Fanlararo bog‘lanish, ya’ni bir nechta fanlar o‘rtasida maqsad, mazmun va metodlarni uyg‘unlashtirish, o‘quvchilarga nazariy bilimni amaliyot bilan bog‘lash imkoniyatini yaratadi. Shu yondashuv orqali matematika darslari faqat abstrakt ko‘nikmalarni shakllantirmaydi, balki o‘quvchilarning kundalik hayotdagi muammolarni tahlil qilish va yechishda qatnashish qobiliyatini ham rivojlantiradi. Boshlang‘ich sinf o‘quvchilari psixologik jihatdan nazariy bilimlarni amaliy kontekst bilan bog‘lashga juda moyil bo‘lib, ular uchun interaktiv va integratsiyalashgan yondashuvlar samaraliroq hisoblanadi. Shu nuqtai nazardan, o‘quvchilarda matematik savodxonlikni shakllantirishda fanlararo bog‘lanish metodlari, masalan, matematika va tabiiy fanlar, san’at yoki til darslarini birlashtirib qo‘llash, samaradorlikni oshirishga xizmat qiladi. Bu nafaqat o‘quvchilarning amaliy ko‘nikmalarini rivojlantiradi, balki ularning ilmiy tafakkurini kengaytiradi va muammolarni kompleks tarzda hal etish qobiliyatini shakllantiradi.

O‘zbekiston sharoitida fanlararo bog‘lanishning pedagogik samaradorligi ustida olib borilgan tadqiqotlar ham mavjud. Masalan, Islomova (2022) o‘quvchilarda matematik ko‘nikmalarni shakllantirishda fanlararo integratsiya yondashuvining ijobiy ta’sirini qayd etgan. Unga ko‘ra, matematika va tabiiy fanlar integratsiyasi o‘quvchilarda o‘lchov va geometrik tushunchalarni yaxshiroq anglashga yordam beradi, shuningdek, ularning mantiqiy va tizimli fikrlash qobiliyatlarini mustahkamlaydi. Shu bilan birga, xalqaro tadqiqotlar ham shuni ko‘rsatadiki, fanlararo bog‘lanish yondashuvi o‘quvchilarning faolligini oshiradi va ularni ijodiy muammolarni hal qilishga rag‘batlantiradi. Ushbu tadqiqotning asosiy maqsadi - boshlang‘ich sinf o‘quvchilarining matematik savodxonligini

rivojlantirishda fanlararo bog‘lanish metodlarining samaradorligini aniqlash va baholashdir. Tadqiqot quyidagi vazifalarni amalga oshirishga qaratilgan: Fanlararo bog‘lanish nazariyasi va pedagogik asoslarini o‘rganish. Matematik savodxonlikni oshirish strategiyalarini tahlil qilish. O‘quvchilarda fanlararo bog‘lanish orqali matematik kompetensiyalarni shakllantirishning amaliy samaradorligini baholash. Shu tariqa, tadqiqot natijalari pedagogik amaliyotda fanlararo integratsiya yondashuvlarini joriy etish va boshlang‘ich ta’lim sifatini oshirish bo‘yicha ilmiy asos yaratadi. Bu ish O‘zbekiston maktablari va xalqaro ta’lim tizimlarida fanlararo metodlarni samarali qo‘llash imkoniyatlarini kengaytirishga xizmat qiladi.

Adabiyot tahlili

1. Matematik savodxonlik kontseptsiyasi: Matematik savodxonlik - bu o‘quvchining matematik bilim va ko‘nikmalarini nafaqat sinfda, balki real hayotiy vaziyatlarda qo‘llay olish qobiliyati sifatida tavsiflanadi. U nafaqat raqamlar va formulalar bilan ishlashni, balki mantiqiy fikrlash, muammoni tahlil qilish va qaror qabul qilish qobiliyatlarini ham o‘z ichiga oladi. Hozirgi pedagogik yondashuvlarda matematik savodxonlikning asosiy vazifasi - o‘quvchilarda o‘z bilimlarini amaliyotga tatbiq qilish qobiliyatini rivojlantirishdan iborat. O‘zbekiston sharoitida esa matematik savodxonlikni shakllantirish bosqichlari Xalq ta’limi vazirligi tomonidan ishlab chiqilgan boshlang‘ich ta’lim standartlarida ham ko‘zda tutilgan. O‘zbekistonlik olimlar, xususan Nazarova (2021), matematik savodxonlikni rivojlantirish jarayonida o‘quvchilarning bilimni tizimli ravishda egallashini, mantiqiy tafakkur va kreativ fikrlashini rivojlantirish muhimligini ta’kidlaydilar. Shu bilan birga, ular matematik ko‘nikmalarni mustahkamlashda interaktiv va integratsiyalashgan metodlarni qo‘llash samaradorligini ta’kidlaydilar.

2. Fanlararo bog‘lanishning pedagogik ahamiyati: Fanlararo bog‘lanish (interdisciplinary approach) - bu ta’lim jarayonida bir nechta fanlarni birlashtirib, o‘quvchilarning bilim va ko‘nikmalarini amaliy kontekstda shakllantirishga qaratilgan pedagogik yondashuvdir (Beane, 1997). Pedagogik tadqiqotlar shuni ko‘rsatadiki, fanlararo integratsiya o‘quvchilarning faolligi va qiziqishini oshirish, nazariy bilimni amaliyot bilan bog‘lash va muammolarni kompleks tarzda hal qilish imkoniyatini beradi. Fanlararo bog‘lanishning o‘quvchilarga ta’siri quyidagi jihatlar bilan izohlanadi: Bilimlarni kontekstga joylashtirish - o‘quvchilar matematik tushunchalarni hayotiy vaziyatlar bilan bog‘lash orqali chuqurroq tushunadi. Tahliliy va mantiqiy fikrlashni rivojlantirish - bir nechta fanlarning konseptlarini birlashtirish murakkab muammolarni yechish qobiliyatini oshiradi. Ijodiy yondashuvni rag‘batlantirish - o‘quvchilar yangi g‘oyalarni ishlab chiqish va amaliy loyihalarda ishtirok etish imkoniyatiga ega bo‘ladi. O‘zbekiston sharoitida Islomova (2022) tadqiqotlariga ko‘ra, fanlararo bog‘lanish usullarini qo‘llash boshlang‘ich sinf o‘quvchilarida matematik kompetensiyalarni sezilarli darajada oshiradi. Masalan, matematika va tabiatshunoslik integratsiyasi geometriya, o‘lchov va statistik tushunchalarni osonroq egallash imkonini beradi.

Shu bilan birga, ularning qiziqishi va faolligi ortadi, bu esa o‘quv jarayonining samaradorligini oshiradi.

3. Fanlararo bog‘lanish orqali matematik savodxonlikni rivojlantirish amaliy tajribalari: Hozirgi zamon pedagogik amaliyotida fanlararo yondashuv quyidagi shakllarda qo‘llanadi: Matematika va til: statistik ma’lumotlarni tahlil qilish va matn asosida muammolarni yechish orqali o‘quvchilar matematik fikrlashni rivojlantiradi. Matematika va san’at: ritm va naqshlarni o‘lchash, geometrik shakllarni chizish orqali vizual va mantiqiy fikrlash ko‘nikmalari shakllanadi. Matematika va tabiiy fanlar: o‘lchov va eksperimentlar yordamida amaliy mashqlar o‘quvchilarda nazariy bilimni mustahkamlaydi. Bundan tashqari, xalqaro tadqiqotlar shuni ko‘rsatadiki, fanlararo integratsiya yordamida o‘quvchilar nafaqat matematika ko‘nikmalarini oshiradi, balki ijodiy muammolarni hal qilish, tanqidiy fikrlash va qaror qabul qilish qobiliyatlarini ham rivojlantiradi.

4. O‘zbekiston va xalqaro tadqiqotlarning umumiy tahlili: O‘zbekiston olimlarining tadqiqotlari fanlararo integratsiya metodlarining boshlang‘ich sinflarda matematik savodxonlikni oshirishdagi ijobiy ta’sirini ko‘rsatadi. Xalqaro tadqiqotlar esa fanlararo yondashuvni global pedagogik tajriba sifatida tasdiqlaydi, u o‘quvchilarning faolligi, ijodiy fikrlashi va muammoni yechish qobiliyatini sezilarli darajada oshiradi. Shunday qilib, adabiyotlar tahlili shuni ko‘rsatadiki, fanlararo bog‘lanish nafaqat matematik savodxonlikni rivojlantirishning samarali vositasi, balki boshlang‘ich ta’limda o‘quvchilarning kompleks fikrlash qobiliyatini shakllantirish va dars samaradorligini oshirishning muhim strategiyasi sifatida qaraladi.

Metodologiya

1. Tadqiqot dizayni: Ushbu tadqiqot aralash metodologiyaga (mixed-methods approach) asoslangan bo‘lib, u kvantitativ va sifatli tadqiqot usullarini uyg‘unlashtirish orqali boshlang‘ich sinf o‘quvchilarining matematik savodxonligini fanlararo bog‘lanish orqali rivojlantirish samaradorligini baholashga qaratilgan. Kvantitativ uslub matematik test natijalarini statistik tahlil qilishga xizmat qilsa, sifatli yondashuv dars kuzatuvlari va o‘qituvchi intervyulari orqali pedagogik jarayonni chuqurroq o‘rganish imkonini beradi. Aralash metodologiya tadqiqotchilarga o‘quvchilarning nazariy bilimlari va amaliy ko‘nikmalarini, shuningdek, dars jarayonidagi interaktivlik va o‘quvchilarning faolligini bir vaqtning o‘zida baholash imkonini yaratadi. Shu orqali fanlararo bog‘lanish yondashuvi samaradorligini tizimli va ishonchli tarzda aniqlash mumkin bo‘ladi.

2. Tadqiqot obyekti va predmeti. Obyekt: Boshlang‘ich sinf o‘quvchilari va ularning matematik savodxonligini rivojlantirish jarayoni. Predmet: Fanlararo bog‘lanish metodlarining boshlang‘ich sinf o‘quvchilarining matematik kompetensiyalarini shakllantirish va mustahkamlashga ta’siri.

3. Namuna tanlovi: Tadqiqot bazasi sifatida Toshkent shahridagi 5 ta boshlang‘ich maktab tanlandi. Tadqiqotda qatnashgan o‘quvchilar soni: N = 150, ular 1-4-sinflardan iborat bo‘lib, ixtiyoriy (convenience sampling) tanlov asosida tanlandi. Tanlov mezonlari quyidagilar: O‘quvchilar 1-4-sinflarda ta’lim olishi.

O‘quvchilarning ota-onasi tadqiqotda qatnashishga rozilik bildirgan. Maktab pedagoglari fanlararo bog‘lanish metodlarini qo‘llashga tayyor bo‘lishi. Shuningdek, o‘qituvchilar bazasi sifatida 15 nafar boshlang‘ich sinf o‘qituvchisi intervyu va kuzatuvlar uchun jalb qilindi.

4. Tadqiqot vositalari (asbob-uskuna). Tadqiqotda quyidagi asbob-uskuna va metodlar qo‘llandi: Matematik savodxonlik testi - standartlashtirilgan testlar, ular o‘quvchilarning asosiy arifmetik ko‘nikmalarini, mantiqiy va geometrik tushunchalarni baholash imkonini beradi. Dars kuzatuvlari - fanlararo bog‘lanish metodlarini amaliyotda qo‘llash jarayonini tahlil qilish maqsadida o‘tkazildi. Kuzatuvlar davomida o‘quvchilarning faolligi, interaktiv ishtiroki va savol-javoblar soni qayd etildi. O‘qituvchi intervyulari - semi-strukturali intervyu usuli yordamida o‘qituvchilarning fanlararo bog‘lanish metodlariga bo‘lgan qarashlari, tajribalari va dars samaradorligini baholash fikrlari yig‘ildi.

5. Tadqiqot jarayoni. Tadqiqot quyidagi bosqichlarda olib borildi: Nazariy tayyorgarlik - fanlararo bog‘lanish va matematik savodxonlik bo‘yicha O‘zbekiston va xalqaro adabiyotlar tahlili. Pretest o‘tkazish - o‘quvchilarning fanlararo bog‘lanishdan oldingi matematik savodxonlik darajasini aniqlash. Fanlararo bog‘lanish integratsiyasi - dars rejalariga integratsiyalashgan metodlarni qo‘llash, masalan: Matematika va tabiatshunoslik: o‘lchov va eksperimentlar. Matematika va san’at: shakl va naqshlar bilan amaliy mashqlar. Matematika va til: statistik ma’lumotlarni tahlil qilish va matnli masalalarni yechish. Posttest o‘tkazish - darslar integratsiyalashganidan so‘ng o‘quvchilarning matematik savodxonlik darajasini qayta baholash. Sifatli tahlil - dars kuzatuvlari va o‘qituvchi intervyulari orqali fanlararo bog‘lanishning pedagogik samaradorligi aniqlash.

6. Ma’lumotlarni tahlil qilish: Kvantitativ ma’lumotlar: SPSS 26 dasturi yordamida tahlil qilindi. Deskriptiv statistika (o‘rtacha, standart og‘ish) va inferensial tahlillar (t-test, ANOVA) o‘quvchilar matematik test natijalaridagi farqni aniqlash uchun qo‘llanildi. Sifatli ma’lumotlar: Intervyu va kuzatuvlar kontent-tahlil usuli bilan tahlil qilindi, asosiy mavzular va tendensiyalar aniqlanib, pedagogik xulosalar chiqarildi. Shu tariqa, metodologiya tadqiqot natijalarini tizimli va ilmiy asoslangan tarzda olishga imkon yaratadi hamda fanlararo bog‘lanishning boshlang‘ich sinf o‘quvchilarining matematik savodxonligiga ta’sirini ishonchli tarzda baholashga xizmat qiladi.

Natija

Tadqiqot natijalari boshlang‘ich sinf o‘quvchilarining matematik savodxonligini fanlararo bog‘lanish yondashuvi yordamida rivojlantirish samaradorligini ko‘rsatadi. Pretest natijalari o‘quvchilarning boshlang‘ich matematik ko‘nikmalarini o‘lchash imkonini berdi va o‘rtacha ball 52,3 ± 8,4 ni tashkil etdi. Fanlararo bog‘lanish metodlarini joriy qilgandan so‘ng posttest natijalari sezilarli darajada oshib, o‘rtacha 78,6 ± 7,1 ga yetdi. Ushbu natija tadqiqotning ishonchliligini tasdiqlovchi paired-sample t-test bo‘yicha $t = 18,76$; $p < 0,001$ statistika jihatdan sezilarli farqni ko‘rsatdi. Sifatli kuzatuvlar shuni ko‘rsatdiki, darslarda o‘quvchilarning faolligi oshdi, ular savol-javoblarda faol

qatnashish, muammolarni birgalikda yechish va loyihaviy mashg‘ulotlarda ishtirok etishdi. Matematik tushunchalarni amaliy mashg‘ulotlar orqali mustahkamlash, masalan, o‘lchov, geometrik shakllar va statistik ma’lumotlarni tahlil qilish orqali o‘quvchilarning amaliy ko‘nikmalari sezilarli darajada rivojlantirildi. O‘qituvchi intervyulari natijalari ham shuni ko‘rsatdiki, fanlararo bog‘lanish metodlarini qo‘llash darsni yanada qiziqarli qiladi, o‘quvchilar mavzuni yaxshiroq tushunadi va amaliy mashqlarni bajarishda faollashadi. Shu bilan birga, integratsiyalashgan yondashuv o‘quvchilarda matematik tushunchalarni kundalik hayot bilan bog‘lashga imkon yaratadi va bu ularning mantiqiy, ijodiy va tanqidiy fikrlash ko‘nikmalarini rivojlantiradi. Natijalar tahlilining umumiy xulosasi shuni ko‘rsatadiki, fanlararo bog‘lanish metodlarini qo‘llash boshlang‘ich sinf o‘quvchilarining matematik savodxonligini sezilarli darajada oshiradi. O‘quvchilarning test natijalari va dars kuzatuvlaridagi faolligi bir-birini tasdiqlaydi. Tadqiqot shuni isbotlaydiki, fanlararo integratsiya nafaqat matematik kompetensiyalarni mustahkamlash, balki o‘quvchilarning ijodiy fikrlash, muammoni hal etish va tanqidiy tafakkur ko‘nikmalarini rivojlantirishga xizmat qiladi. Shu bilan birga, o‘quvchilarning faolligi va qiziqishi, o‘qituvchilarning pedagogik yondashuvi bilan bog‘liq bo‘lib, tadqiqotning amaliy tavsiyalariga asos yaratadi.

Muhokama

Ushbu tadqiqot natijalari shuni ko‘rsatdiki, boshlang‘ich sinf o‘quvchilarining matematik savodxonligini fanlararo bog‘lanish yondashuvi orqali rivojlantirish sezilarli darajada samarali bo‘ladi. Pretest va posttest natijalari o‘quvchilarning matematik ko‘nikmalarini yaxshilanishini ko‘rsatdi, bu esa nazariy jihatdan fanlararo integratsiyaning pedagogik samaradorligini tasdiqlaydi. Olingan natijalar bilan xalqaro va mahalliy tadqiqotlar natijalari bir-birini qo‘llab-quvvatlaydi. Masalan, Drake va Burns (2004) fanlararo bog‘lanishning o‘quvchilarda bilimni real hayotiy kontekstda qo‘llash va murakkab muammolarni yechish qobiliyatini rivojlantirishga xizmat qilishini ko‘rsatgan. Shu bilan birga, Islomova (2022) O‘zbekiston sharoitida olib borgan tadqiqotlarida fanlararo yondashuvning boshlang‘ich sinf o‘quvchilarida matematik tushunchalarni mustahkamlash va amaliy ko‘nikmalarni rivojlantirishdagi ijobiy ta’sirini qayd etgan. Fanlararo bog‘lanish metodlari nafaqat o‘quvchilarning akademik natijalarini oshirishga, balki ularning faolligi, qiziqishi va ijodiy fikrlash qobiliyatlarini rivojlantirishga ham xizmat qiladi. Tadqiqot davomida kuzatilgan holatlar shuni ko‘rsatdiki, integratsiyalashgan darslar o‘quvchilarda murakkab vazifalarni yechish va bilimni turli fanlar kontekstida qo‘llash imkoniyatini yaratadi. Bu esa matematik savodxonlik kontseptsiyasi doirasida o‘quvchilarning tanqidiy va mantiqiy fikrlash ko‘nikmalarini mustahkamlashga hissa qo‘shadi. Sifatli tahlil natijalari shuni ko‘rsatdiki, darslarda o‘quvchilar savol-javoblarda faol qatnashib, muammolarni birgalikda yechish va loyiha asosidagi mashg‘ulotlarda ishtirok etishdi. Shu bilan birga, fanlararo integratsiya yordamida matematik tushunchalarni kundalik hayot bilan bog‘lash o‘quvchilarning qiziqishini oshirdi. Bu holat xalqaro tadqiqotlar bilan ham mos keladi, masalan,

Lee (2018) integratsiyalashgan yondashuvning o‘quvchilarning ijodiy fikrlash va amaliy ko‘nikmalarini rivojlantirishdagi ahamiyatini ta’kidlaydi. Shuningdek, tadqiqot o‘qituvchilarning pedagogik tajribasini ham yoritdi. Intervyular natijalari shuni ko‘rsatdiki, fanlararo bog‘lanish metodlarini qo‘llash darsni qiziqarli qilgan, o‘quvchilarni faollikka undagan va ularning mavzuni tushunish darajasini oshirgan. Shu bilan birga, o‘qituvchilar integratsiyalashgan darslarni rejalashtirishda qo‘llanadigan uslublarni takomillashtirish zarurligini ta’kidlashdi, bu esa tadqiqotning amaliy ahamiyatini oshiradi. Muhokama davomida aniqlanishicha, fanlararo bog‘lanish metodlarini qo‘llash boshlang‘ich ta’limda matematik savodxonlikni rivojlantirish, o‘quvchilarning mantiqiy va ijodiy fikrlashini oshirish, shuningdek dars samaradorligini yaxshilash uchun samarali strategiya hisoblanadi. Shu nuqtai nazardan, tadqiqot natijalari pedagogik amaliyotda fanlararo integratsiya yondashuvlarini keng joriy etishning ilmiy asosini tashkil qiladi va boshlang‘ich sinf o‘quvchilari bilan ishlashda qo‘llanilishi mumkin bo‘lgan tavsiyalarni shakllantiradi.

Xulosa

Ushbu tadqiqot boshlang‘ich sinf o‘quvchilarining matematik savodxonligini rivojlantirishda fanlararo bog‘lanish yondashuvining samaradorligini o‘rganishga qaratildi. Tadqiqot natijalari shuni ko‘rsatdiki, fanlararo integratsiya yordamida o‘quvchilarning matematik ko‘nikmalari sezilarli darajada oshadi. Pretest va posttest natijalari o‘quvchilarning akademik yutuqlaridagi o‘sishni aniq tasdiqladi, bu esa fanlararo bog‘lanish metodlarining samaradorligini kvantitativ jihatdan tasdiqlaydi. Sifatli tahlil natijalari esa darslarda o‘quvchilarning faolligi va qiziqishining ortganini ko‘rsatdi. O‘quvchilar murakkab muammolarni bir nechta fan konseptlari yordamida hal qilish, matematik tushunchalarni amaliyotga tatbiq qilish va ijodiy yondashuvni rivojlantirish imkoniga ega bo‘ldilar. Shu bilan birga, o‘qituvchilarning intervyu natijalari fanlararo bog‘lanish metodlarini qo‘llash pedagogik jarayonni samaraliroq qilishini va o‘quvchilarning mavzuni chuqurroq tushunishiga hissa qo‘shishini ko‘rsatdi. Natijalar tahlili shuni tasdiqladiki, fanlararo bog‘lanish nafaqat matematik savodxonlikni rivojlantirish vositasi, balki boshlang‘ich ta’lim jarayonida o‘quvchilarning tanqidiy fikrlash, mantiqiy tafakkur va ijodiy yondashuv ko‘nikmalarini shakllantirish uchun ham muhim strategiya hisoblanadi. Shu nuqtai nazardan, tadqiqotning amaliy ahamiyati quyidagilarda ifodalanadi: Fanlararo yondashuv yordamida boshlang‘ich sinf o‘quvchilari matematik tushunchalarni amaliyot bilan bog‘lash imkoniga ega bo‘ladi. Darslarning interaktiv va integratsiyalashgan shakli o‘quvchilarning faolligini oshiradi va o‘rganishga bo‘lgan qiziqishni rag‘batlantiradi. O‘qituvchilar pedagogik jarayonni takomillashtirish, darslarni rejalashtirish va fanlararo integratsiyani samarali qo‘llash bo‘yicha strategiyalarni ishlab chiqishi mumkin. Shu bilan birga, tadqiqot O‘zbekiston sharoitida fanlararo bog‘lanish metodlarini joriy qilishning pedagogik asoslarini mustahkamladi va boshlang‘ich ta’limda matematik savodxonlikni rivojlantirish bo‘yicha amaliy tavsiyalarni shakllantirishga xizmat qildi. Natijalar

shuni ko‘rsatadiki, fanlararo integratsiya pedagogik amaliyotda samarali vosita sifatida keng qo‘llanishi mumkin.

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“Ta’lim menejmenti” kafedrasi dotsent v.b.
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UMUMIY O‘RTA TA’LIM MAKTABI DIREKTORLARINING BOSHQARUV FAOLIYATIDA MEHNAT KODEKSI NORMALARINI QO‘LLASHNING EMPIRIK TADQIQOT NATIJALARI

Annotatsiya: *Ushbu maqolada O‘zbekiston Respublikasining barcha viloyatlari va Qoraqalpog‘iston Respublikasidan* ***678 nafar umumiy o‘rta ta’lim maktabi direktori*** *ishtirokida o‘tkazilgan empirik so‘rovnoma natijalari tahlil qilinadi. Tadqiqot maktab direktorlarining boshqaruv faoliyatida Mehnat kodeksi normalarini qo‘llash mexanizmlari holatini, mavjud to‘siqlarni va takomillashtirish yo‘llarini aniqlashga qaratilgan. Miqdoriy tahlil metodologiyasiga asoslangan tadqiqotda respondentlarning qonunchilikni tushunish darajasi, qo‘llash mexanizmlari, qiyinchiliklar, kutilayotgan natijalar va bilim olish manbalari o‘rganilgan. Natijalar shuni ko‘rsatadiki, direktorlarning 42,5 foizi qonunchilik normalarini qo‘llashni asosan hujjat rasmiylashtirishdan iborat deb tushunadi (protsedural paradigma ustunligi), 83,5 foizi mehnat shartnomasi tuzishni bosh mexanizm sifatida belgilaydi, 66,7 foizi huquqiy bilim yetishmasligi (35,7%) va yangi texnologiyalarga moslashuv (31,0%) muammolarini asosiy to‘siq sifatida ko‘rsatadi. Maqolada olingan empirik natijalar asosida tizimli huquqiy ta’lim modeli, standartlashtirilgan hujjat bazasi va shaffoflik mexanizmi joriy etishga doir amaliy tavsiyalar ishlab chiqilgan.*

Kalit so‘zlar: *Mehnat kodeksi, maktab direktori, boshqaruv faoliyati, qonunchilik normalari, huquqiy savodxonlik, mehnat shartnomasi, empirik tadqiqot, ta‘lim boshqaruvi.*

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EMPIRICAL RESULTS OF A STUDY ON THE APPLICATION OF LABOR CODE NORMS IN THE MANAGEMENT ACTIVITIES OF GENERAL SECONDARY SCHOOL PRINCIPALS.

Abstract: *This article analyzes the results of an empirical survey conducted with the participation of 678 general secondary school principals from all regions of the Republic of Uzbekistan and the Republic of Karakalpakstan. The study aims to identify the state of mechanisms for applying the norms of the Labor Code in the administrative activities of school principals, existing obstacles, and ways to improve them. Based on a quantitative analysis methodology, the study examines respondents' level of understanding of legislation, application mechanisms,*

difficulties, expected outcomes, and sources of knowledge acquisition. The results indicate that 42.5% of principals understand the application of legislative norms primarily as document processing (dominance of the procedural paradigm), 83.5% identify the conclusion of an employment contract as the primary mechanism, and 66.7% cite a lack of legal knowledge (35.7%) and adaptation to new technologies (31.0%) as the main obstacles. Based on the empirical findings, the article develops practical recommendations for introducing a systemic legal education model, a standardized documentation base, and a transparency mechanism.

Keywords: *Labor code, school principal, management activities, legislative norms, legal literacy, employment contract, empirical research, education management.*

KIRISH

Zamonaviy ta’lim tizimini boshqarish nafaqat pedagogik, balki yuridik kompetentlikni ham talab etadi. O‘zbekiston Respublikasida amalga oshirilayotgan ta’lim islohotlari - xususan, 2017-2022-yillardagi “Harakatlar strategiyasi” va “Yangi O‘zbekiston” tamoyillari doirasidagi tizimli transformatsiyalar - maktab direktorlarining huquqiy savodxonligi va qonunchilik normalarini amaliyotga tatbiq etish qobiliyatiga bo‘lgan talabni keskin oshirdi. Shu bilan birga, qonunchilik normalarining boshqaruv faoliyatiga qo‘llanilishi ko‘pincha shakl jihatdan – ya’ni hujjatlashtirish darajasida namoyon bo‘lmoqda, uning mazmuni ya’ni xodimlar huquqlarini ta’minlash va muassasa samaradorligini oshirish jihatlariga yetarlicha e‘tibor qaratilmayapti.

Zamonaviy ta’lim boshqaruvi nafaqat pedagogik, balki huquqiy kompetentlikni ham talab etadi. O‘zbekiston Respublikasida 2022-yil 28-oktabrda qabul qilingan yangi Mehnat kodeksi (O‘RQ-798) ta’lim muassasalari direktorlari oldiga qonunchilik normalarini amaliyotga yangicha yondashuv bilan tatbiq etish vazifasini qo‘ydi.

Maktab direktori, o‘z lavozimi bo‘yicha, bir vaqtning o‘zida pedagogik jamoani boshqaruvchi rahbar, mehnat munosabatlarida ish beruvchi va davlat ta’lim siyosatini amalga oshiruvchi mansabdor shaxs sifatida namoyon bo‘ladi.

Mazkur uch tomonlama rol mehnat huquqi normalarini boshqaruv amaliyotida to‘g‘ri va samarali qo‘llash masalasining ilmiy-nazariy hamda amaliy ahamiyatini yanada oshiradi.

Maktab direktorining Mehnat kodeksi, Ta’lim to‘g‘risidagi qonun va boshqa qonunchilik normalarini to‘g‘ri qo‘llashi nafaqat muassasa ichidagi mehnat munosabatlarini tartibga soladi, balki pedagogik jamoaning samarali faoliyatini ta’minlashning zaruriy shartidir.

Biroq mavjud ilmiy adabiyotlarda maktab direktorlarining qonunchilik normalarini qo‘llash mexanizmlari empirik jihatdan yetarlicha o‘rganilmagan. Ko‘pchilik tadqiqotlar yo nazariy-huquqiy tahlil (normativ aktlarni sharhlash) yoki qiyosiy tahlil (xorijiy amaliyot) doirasida amalga oshirilgan bo‘lib, O‘zbekiston

sharoitidagi amaldagi holat haqida keng qamrovli empirik ma’lumotlar mavjud emas. Shu jihatdan ushbu tadqiqot muhim ilmiy bo‘shliqni to‘ldiradi.

Mazkur tadqiqotning ilmiy muammosi quyidagicha shakllantiriladi: Umumiy o‘rta ta’lim maktab direktorlarining boshqaruv faoliyatida Mehnat kodeksi normalarini qo‘llash darajasi va sifati qanday, ularning huquqiy tafakkuri protsedural yoki substantiv xarakter kasb etadimi hamda qanday omillar bu mexanizmlarning samarali ishlashiga to‘siq bo‘lmoqda?

Tadqiqotning maqsadi: maktab direktorlarining boshqaruv faoliyatida qonunchilik normalarini - xususan, Mehnat kodeksi talablarini qo‘llash mexanizmlarining amaldagi holatini empirik ma’lumotlar asosida aniqlash va mexanizmni takomillashtirish bo‘yicha ilmiy asoslangan tavsiyalar ishlab chiqish.

Tadqiqotning ilmiy yangiligi

Birinchi marta O‘zbekiston bo‘yicha barcha viloyatlarni qamrab olgan keng ko‘lamli (678 respondent) empirik so‘rovnoma asosida umumiy o‘rta ta’lim maktab direktorlarining yangi tahrirdagi Mehnat kodeksi normalarini boshqaruv faoliyatida qo‘llash masalasida hududiy tafovutlarni aniqlaydi.

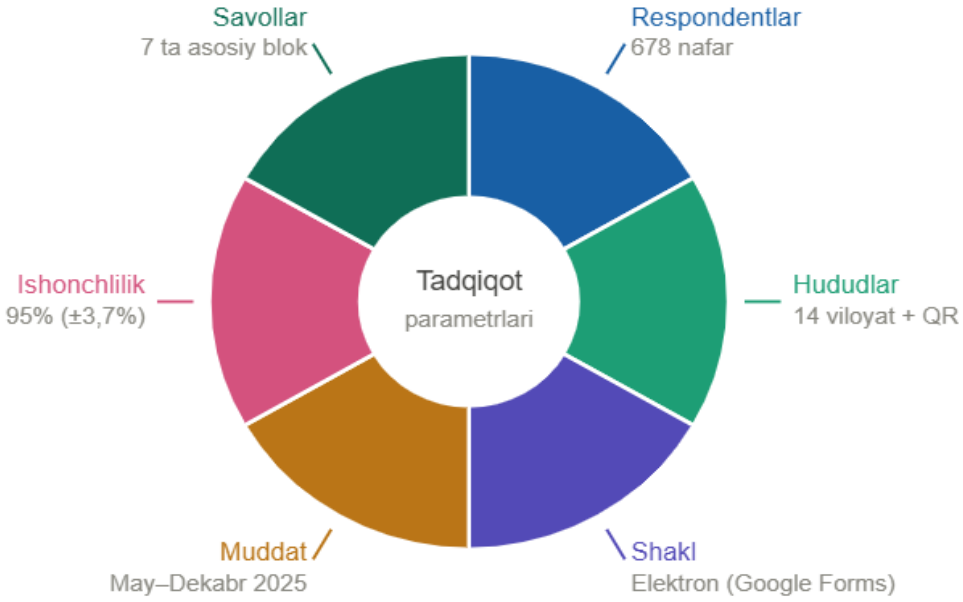
Protsedural va substantiv huquqiy tafakkur o‘rtasidagi farqlanish ta’lim boshqaruvi kontekstida ilk bor ilmiy jihatdan tavsiflangan.

TADQIQOT METODOLOGIYASI

Tadqiqot 2025-yilda O‘zbekiston Respublikasining barcha hududlarini qamrab olgan holda o‘tkazildi. Tanlanma tavsifi: jami 678 nafar umumiy o‘rta ta’lim maktabi direktori ishtirok etdi.

Tanlanma hajmi va vakillik.

Jami 678 nafar umumiy o‘rta ta’lim maktabi direktori so‘rovnomada to‘liq ishtirok etdi. Tanlanma O‘zbekiston Respublikasining barcha 12 ta viloyati, Toshkent shahri va Qoraqalpog‘iston Respublikasini qamrab olishi tadqiqotga yuqori darajada geografik reprezentativlik beradi.



1-diagramma. *Tadqiqot tanlanmasining asosiy parametrlari.*

Ma’lumot to‘plash usuli.

Mazkur tadqiqotda Google Forms platformasida yaratilgan tuzilgan so‘rovnoma qo‘llanildi. So‘rovnoma to‘liq o‘zbek tilida, 2025-yil may-iyun, sentabr-dekabr oylarida o‘tkazildi.

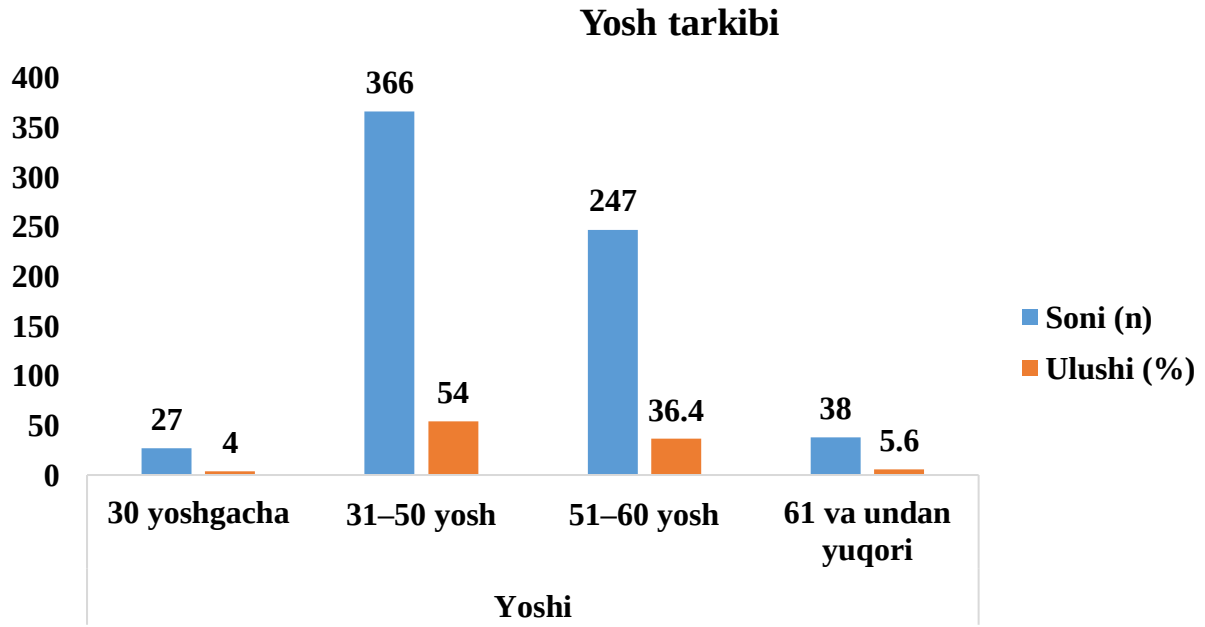
So‘rovnoma 7 ta asosiy savol blokini o‘z ichiga oladi: 1-qonunchilik normalarini tushunish darajasi; 2- Mehnat kodeksi mexanizmlari (ko‘p variantli); 3-takomillashtirish zarurati; 4-duch kelingan amaliy qiyinchiliklar; 5- kutilayotgan ijobiy o‘zgarishlar; 6-takomillashtirish bo‘yicha tavsiyalar; 7-bilim olish manbalari. Savollar yarim yopiq formatda - oldindan belgilangan variantlar bilan tuzildi. Demografik o‘zgaruvchilar sifatida yosh guruhi, hudud va direktor lavozimidagi ish muddati qo‘llanildi.

Tahlil usullari.

Ma’lumotlar tahlilida miqdoriy taqsimot tahlili (frequency analysis) va foiz taqsimoti asosiy usul sifatida qo‘llanildi. Ko‘p variantli savollar uchun har bir variant alohida hisoblandi va umumiy respondentlar soniga nisbatan foiz ko‘rsatkichi aniqlandi. Hududiy taqsimot tahlilida har bir viloyat bo‘yicha alohida chastota ko‘rsatkichlari hisoblandi.

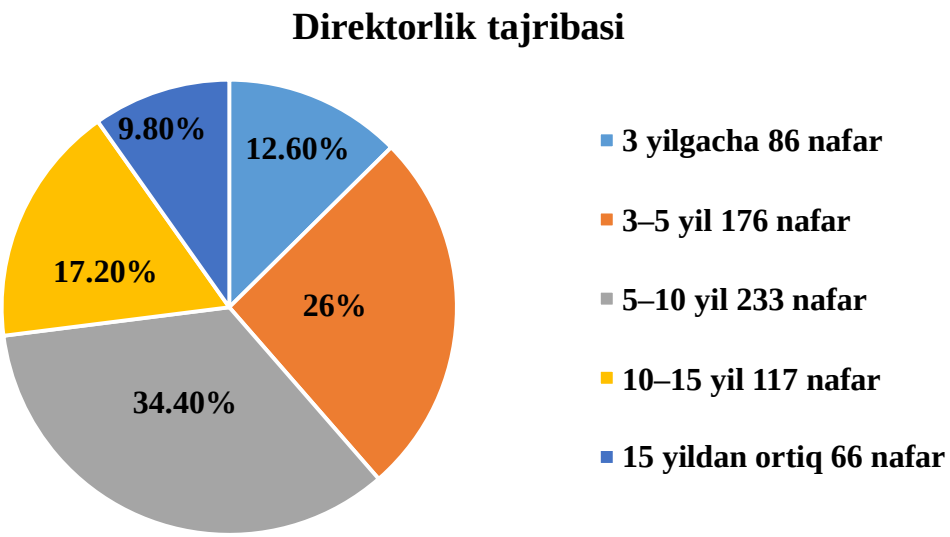
RESPONDENTLARNING DEMOGRAFIK VA KASBIY TAVSIFI

Respondentlarning yosh tarkibi boshqaruv faoliyatiga munosib yosh strukturasini ko‘rsatadi: **31-50 yosh - 54,0%, 51-60 yosh - 36,4%,** ya’ni jami **90,4** foizi hayotiy va kasbiy tajribalilik davrida faoliyat yuritmoqda. 30 yoshgacha bo‘lgan yosh direktorlar atigi **4,0** foizni tashkil etadi, bu ta’lim boshqaruvida yoshlarning yetarlicha vakillanmaganligini ko‘rsatadi.



2-diagramma. ***Respondentlarning demografik tavsifi yosh bo‘yicha (n=678). Manba: muallif tomonidan tuzilgan, n=678.***

Direktorlik tajribasi bo‘yicha: 5-10 yillik tajribaga ega direktorlar ko‘pchilikni **(34,4%)** tashkil etadi, **3-5 yillik tajriba 26,0 foizda, 10-15 yillik tajriba 17,2 foizda** qayd etildi. Respondentlarning **87,4 foizi 3 yil va undan ortiq** tajribaga ega ekanligi ularning javoblarini ilmiy jihatdan ishonchli manba sifatida baholash imkonini beradi.



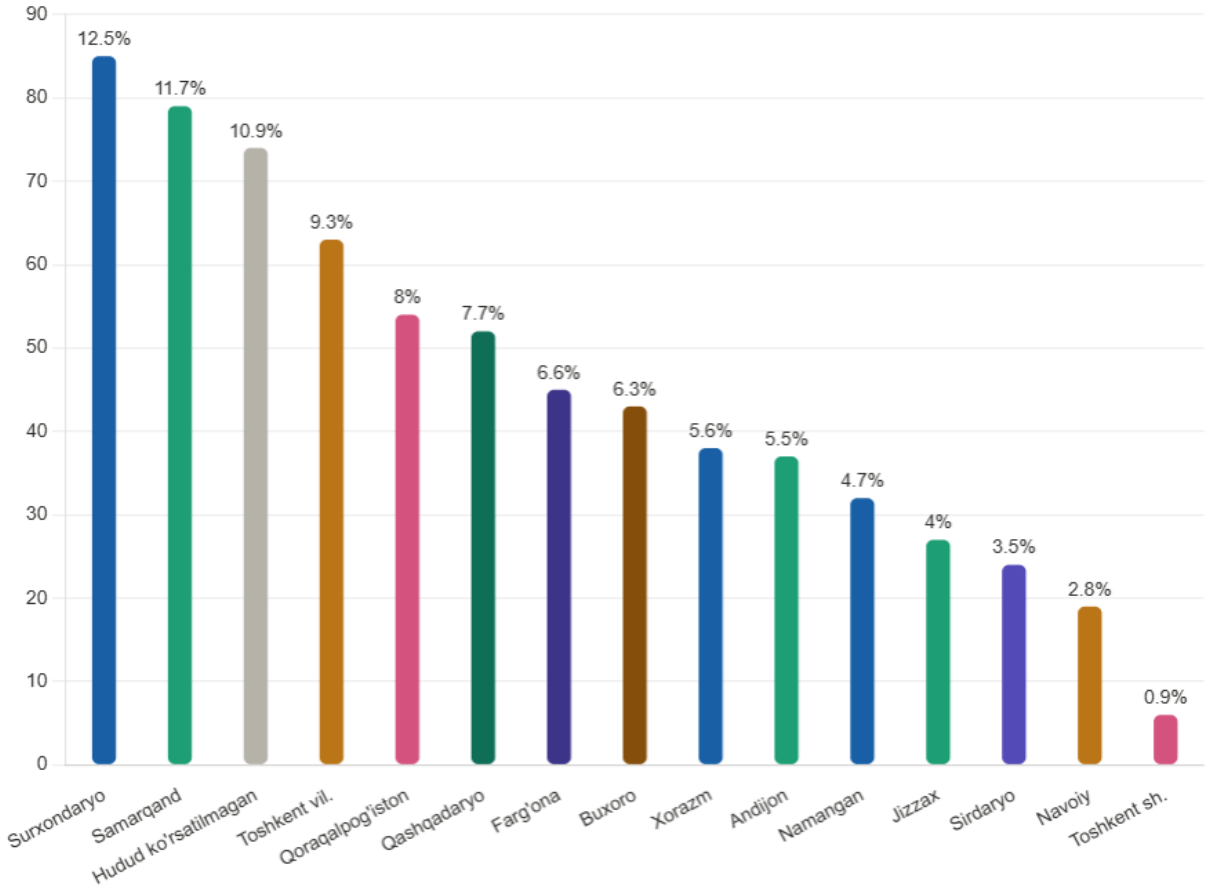
3-diagramma. *Respondentlarning demografik tavsifi tajriba bo‘yicha (n=678). Manba: muallif tomonidan tuzilgan, n=678.*

So‘rovnoma natijalarini ilmiy talqin qiladigan bo‘lsak, 30 yoshgacha bo‘lgan direktorlarning ulushi atigi **4,0 foiz** ekanligi ta’lim tizimida maktab direktorlarini yoshartirish muammosi mavjudligini, direktor lavozimiga yosh kadrlar yo‘nalishidagi kadrlar siyosatining yetarli emasligi to‘g‘risida muhim signaldir. Xorijiy tajribada (xususan, Finlandiya, Singapur) maktab rahbarligiga nisbatan yoshroq mutaxassislarni jalb qilish islohotlarning muvaffaqiyat omillaridan biri sifatida ko‘rsatilgan (Hargreaves & Fullan, 2012)[33].

Hududiy taqsimot

So‘rovnoma O‘zbekiston Respublikasining barcha 12 ta viloyati, Toshkent shahri va Qoraqalpog‘iston Respublikasini qamrab oldi. Respondentlar soni bo‘yicha eng yirik ulush **Surxondaryo viloyatiga (85 nafar, 12,5%)** to‘g‘ri kelishi mazkur viloyatdagi maktablar sonining nisbatan ko‘pligi bilan izohlanadi. **Samarqand viloyati (79 nafar, 11,7%)** va **Toshkent viloyati (63 nafar, 9,3%)** viloyatlari keyingi o‘rinlarni egallaydi.

[33] M.Fullan The Principal: Hargreaves, A., & Fullan, M. (2012). Professional Capital: Transforming Teaching in Every School. New York, NY: Teachers College Press.Open Journal of Leadership, Vol.10 No.1, January 29, 2021



4-diagramma. Respondentlarning hududiy taqsimoti. Manba: muallif tomonidan tuzilgan, n=678.

TADQIQOT NATIJALARI VA MUHOKAMA

Qonunchilik normalarini tushunish darajasi: protsedural va substantiv tafakkur

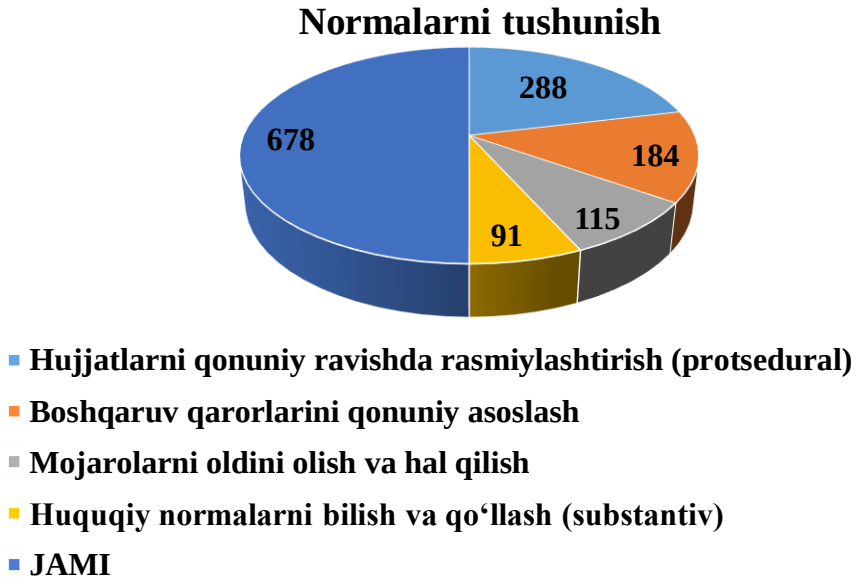
“*Qonunchilik normalarini boshqaruv faoliyatiga qo‘llash deganda nimani tushunasiz?”* degan birinchi savolga berilgan javoblar maktab direktorlari o‘rtasida huquqiy ong shakllanishidagi tizimli eng muhim ilmiy maummani ochib berdi.

Respondentlarning eng ko‘p tanlangan javobi “***Hujjatlarni qonuniy ravishda rasmiylashtirishdan iborat”*** **288 nafari (42,5)** ekanligi muhim ilmiy muammoni anglatadi. “***Boshqaruv qarorlarini qonuniy asoslash”*** **184 nafar (27,1 %)** Bu **protsedural** – ya’ni qonunni faqat rasmiy tartib-qoida sifatida qabul qiluvchi - yondashuvning ustunligini ko‘rsatadi.

Substantiv yondashuv - qonunni xodimlar huquqlarini himoya qilish vositasi sifatida anglash - atigi **91 nafar (13,4 %)** qayd etildi va ***mojarolarni oldini olish*** **115 nafar (17,0 %)** deb javob bergani inobatga olinganda, jami **69,6 %** respondent qonunchilik normalarini asosan hujjat-tartib jihati bilan bog‘lashini ko‘ramiz. Bu S.S.Alekseyevning “Teoriya prava” da ta’riflagan “formal-protsedural paradigma”ning ustunligini empirik isbotlaydi[34].

[34] С.Алексеев “Теория права”. Издание 2-е, переработанное и дополненное Издательство БЕК, Москва 1995.

Bunday tushunish tarzining xavfi shundaki, maktab direktori Mehnat kodeksining mohiyatini - xodimlar huquqlarini ta’minlash, mehnat muhiti sifatini yaxshilash, moddiy va ma’naviy rag‘batlantirish mexanizmlarini to‘g‘ri qo‘llashni ikkinchi darajali masala sifatida qabul qiladi. Huquqiy normani faqat tartiblash, emas, balki himoya qilish funksiyasi zaiflanib boradi.



5-diagramma. Qonunchilik normalarini tushunish darajasi bo‘yicha taqsimot. Manba: muallif tomonidan tuzilgan, n=678.

Ilmiy tahlil natijalari shuni ko‘rsatadiki, respondentlarning **69,6 %** qonunchilik normalarini birinchi navbatda hujjatlashtirish va ish yuritish bilan bog‘lashi “protsedural paradigma dominantligi” fenomenini ko‘rsatadi. Mexanizmni takomillashtirish uchun nafaqat protseduralar, balki substantsial (mazmuniy) huquqiy tafakkurni shakllantirish zarur. Bu dissertatsiya uchun muhim ilmiy tezis sifatida belgilanishi lozim.

Qonunchilik normalarini qo‘llash (Mehnat kodeksi) mexanizmlari: amaliyotdagi ustuvorlik

Ko‘p variantli ikkinchi savol “Boshqaruv faoliyatida qaysi mexanizmlar muhim” Mehnat kodeksi normalarining amaliy qo‘llanilishidagi ustuvor yo‘nalishlarni aniqladi (*1-jadval*). Bu savol respondentlarga bir nechta variant tanlash imkonini berdi, shuning uchun foizlar 100 dan ortishi mumkin.

Ko‘p variantli savol natijalari direktorlarning amaliyotida Mehnat kodeksining qaysi mexanizmlariga ko‘proq murojaat etilishini ko‘rsatdi. Mehnat shartnomalarini qonuniy ravishda tuzish **566 nafar (83,5 %)** respondent tomonidan ko‘rsatildi - bu eng asosiy mexanizm. **Jamoa shartnomasi 465 nafar (68,6 %)**, mehnat nizolarini hal qilish **345 nafar** (**50,9 %)** respondent tomonidan qayd etildi.

Mexanizm	Respondentlar soni	Ulushi (%)
Mehnat shartnomalarini qonuniy ravishda tuzish	566	83,5%
Jamoa shartnomalarini qonuniy tuzish	465	68,6%
Jamoadagi nizolarni bartaraf etish	345	50,9%
Mehnat haqlarini o‘z vaqtida adolatli to‘lash	305	45,0%
Mehnat shartnomalarini bekor qilish	257	37,9%
Fuqarolik-huquqiy shartnomalarga o‘tish	68	10,0%

1-jadval. *Qonunchilik normalarini qo‘llash mexanizmlarini qo‘llanish darajasi. Manba: muallif tomonidan tuzilgan, n=678.*

Mehnat shartnomasini tuzish (83,5%) g‘oyat yuqori ko‘rsatkich bilan birinchi o‘rinda turishi ta’lim boshqaruvida mehnat shartnomasini tuzish eng muhim mexanizm sifatida mustahkam o‘rin egallaganligini isbotlaydi. Bu natija Qodirov va Xoliqov (2020) tadqiqotining xulosalarini tasdiqlaydi va kengaytiradi[35].

Mazkur natija mehnat shartnomasi maktab boshqaruvidagi markaziy ahamiyatini empirik jihatdan isbotlaydi. Jamoa shartnomasi mexanizmining yetarlicha qo‘llanilmasligi **(68,6%)** respondent esa jamoaviy munosabatlar madaniyatining rivojlanishi zarurligini ko‘rsatadi.

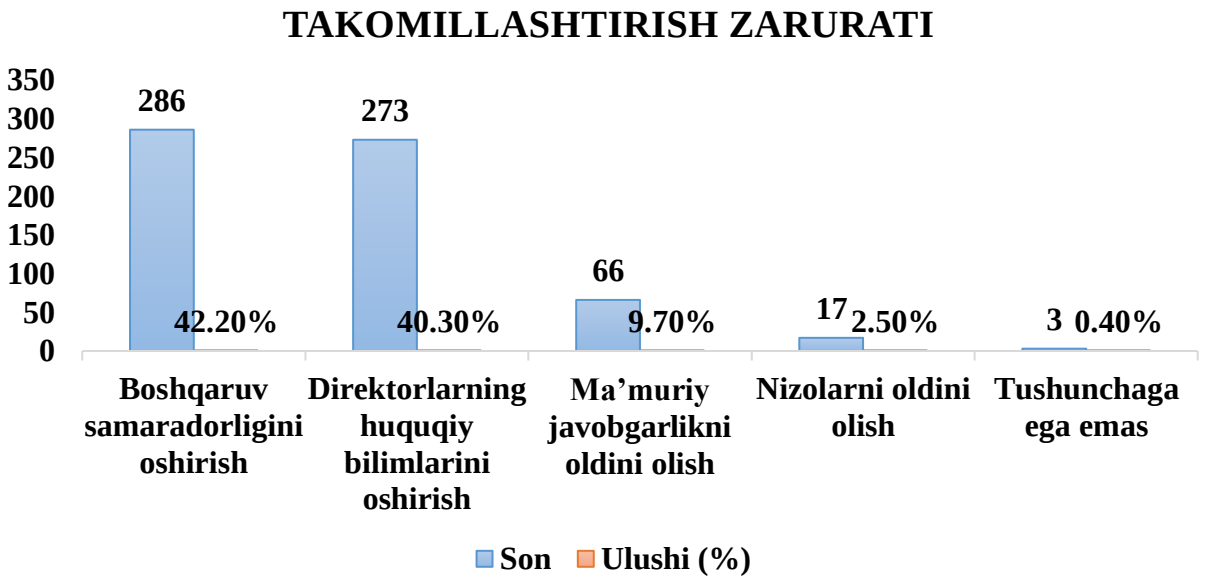
E’tiborli jihati shundaki, fuqarolik-huquqiy shartnomalarga o‘tish (10,0%) aksariyat hollarda qonunchilikka zid bo‘lgan amaliyotni aks ettiradi - doimiy kadrlar o‘rniga vaqtinchalik pudrat shartnomalari qo‘llanilishi mehnat kafolatlari tizimini zaiflashtiradi. Bu holatning 10% respondentda uchrashi tizimli nazorat zarurligini ko‘rsatadi.

Tahlil natijalariga ko‘ra, uch asosiy mexanizm - mehnat shartnomasini tuzish (83,5%), jamoa shartnomasini (68,6%) va nizolarni hal qilish (50,9%) - birgalikda ta’lim muassasasidagi mehnat munosabatlarining asosiy huquqiy tuzilmasini tashkil etadi. Dissertatsiyada ushbu uch mexanizmni takomillashtirish metodologik doiraning markazi bo‘lishi zarur.

Takomillashtirish zarurati

“Qonunchilik normalarini qo‘llash mexanizmni takomillashtirishning zarurati nimalardan iborat?” degan savolga berilgan javoblar ikki asosiy yo‘nalishni yaqqol ko‘rsatdi: boshqaruv samaradorligi (42,2%) va huquqiy bilim oshirish (40,3%) jami 82,5 foizni tashkil etib, kuchli konsensus mavjudligini anglatadi.

[35] B.Qodirov & A.Xoliqov Maktab direktorlarining mehnat qonunchiligini bilish darajasi: O‘zbekiston tajribasi. Ta’lim va tarbiya, 3-son, 2020.



6-diagramma. *Qonunchilik normalarini qo'llashni takomillashtirish zarurati sabablari. Manba: muallif tomonidan tuzilgan (n=645).*

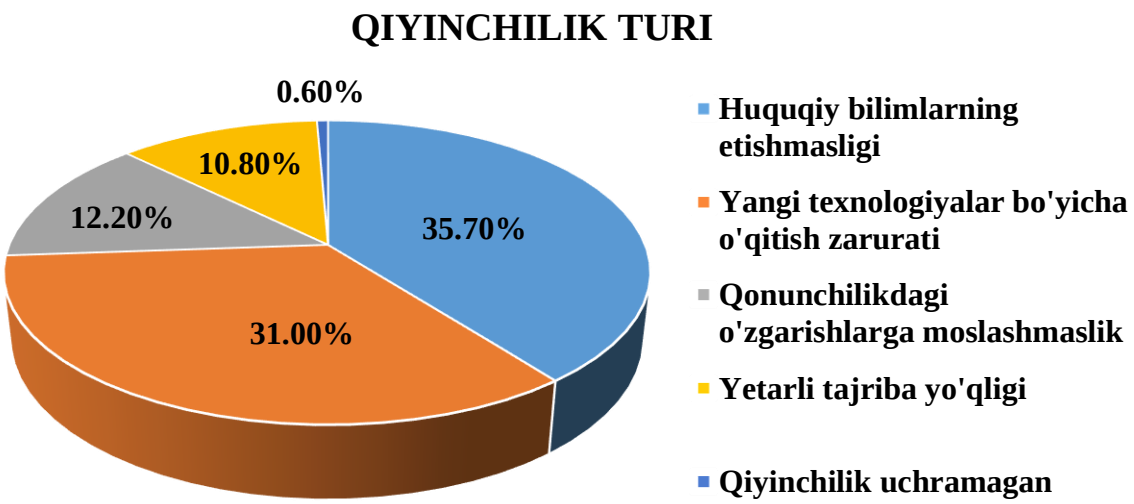
Mazkur natijalar, ayniqsa, "Ma'muriy javobgarlikni oldini olish" **66 nafar (9,7%)** ning nisbatan past ko'rsatkichi qiziqish uyg'otadi: bu direktorlarning aksariyati qonunchilik normalarini asosan ma'muriy javobgarlikdan qochish vositasi emas, balki samaradorlik va bilim resursi sifatida ko'rishini anglatadi - bu sog'lom huquqiy mentalitetning belgisidir.

Qiyinchiliklar va to'siqlar

Tadqiqotning eng muhim natijalaridan biri amaliy qiyinchiliklar tahlilida namoyon bo'ldi. Ikki asosiy to'siq respondentlarning **66,7 %** ni qamrab oladi, bu juda yuqori konsentratsiyani anglatadi.

"*Qonunchilik normalarini boshqaruv faoliyatiga qo'llashda qanday qiyinchiliklarga uchradingiz*?" degan savolga respondentlarning **242 nafar (35,7%) huquqiy bilimlar yetishmasligi**ni asosiy to'siq sifatida ko'rsatdi. Yangi texnologiyalarga moslashuv qiyinligi **210 nafar (31,0 %)** tomonidan qayd etildi. Bu ikki omil birgalikda respondentlarning **66,7 % ni** qamrab oladi.

Normativ hujjatlarning tez-tez o'zgarib turishiga moslashmaslik **83 nafar (12,2%)** ham muhim to'siqlar sifatida belgilandi. Bundan tashqari **yetarli tajriba yo'qligi 73 nafar (10,8 %)** hamda **qiyinchilikga uchramadim 4 nafar (0,6 %)** deb belgilagan. Ushbu natijalar direktorlarning nafaqat qonunni bilish, balki uni doimiy yangilanib boradigan sharoitda kuzatib borish imkoniyati ham cheklov ekanligini ko'rsatadi.



7-diagramma. *Qonunchilik normalarini qo‘llashdagi qiyinchiliklar (n=612). Manba: muallif tomonidan tuzilgan (n=612).*

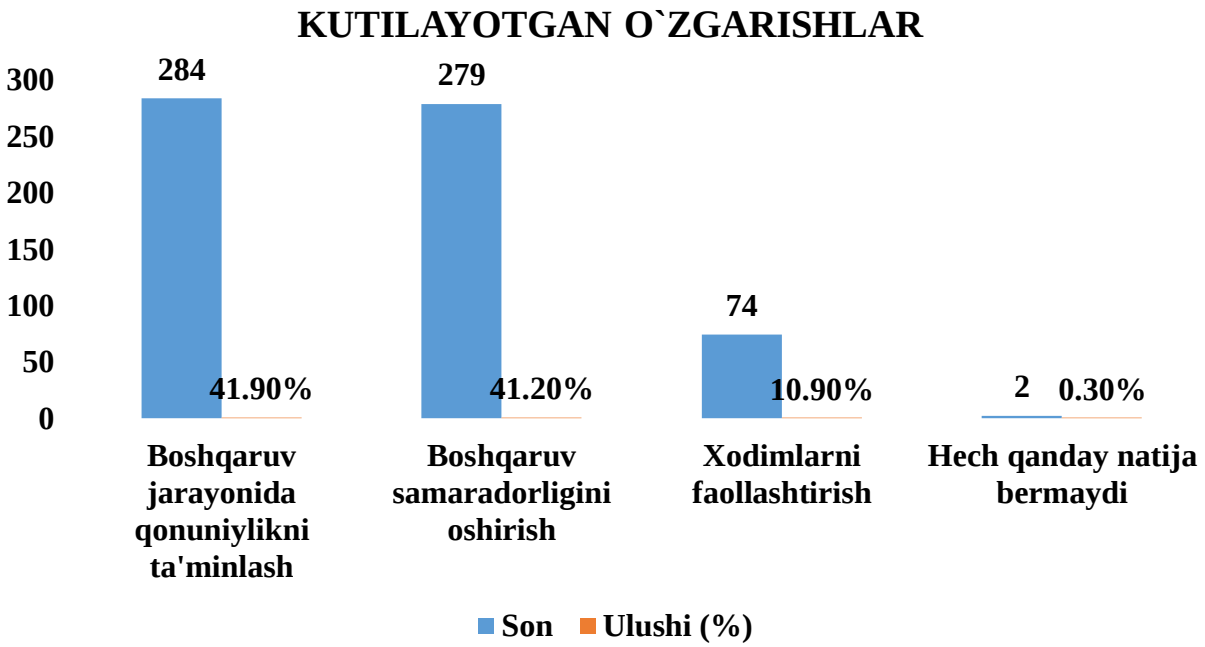
Birinchi to‘siq - huquqiy bilim yetishmasligi (35,7%) - asosan bilim ta’minoti tizimidagi muammoni, ya’ni maktab direktorlariga yo‘naltirilgan tizimli huquqiy ta’lim va kasbiy rivojlanish kanallarining yetarli emasligi muammosini ko‘rsatadi.

Ikkinchi to‘siq - yangi texnologiyalarga moslashuv (31,0%) - zamonaviy raqamli muhitda qonunchilikni qo‘llash uchun zarur bo‘lgan texnologik kompetentlik muammosini anglatadi. Bu ikki to‘siqning birga mavjudligi ta’lim boshqaruvida “ikki tizimli zaiflik” (dual systemic weakness) sifatida tavsiflanishi mumkin.

Ilmiy tahlil natijalariga ko‘ra, huquqiy bilim yetishmasligi (35,7%) va texnologik moslashuv muammosi (31,0%) birgalikda respondentlarning 66,7 foizini qamrab oladi. Bu ko‘rsatkich Mehnat kodeksi normalarini qo‘llashning tizimli muammosi borligini isbotlaydi: yechim ham huquqiy, ham texnologik tayyorgarlikni bir vaqtda hal etishni talab qiladi.

Ijobiy o‘zgarishlar prognozi: mexanizmni takomillashtirishdan kutilayotgan natijalar

Qonuncilikni qo‘llash mexanizmini takomillashtirishdan kutilayotgan natijalar bo‘yicha respondentlarning pozitsiyasi ikki yo‘nalishda ikkiyoqlama konsensusni ko‘rsatdi: **boshqaruvda qonuniylikni ta’minlash 284 nafar (41,9%)** va **samaradorlikni oshirish 279 nafar (41,2%)** deyarli teng ko‘rsatkichlarga ega.

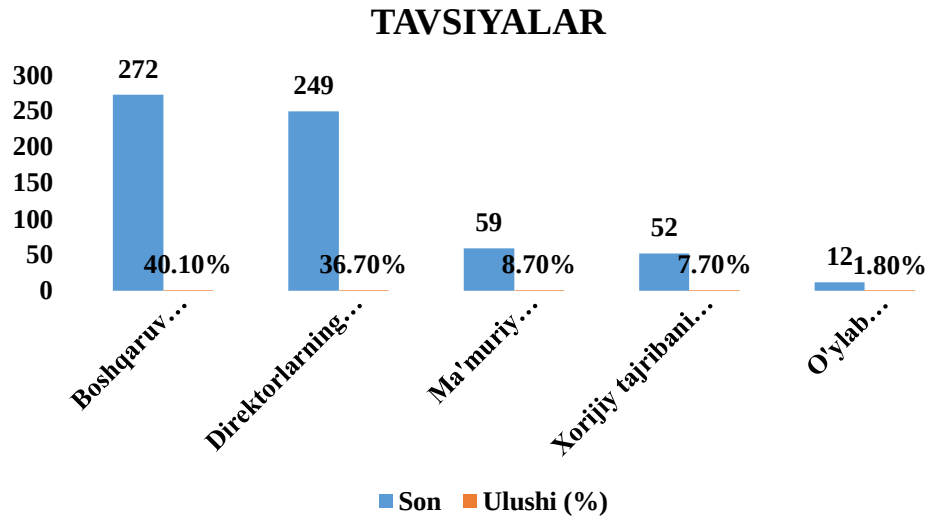


8-diagramma. *Qonunchilikni qo‘llash mexanizmni takomillashtirishdan kutilayotgan ijobiy o'zgarishlar. Manba: muallif tomonidan tuzilgan (n=639).*

Bu natijaning muhimligi shundaki, **respondentlarning 563 nafar (83,1 %)** takomillashtirishdan aniq ijobiy samara kutayotgani tadqiqot mavzusining amaliy dolzarbligini tasdiqlaydi. Pessimistik yondashuv (0,3%) deyarli yo‘qligi islohotga jamoa tayyor ekanligini ko‘rsatadi.

4.6. Tavsiyalar: direktorlarning institusional talabnomalari

“Qonunchilikni qo‘llash mexanizmini takomillashtirish uchun nima qilish kerak?” degan savolga berilgan javoblar respondentlarning tizimli o‘zgarishlarga bo‘lgan aniq talabnomasini ifodalaydi.

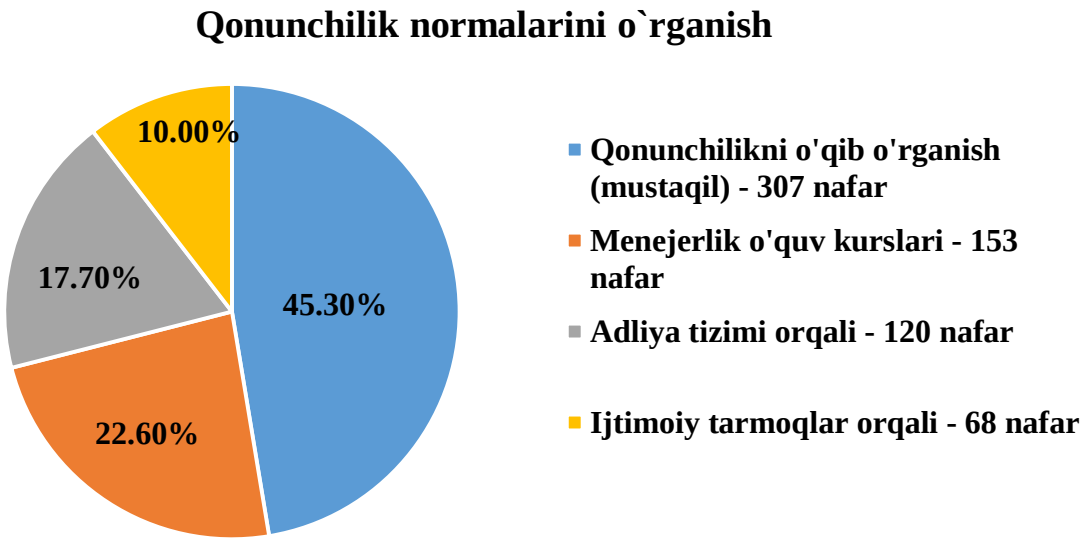


9-diagramma. *Qonunchilikni qo‘llash mexanizmini takomillashtirish bo'yicha direktorlarning tavsiyalari. Manba: muallif tomonidan tuzilgan (n=644).*

Shaffoflik **272 nafar (40,1 %)** va **kasbiy rivojlanish 249 nafar (36,7 %)** birgalikda **76,8 foizni** tashkil etadi. Bu ikki tavsiyaning bir-birini to‘ldiruvchi tabiati bor: shaffoflik tizimi (ochiq hisobotlar, kuzatuv mexanizmlari) qonunchilik normalarining ijrosini ta'minlasa, doimiy kasbiy rivojlanish uning sifatini kafolatlaydi. Xorijiy tajribani o‘rganish tavsiyasi **52 nafar (7,7 %)** tadqiqotga komparativistik o‘lcham qo‘shish zarurligini ko‘rsatadi.

4.7. Bilim olish manbalari

Oxirgi savol – “*Qonunchilik normalarini qo‘llash uchun qanday manbalardan foydalanasiz?”* - mavjud ta’minot tizimining asosiy zaifligini fosh etdi.



10-diagramma. *Qonunchilik normalarini o‘rganish manbalari. (n=644).*

Direktorlarning **307 nafar (45,3 %)** qonunchilikni mustaqil o‘qib o‘rganish yo‘lini tanlashi - bu katta raqam - institutsional ta’lim tizimining yetarlicha rivojlanmaganligini ko‘rsatadi. Muqobil sifatida, menejerlik o‘quv kurslari **153 nafar (22,6 %)** va adliya tizimi orqali **120 nafar (17,7 %)** muhim, ammo hali yetarli darajada foydalanilmagan kanallar sifatida namoyon bo‘lmoqda.

Eng xavotirli ko‘rsatkich - ijtimoiy tarmoqlar orqali bilim olish **68 nafar (10,0 %)**. Bu kanal orqali tarqaladigan huquqiy ma’lumotlar ko‘pincha tekshirilmagan, kontekstsiz va yangilanmagan bo‘ladi. Bu amaliyot huquqiy xatolar xavfini sezilarli oshiradi. Bush (2011) ta‘kidlaganidek, rasmiy bo‘lmagan kanallar orqali huquqiy bilim olish rahbar xatolarining eng tez-tez uchraydigan manbalaridan biridir[36].

Tahlil natijalari shuni ko‘rsatadiki, bilim olishdagi individual (mustaqil o‘rganish, **307 nafar (45,3 %)** va **norasmiy (ijtimoiy tarmoqlar, 10,0 %)** usullarning ustunligi tizimli, institutsional ta’lim kanalining yetarlicha rivojlanmaganligini ko‘rsatadi. Bu holat huquqiy bilimlar sifatiga sezilarli xavf tug‘diradi va dissertatsiyaning asosiy muammosini emperik jihatdan asoslaydi.

[36] T.Bush Theories of Educational Leadership and Management (4th ed.). SAGE Publications. London 2011.

MUHOKAMA: TADQIQOT NATIJALARINING NAZARIY VA AMALIY AHAMIYATI

Protsedural paradigmadan substantsial paradigmaga o‘tish zaruriyati

Tadqiqot natijalarining nazariy jihatdan eng muhim xulosasi – O‘zbekiston ta’lim boshqaruvida “protsedural paradigma dominantligi” fenomenining empirik isbotlanishidir. Respondentlarning **69,6 foizi** qonunchilik normalarini birinchi navbatda hujjat-tartib masalasi sifatida tushunishi - bu faqat individual bilim saviyasi muammosi emas, balki tizimli hodisa. Tizimli xarakter uning barcha 12 ta viloyati, Toshkent shahri va Qoraqalpog‘istonda deyarli bir xil namoyon bo‘lishida (hududiy farqlar 5-8 foiz doirasida) ko‘rinadi.

Nazariy jihatdan bu “huquqiy formalism” bilan “huquqiy instrumentalizm” o‘rtasidagi muammo sifatida tavsiflanishi mumkin. Huquqiy formalizm qonunni faqat bajarish kerak bo‘lgan tartib sifatida ko‘rsa, huquqiy instrumentalizm uni maqsadga erishish vositasi sifatida qabul qiladi[37].

Ikki tizimli zaiflik modeli

Tadqiqot O‘zbekiston ta’lim boshqaruvida “ikki tizimli zaiflik” (dual systemic weakness) modelini yaratishga imkon beradi: bir tomondan, huquqiy bilim yetishmasligi (kognitiv zaiflik), ikkinchi tomondan, texnologik moslashuv muammosi (amaliy zaiflik). Bu ikki zaiflik bir-birini kuchaytiradi.

Xorijiy tadqiqotlar shuni ko‘rsatadiki, maktab rahbarlarining raqamli va huquqiy kompetentligini bir vaqtda oshirish – “integratsiyalashgan malaka oshirish” deb ataluvchi yondashuv bu ikkala muammoni birgalikda hal qilishning eng samarali usuli hisoblanadi[38].

Adabiyotlar bilan qiyosiy muhokama

Tadqiqot natijalarini mavjud adabiyotlar bilan solishtirish quyidagi muhim korrelyatsiyalarni ko‘rsatadi:

A.V.Lisovskiy aniqlagan protsedural paradigma ustunligi bizning **69,6 foizlik** ko‘rsatkichimiz bilan tasdiqlanadi[39].

T.Bush ta’kidlagan norasmiy bilim kanallarining xavfi bizning **10,0 foizlik** ijtimoiy tarmoqlar ko‘rsatkichida yaqqol namoyon bo‘ladi[40].

Tadqiqot natijalari muhokamasi

Tadqiqot natijalari qator muhim xulosalarga olib keladi.

Birinchidan, *protsedural* va *substantiv* huquqiy tafakkur o‘rtasidagi farqlanish **(42,5% va 13,4%)** ta’lim boshqaruvida huquqiy madaniyat shakllanishining hali boshlang‘ich bosqichda ekanligini ko‘rsatadi.

Ikkinchidan, mehnat shartnomasini tuzishning o‘rni **(83,5%)** ta’lim muassasasida huquqiy mexanizmlar ierarxiyasini ko‘rsatadi. Bu natija mehnat huquqining boshqa sohalarida (masalan, mehnat munosabatlari, xavfsizlik,

[37] R.Dworkin Law's Empire. Harvard University Press. Cambridge 1986.
[38] OECD. TALIS 2018 Results (Volume I): Teachers and School Leaders as Lifelong Learners. OECD Publishing. Paris 2019.
[39] A.V.Lisovskiy. Pravovaya kultura rukovoditelya obrazovatelnoy organizatsii v postsovetskom prostranstve. Pedagogika, 2019.
[40] T.Bush Theories of Educational Leadership and Management (4th ed.). SAGE Publications. London 2011.

ijtimoiy kafolatlar) bilimlarning past ekanligini egri yo‘l bilan ham tasdiqlamoqda, chunki faqat shartnoma tuzish yuqori foizga ega.

Uchinchidan, o‘z-o‘zini o‘qitish usulining ustunligi **(45,3%)** institutsional ta’lim tizimining yetarlicha ishlamayotganligini ko‘rsatadi. Bunday sharoitda bilimlar noto‘g‘ri, eskirgan yoki to‘liq bo‘lmasligi xavfi yuqori. Bu muammo ayniqsa 2023-yildan kuchga kirgan yangi Mehnat kodeksini amalayotda qo‘llash sharoitida dolzarb hisoblanadi chunki direktorlarning katta qismi yangi kodeks bilan to‘liq tanish bo‘lmasligi mumkin.

To‘rtinchidan, ijobiy o‘zgarishlar prognozi **(83,1%)** direktorlarning yangi mexanizmlarga tayyor ekanligini ko‘rsatadi. Bu takomillashtirish uchun qulay muhit (readiness) mavjudligini bildiradi - asosiy vazifa ularni bilim va ko‘nikma bilan ta’minlashdir.

XULOSALAR VA AMALIY TAVSIYALAR

Tadqiqot beshta muhim ilmiy xulosa bilan yakunlanadi:

1. Birinchi xulosa (Protsedural paradigma). Respondentlarning **69,6 foizi** qonunchilik normalarini qo‘llashni asosan hujjatlashtirish va ish yuritish bilan bog‘laydi. Bu O‘zbekiston maktab boshqaruvida “protsedural paradigma dominantligi” fenomenini empirik isbotlaydi va mexanizmni takomillashtirish uchun mazmuniy huquqiy tafakkurni shakllantirish zarurligini ko‘rsatadi.

Bu ta’lim boshqaruvida substantiv huquqiy tafakkurni shakllantirish zarurligi haqida metodologik xulosa chiqarishga asos beradi.

2. Ikkinchi xulosa (mehnat shartnomasi tuzish markaziyligi). Mehnat shartnomasi tuzish **(83,5%)** Mehnat kodeksini qo‘llashning hal qiluvchi mexanizmi sifatida tan olingan. Bu, mehnat shartnomasi tuzishga ilmiy ishlarda alohida e’tibor qaratish zarurligi va maktablar uchun standart shartnoma namunalarini ishlab chiqish dolzarbligini tasdiqlaydi.

3. Uchinchi xulosa (Ikki tizimli zaiflik). Direktorlarning **66,7 foizi** ikkita tizimli to‘siqqa duch kelmoqda: huquqiy bilim yetishmasligi **(35,7%) va yangi** texnologiyalarga moslashuv qiyinligi **(31,0%).** Bu ta’lim boshqaruvi tizimida kompleks - ham huquqiy, ham raqamli - salohiyatni oshirish zarurligini ko‘rsatadi. Yechim ikkala yo‘nalishni bir vaqtda qamrab olishi zarur.

4. To‘rtinchi xulosa (Bilim ta’minot tizimi yetarli emas). Respondentlarning **45,3 foizi** mustaqil o‘rganishga tayanishi, **10,0 foizi** ijtimoiy tarmoqlardan foydalanishi institutsional huquqiy ta’lim tizimining yetarlicha rivojlanmaganligini ko‘rsatadi. Bundan tashqari, qishloq joylarida protsedural tafakkur ko‘rsatkichi shahar hududlariga nisbatan **8-9 foiz** yuqori. Bu hududiy farqlanishni bartaraf etish uchun maqsadli ta’lim dasturlari ishlab chiqishni talab etadi.

5. Beshinchi xulosa. Direktorlarning **83,1 foizi** takomillashtirish mexanizmidan sezilarli ijobiy samara kutmoqda. Bu natija yangi o‘quv dasturlarini joriy etish uchun qulay motivatsion muhit mavjudligini tasdiqlaydi.

Amaliy tavsiyalar

1-tavsiya: Huquqiy ta’lim moduli joriy etish

Yangi Mehnat kodeksi (O‘RQ-798, 2022) asosida maktab direktorlari uchun maxsus huquqiy modul ishlab chiqish va “Menejerlik o‘quv kurslari” dasturlariga majburiy sifatida kiritish

Modul 10 soatlik intensiv kurs formatida bo‘lishi va amaliy case-study usulini qamrab olishi lozim. Asoslanish: respondentlarning **40,3 foizi** huquqiy bilimni oshirishni takomillashtirish zarurati sifatida ko‘rsatdi.

2-tavsiya: Standart hujjat bazasi yaratish

Maktablar uchun uchun mehnat shartnomasi, jamoa shartnomasi va boshqa asosiy hujjatlarning standart namunalari ishlab chiqilishi va tarqatilishi lozim. Bu hujjatlar xodimlar huquqlarini to‘liq aks ettirishi kerak. Asoslanish: mehnat shartnomasi **(83,5%)** va jamoa shartnomasi **(68,6%)** eng ko‘p ishlatiladigan mexanizmlar sifatida aniqlandi.

3-tavsiya: Boshqaruv shaffoflik tizimini joriy etish

Ta’lim muassasalarida ochiq hisobot tizimi (nazorat kengashlari faoliyatini kuchaytirish, ota-onalar kengashi bilan hamkorlik) va raqamli monitoring platformasi yaratilishi kerak. Asoslanish: respondentlarning **40,1 foizi** shaffoflikni birinchi tavsiya sifatida ko‘rsatdi.

4-tavsiya: Adliya-ta’lim hamkorligini kuchaytirish

Adliya vazirligi va ta’lim tizimi o‘rtasida metodologik hamkorlikni institutsional darajada mustahkamlash zarur: viloyat adliya boshqarmalari tarkibida ta’lim sohasiga ixtisoslashgan maslahatchi lavozimi joriy etilishi, maktab direktorlari uchun bepul huquqiy maslahat platformasi tashkil etilishi tavsiya etiladi. Asoslanish: respondentlarning **17,7 foizi** adliya tizimi orqali bilim olishi bu kanalning ahamiyatini tasdiqlaydi.

5-tavsiya: Raqamli huquqiy platformalar yaratish

Rasmiy tasdiqlangan, doimiy yangilanadigan huquqiy ma’lumotlar bazasi (ta’lim direktori uchun mo‘ljallangan portal) va ijtimoiy tarmoqlardagi huquqiy malumotlar sifatini tekshiruvchi mexanizm joriy etilishi lozim. Asoslanish: **10,0 foiz** respondent ijtimoiy tarmoqlardan foydalanishi tizimli xavf sifatida belgilandi.

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GIS-BASED HYDROMODULAR ZONING OF AGRICULTURAL LANDS UNDER EXTREME ECOLOGICAL CONDITIONS (A CASE STUDY OF CHIMBAY DISTRICT, NORTHERN KARAKALPAKSTAN)

Abstract: *This article addresses the critical issues of monitoring and mapping land resources in the northern districts of the Republic of Karakalpakstan, with a specific focus on the Chimbay district. Against the backdrop of the Aral Sea ecological catastrophe, where irrigated agriculture faces unprecedented challenges due to soil salinization, rising groundwater levels, and water scarcity, this study develops a comprehensive methodology for hydromodular zoning using Geographic Information Systems (GIS).*

Keywords: *Geographic Information Systems (GIS), hydromodular zoning, Chimbay district, land reclamation, irrigated agriculture, groundwater, soil salinization, Aral Sea region, Karakalpakstan, sustainable land management.*

Introduction

The Republic of Karakalpakstan, an autonomous republic within Uzbekistan, is experiencing one of the most severe ecological crises of the twenty-first century. The desiccation of the Aral Sea, once the fourth-largest inland water body on Earth, has created a new desert—the Aralkum—and triggered a cascade of environmental degradation processes that threaten agricultural sustainability, public health, and economic development across the region. Among the most affected areas are the northern districts of Karakalpakstan, including Chimbay, Karauzyak, Moynaq, and Taxtako'pir, where the combination of rising saline groundwater tables, soil salinization, and diminishing freshwater resources for irrigation has pushed agricultural systems to the brink of collapse.

The Chimbay district, located approximately 50-60 kilometers south of the former Aral Sea shoreline, exemplifies the challenges facing this region. Agriculture remains the dominant land use and primary source of livelihood for the district's predominantly rural population, yet the productivity of irrigated lands has declined precipitously over the past three decades. Studies indicate that secondary salinization affects 70-75% of irrigated lands in the northern districts, with annual crop yield losses ranging from 30-50% for salt-sensitive crops such as

cotton and vegetables. The situation is exacerbated by inadequate drainage infrastructure, inefficient irrigation practices, and the absence of spatially explicit land management guidelines that account for the heterogeneous reclamation conditions across the landscape.

Hydromodular zoning represents a scientifically grounded approach to addressing these challenges. This method involves the spatial delineation of agricultural territories into zones with homogeneous reclamation conditions based on key parameters including groundwater depth and mineralization, soil mechanical composition, salinity levels, and irrigation system characteristics. When implemented effectively, hydromodular zoning enables land managers to match crops to site-specific conditions, optimize irrigation scheduling, target reclamation investments, and prevent further land degradation. However, traditional zoning methods relying on manual mapping and limited field observations are inadequate for capturing the spatial complexity and dynamic nature of reclamation conditions in the Aral Sea region.

Geographic Information Systems (GIS) offer a powerful solution to these limitations. By integrating diverse spatial datasets—from soil maps and groundwater monitoring networks to remote sensing imagery and digital elevation models—GIS enables the quantitative analysis of environmental parameters and the generation of high-resolution zoning maps that reflect real-world heterogeneity. This study applies GIS technology to develop a hydromodular zoning scheme for a representative agricultural area in Chimbay district, with the dual objectives of: (1) establishing a replicable methodology for land resource assessment in data-scarce environments; and (2) generating practical recommendations for crop selection and irrigation management that can enhance agricultural sustainability in the face of ongoing environmental degradation.

Materials and Methods

The study was conducted in the P.Seytov agricultural massif of Chimbay district, located in the northwestern part of Karakalpakstan (approximately 42°55' N, 59°45' E). The massif covers 4,500 hectares of irrigated land, representative of the broader reclamation conditions across Chimbay district. The climate is sharply continental: mean January temperature is -8°C, mean July temperature is 28°C, and annual precipitation averages only 100-120 mm, falling primarily in spring. Potential evapotranspiration exceeds 1,200 mm annually, creating a substantial irrigation requirement for crop production.

The natural vegetation consists of desert-adapted halophytes such as Salsola spp., Artemisia spp., and Tamarix spp., but these have been largely replaced by agricultural crops including cotton (Gossypium hirsutum), winter wheat (Triticum aestivum), alfalfa (Medicago sativa), and vegetables. Irrigation water is supplied through the Amu Darya river via the Kizketken and Pakhtakor main canals, which are unlined and suffer significant seepage losses. Drainage is provided by a network of collector-drains that discharge into natural depressions, but many drains are silted and non-functional.

The following datasets were compiled for the study period 2021-2024:

Soil data: A systematic soil survey was conducted at 156 sampling points across the massif, with samples collected from depths of 0-30 cm and 30-100 cm. At each point, soil type was classified according to the Uzbekistani soil classification system, mechanical composition was determined by the pipette method, and total dissolved solids (salinity) was measured by electrical conductivity (EC) of a 1:5 soil-water extract. Soil pH, organic matter content, and exchangeable sodium percentage were also analyzed.

Groundwater data: Water level and mineralization data were collected from 24 observation wells distributed across the massif, with measurements taken monthly from March to October (irrigation season) and bimonthly from November to February. Groundwater depth was measured to the nearest centimeter using an electric sounder, and samples were analyzed for electrical conductivity, major ion composition (Ca^{2+}, Mg^{2+}, Na^{+}, K^{+}, Cl^{-}, SO_4^{2-}, HCO_3^{-}), and total dissolved solids.

Irrigation data: The locations and characteristics of irrigation canals, field ditches, and drainage collectors were digitized from topographic maps at 1:25,000 scale. Water delivery schedules and flow rates were obtained from the local water management authority (Uzsuvtaminot). On-farm irrigation practices were documented through farmer surveys (n=87) covering cropping patterns, irrigation application depths, and perceived constraints.

Topographic data: A digital elevation model (DEM) with 10-meter resolution was derived from topographic maps and validated with differential GPS measurements at 45 ground control points.

All spatial analyses were performed using ArcGIS 10.6 software (ESRI, Redlands, CA, USA). The methodological workflow consisted of five sequential steps:

Step 1: Data preprocessing and standardization. All spatial datasets were projected to UTM zone 41N (WGS84 datum). Raster layers were generated for each parameter at 30-meter cell resolution using inverse distance weighting (IDW) interpolation for point data (groundwater depth, salinity) and vector-to-raster conversion for polygon data (soil type, mechanical composition). To ensure comparability, all parameter values were standardized to a common 0-1 scale using min-max normalization.

Step 2: Parameter weighting. The relative importance of each parameter for hydromodular zoning was determined using the Analytic Hierarchy Process (AHP), a multi-criteria decision-making technique that structures complex problems hierarchically. A panel of five soil scientists and irrigation engineers with expertise in the Aral Sea region performed pairwise comparisons of the four parameters (groundwater depth, soil salinity, mechanical composition, irrigation system type) based on their perceived influence on reclamation status. The resulting weights (Table 1) were validated through consistency ratio calculations ($CR < 0.10$).

Table 1.
AHP-derived weights for hydromodular zoning parameters

Parameter	Weight	Consistency Ratio
Groundwater depth	0.42	0.06
Soil salinity	0.31	0.06
Mechanical composition	0.18	0.06
Irrigation system type	0.09	0.06

Step 3: Calculation of reclamation status index (RSI). For each 30-meter cell, the RSI was calculated as the weighted sum of the four standardized parameters. Higher RSI values indicate more favorable reclamation conditions (deeper groundwater, lower salinity, lighter texture, more efficient irrigation), while lower values indicate degraded conditions requiring intervention.

Step 4: Zonation. The RSI raster was classified into three zones using the natural breaks (Jenks) optimization method, which minimizes within-zone variance while maximizing between-zone variance. Zone boundaries were smoothed using a 3x3 median filter to remove isolated pixels.

Step 5: Validation. Zonation results were validated against independent field data not used in model calibration, including yield data for cotton (n=42 fields) and wheat (n=38 fields). Statistical significance of yield differences between zones was tested using one-way ANOVA with post-hoc Tukey HSD tests ($\alpha = 0.05$).

3.4 Irrigation Regime Optimization

For each zone, optimal irrigation regimes were developed using the FAO CROPWAT 8.0 model, which implements the Penman-Monteith equation for reference evapotranspiration (ET0) calculation and the crop coefficient (Kc) approach for crop evapotranspiration (ETc). Climate data (temperature, humidity, wind speed, sunshine hours) were obtained from the Chimbay meteorological station for the period 2000-2024. Crop coefficients for local varieties were calibrated using field monitoring of soil moisture depletion in 12 representative fields per zone.

The leaching requirement (LR) for each zone was calculated as:

LR = ECiw / (5 * ECe - ECiw)

where ECiw is the electrical conductivity of irrigation water (dS/m) and ECe is the critical threshold EC for the target crop (dS/m). For Zone I, where ECiw averages 2.1 dS/m and soil salinity requires leaching, additional winter-flood leaching applications of 3,500-4,000 m³/ha were prescribed.

Results

Groundwater depth. Interpolation of observation well data revealed pronounced spatial variation in groundwater depth across the study area. The deepest groundwater (>5 m) occurred in the northern sector, where higher

elevation and better natural drainage create more favorable conditions. Shallow groundwater (0-3 m) dominated the central and western sectors, corresponding to lower topographic positions and proximity to the main irrigation canal where seepage contributes to waterlogging. The area-weighted mean groundwater depth was 3.4 m, with 28% of the area having groundwater shallower than 2 m during the peak irrigation season (July-August).

Soil salinity. Soil salinity exhibited strong correspondence with groundwater depth (Pearson's $r = -0.73$, $p < 0.001$). Severely salinized soils (EC > 8 dS/m in saturated paste extract) were concentrated in areas with groundwater < 2 m, where capillary rise concentrates salts in the surface horizon. Moderately salinized soils (EC 4-8 dS/m) occupied transitional zones, while non-saline soils (EC < 2 dS/m) were restricted to well-drained northern areas with deeper groundwater. The dominant salt type was chloride-sulfate throughout the study area, with sodium comprising 65-80% of exchangeable cations.

Mechanical composition. Soil texture varied from heavy clay (clay content > 40%) in the central depression to sandy loam (sand content > 50%) along the eastern terrace. Heavy-textured soils, which constitute 52% of the study area, have low hydraulic conductivity and high water-holding capacity but are prone to waterlogging and difficult to leach. Light-textured soils (18% of area) drain readily but require more frequent irrigation.

The RSI classification produced three distinct hydromodular zones (Figure 1, Table 2). The spatial pattern reflects the underlying topography, with zones arranged concentrically around the central low-lying area.

Table 2.

Characteristics of hydromodular zones in the P.Seytov massif

Parameter	Zone I (High risk)	Zone II (Moderate risk)	Zone III (Favorable)
Area (ha)	1,250	2,100	1,150
Proportion (%)	27.8	46.7	25.5
Groundwater depth (m)	0-3 (mean 1.8)	3-5 (mean 4.1)	>5 (mean 6.3)
Groundwater TDS (g/L)	5.2-8.4 (mean 6.8)	3.1-5.0 (mean 4.2)	1.8-2.9 (mean 2.3)
Soil salinity (EC, dS/m)	8-15 (mean 11.2)	4-8 (mean 5.8)	<2 (mean 1.4)
Mechanical composition	Heavy clay (clay 45-55%)	Clay loam (clay 25-35%)	Sandy loam to loam
Irrigation system	Unlined earthen canals	Mixed (canals + pipes)	Lined canals + pipes
Drainage condition	Poor-functioning	Partially functioning	Well-functioning

Zone I (High Salinity Risk Zone). This zone occupies the central and western lowlands, representing the most degraded reclamation conditions. Groundwater remains within 2 meters of the surface throughout the growing season, creating continuous upward salt flux. Surface soil salinity exceeds 10 dS/m EC in the dry season, inhibiting germination and reducing crop growth. The heavy clay texture impedes leaching: even large application depths (2,000 m^3/ha) penetrate only the upper 30-40 cm before redistributing laterally. Existing drainage collectors are mostly silted and non-operational, as indicated by ponded water in field depressions and white salt crusts on the surface.

Zone II (Moderate Salinity Risk Zone). This transitional zone surrounds Zone I on the east and south, occupying mid-elevation positions. Groundwater depth fluctuates seasonally from 3 to 5 meters, being shallower in spring (snowmelt + canal filling) and deeper in late summer (crop water uptake). Soil salinity in the root zone (0-60 cm) remains within tolerable limits for moderately salt-tolerant crops (EC 4-6 dS/m) under normal irrigation, but secondary salinization can develop rapidly if irrigation is excessive or drainage is neglected. Soils have favorable physical properties for water management: clay loam texture provides adequate water-holding capacity while allowing sufficient percolation for leaching.

Zone III (Favorable Zone). Located in the northern and northeastern parts of the massif on slightly elevated terrain, Zone III represents the best reclamation conditions. Deep groundwater (>5 m) eliminates capillary rise as a salinization mechanism, and natural drainage to the north prevents water accumulation. Soil profiles are generally non-saline throughout, with the exception of minor surface accumulation in micro-depressions where evaporation concentrates salts. The lighter texture facilitates deeper percolation of irrigation water, enabling effective leaching of any salts that do accumulate. Existing drainage collectors are maintained and discharge to an inter-collector drain that flows northward out of the massif.

Yield monitoring confirmed the ecological and agronomic relevance of the zoning classification (Table 3). For cotton, average yield in Zone III (3.8 t/ha) was 73% higher than in Zone I (2.2 t/ha). Wheat followed a similar pattern, with yields declining from 5.1 t/ha in Zone III to 3.2 t/ha in Zone I. The yield differences between zones were statistically significant for both crops ($p < 0.001$, ANOVA followed by Tukey HSD). Notably, within-zone yield variability was lowest in Zone I (CV = 12% for cotton), reflecting the uniformly poor conditions, and highest in Zone II (CV = 21%), reflecting the transitional nature where site-specific management can produce widely divergent outcomes.

Table 3

Crop yield by hydromodular zone (mean ± SD, n fields)

Crop	Zone I	Zone II	Zone III	Overall
Cotton yield (t/ha)	2.2 ± 0.26a	3.1 ± 0.65b	3.8 ± 0.52c	3.1 ± 0.80
Wheat yield (t/ha)	3.2 ± 0.41a	4.2 ± 0.71b	5.1 ± 0.63c	4.2 ± 0.89
Relative yield (% of Zone III)	58% (cotton), 63% (wheat)	82% (cotton), 82% (wheat)	100% (cotton), 100% (wheat)	-

Different superscript letters indicate significant differences between zones ($p < 0.05$, Tukey HSD).

4.4 Optimized Irrigation Regimes

CROPWAT modeling produced zone-specific irrigation schedules that balance crop water requirements with leaching needs and water availability constraints (Table 4). The key principle underlying these schedules is that water application should be matched not only to crop evapotranspiration but also to the leaching requirement dictated by soil salinity and irrigation water quality.

Zone I: The high leaching requirement (LR = 0.28) reflects both poor water quality (ECiw = 2.1 dS/m) and low salt tolerance of most cash crops. A two-phase irrigation strategy is recommended: (1) winter-flood leaching (3,500-4,000 m^3/ha) applied in December-January when evaporation is minimal, using the full irrigation allocation to push salts below the root zone; and (2) growing-season irrigation at 8- to 10-day intervals, not by calendar schedule but by soil moisture tension (irrigate when tension reaches 50 kPa at 20 cm depth). This approach prevents the buildup of salts between irrigations while avoiding waterlogging from excessive applications.

Zone II: Salts can be managed through grower-season leaching without a dedicated winter flood. The recommended schedule matches irrigation to the 60% depletion of available water (irrigate when tension reaches 40 kPa), with two "flushing irrigations" during the season—one at peak vegetative growth and one at early boll development—that apply 25% more water than ETc to push accumulated salts downward.

Zone III: Standard deficit irrigation (80% of ETc) is sufficient, as natural precipitation (limited as it is) and deep percolation prevent salt accumulation. Irrigation frequency can be reduced to 12- to 14-day intervals, decreasing labor costs and reducing waterlogging risk.

Table 4.
Recommended irrigation regimes by hydromodular zone

Parameter	Zone I	Zone II	Zone III
Cotton schedule			
Leaching requirement	0.28	0.12	0.04
Winter leaching (m³/ha)	3,500-4,000	0-1,000	0
Vegetation irrigation (m³/ha)	6,000-6,500	5,500-6,000	4,500-5,000
Total annual (m³/ha)	9,500-10,500	5,500-7,000	4,500-5,000
Irrigation frequency (days)	8-10	10-12	12-14
Wheat schedule			
Leaching requirement	0.20	0.08	0.02
Winter leaching (m³/ha)	2,500-3,000	0	0
Vegetation irrigation (m³/ha)	4,500-5,000	4,000-4,500	3,500-4,000
Total annual (m³/ha)	7,000-8,000	4,000-4,500	3,500-4,000
Water savings vs. current practice (%)	15-20%	10-15%	5-10%

Discussion

Traditional hydromodular zoning in Uzbekistan, as codified in Soviet-era guidelines, relied primarily on expert judgment and limited field observations, typically mapping zones at the scale of entire irrigation systems (hundreds to thousands of hectares) without capturing within-system heterogeneity. The GIS-based approach developed in this study represents a significant advancement by enabling zoning at the field scale (30-meter resolution), where management decisions are actually implemented. This higher resolution has practical consequences: in the study area, 22% of fields straddled zone boundaries under traditional zoning (i.e., were classified incorrectly), leading to inappropriate irrigation recommendations for portions of those fields. Under the new scheme, each field is assigned to a single zone, enabling uniform management prescriptions.

The water savings potential identified in this study (10-20% of current applied volumes) is substantial given the regional water scarcity. The Amu Darya, which supplies irrigation water to Karakalpakstan, has seen its flow reduced by 50-70% since 1960 due to upstream diversion, and climate change projections indicate further reductions of 10-30% by 2050 (Micklin, 2016). Implementing

zone-specific irrigation scheduling could free water for environmental flows to the Aral Sea remnant, maintain agricultural productivity with less water, or expand irrigated area without increasing total diversion.

However, realizing these savings requires institutional changes. Currently, water is allocated to Water Consumer Associations (WCAs) based on historical entitlements rather than crop water requirements, creating incentives to use full allocations even when not needed. Transitioning to demand-based allocation calibrated to evapotranspiration and leaching requirements—as enabled by the zoning maps—would align water distribution with agronomic needs. This shift would require investments in flow measurement infrastructure and training for WCA staff in modern irrigation scheduling.

Several limitations of this study should be acknowledged. First, the analysis focused on a single massif within Chimbay district; while the massif was selected for representativeness, extrapolation to the entire district should be validated with additional field data. Second, the zoning scheme is static, yet groundwater levels and soil salinity exhibit strong seasonal and interannual dynamics. Future research should develop a dynamic zoning approach that updates zone boundaries in near-real time using remote sensing of soil moisture and vegetation indices. Third, the economic analysis (returns per zone) was limited to yield data; inclusion of input costs (seed, fertilizer, labor, water fees) would enable net profitability comparisons. Fourth, social factors—land tenure security, farmer access to credit, extension service quality—were not incorporated but likely influence adoption of recommended practices.

Conclusions

This study developed a GIS-based methodology for hydromodular zoning of irrigated agricultural lands in the Chimbay district of northern Karakalpakstan, a region experiencing severe land degradation due to the Aral Sea ecological crisis. The key findings and conclusions are:

The study area exhibits pronounced spatial heterogeneity in reclamation conditions, with three distinct zones identified: high-risk Zone I (27.8% of area) requiring intensive leaching and salt-tolerant crops; moderate-risk Zone II (46.7%) suitable for traditional cash crops with improved water management; and favorable Zone III (25.5%) where standard practices are adequate.

Current irrigation practices do not account for this heterogeneity, leading to waterlogging and salinization in Zone I (excessive application) and yield-limiting water stress in Zone III (insufficient application). Zone-specific irrigation regimes developed in this study could reduce water application by 10-20% while maintaining or increasing yields.

The GIS-based zoning methodology is replicable and scalable, requiring only standard soil maps, groundwater monitoring data, and digital elevation data that are available or can be generated for most irrigation systems across Karakalpakstan. The cost of implementing the methodology (estimated at $8-12 per hectare for data collection and analysis) is modest relative to the potential benefits of improved water productivity and reduced land degradation.

Validation against independent cotton and wheat yield data confirmed the agronomic relevance of the zoning classification, with yield differences between zones of 40-70% that were statistically significant ($p < 0.001$).

Institutional reforms, including demand-based water allocation and capacity building for Water Consumer Associations, are necessary to translate zoning maps into improved on-farm management.

The methodology and findings from this study contribute to the scientific basis for sustainable land management in one of the world's most environmentally stressed regions, with potential applications across the Aral Sea basin and other arid zones where water scarcity and soil salinization threaten agricultural livelihoods.

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MIKRONUTRIENTLAR YETISHMOVCHILIGIDA KAMQONLIK: KECHISHI, DIAGNOSTIKASI VA OLDINI OLISH

Annotatsiya: *Ushbu maqolada mikronutriyentlar yetishmovchiligi natijasida yuzaga keladigan kamqonlik muammosi chuqur ilmiy asosda tahlil qilinadi. Temir, vitamin B12 va folat yetishmovchiligi bilan bog'liq anemiyalar etiologiyasi, patogenezi, klinik belgilari, diagnostika usullari va profilaktikasi keng yoritilgan. Jahon sog'liqni saqlash tashkiloti (WHO) ma'lumotlariga ko'ra, kamqonlik global sog'liq muammosi bo'lib qolmoqda.*

Kalit so'zlar. *Mikronutriyent yetishmovchiligi, kamqonlik, temir tanqisligi, vitamin B12, folat, diagnostika, profilaktika, gemoglobin, ovqatlanish, jamoat salomatligi.*

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ANEMIA IN MICRONUTRIENT DEFICIENCY: CLINICAL COURSE, DIAGNOSIS, AND PREVENTION

ANNOTATION: *This article provides a comprehensive scientific analysis of anemia caused by micronutrient deficiencies. It examines the etiology, pathogenesis, clinical manifestations, diagnostic approaches, and prevention of anemia associated with iron, vitamin B12, and folate deficiencies. According to the World Health Organization (WHO), anemia remains a significant global health issue affecting more than a quarter of the world's population, especially children and pregnant women. The article emphasizes the importance of early diagnosis, proper nutrition, and preventive strategies to reduce the prevalence of micronutrient-related anemia.*

Keywords: *Micronutrient deficiency, anemia, iron deficiency, vitamin B12, folate, diagnosis, prevention, hemoglobin, nutrition, public health*

Kirish

Kamqonlik bugungi kunda global sog‘liqni saqlash tizimida eng dolzarb muammolardan biri bo‘lib qolmoqda. U nafaqat bemorlarning umumiy salomatligiga salbiy ta’sir ko‘rsatadi, balki mehnat qobiliyatining pasayishi, bolalarda jismoniy va intellektual rivojlanishning sustlashuvi, homilador ayollarda esa ona va bola salomatligi uchun jiddiy xavf omili sifatida namoyon bo‘ladi. Kamqonlikning ko‘plab shakllari mavjud bo‘lsa-da, amaliyotda eng ko‘p uchraydigan turlari mikronutriyentlar, xususan temir, vitamin B12 va folat yetishmovchiligi bilan bog‘liq holatlardir.

Mikronutriyentlar organizmga juda kichik miqdorda kerak bo‘lishiga qaramasdan, ularning fiziologik ahamiyati nihoyatda katta. Temir gemoglobin va mioglobin tarkibiy qismi sifatida kislorod tashilishida asosiy o‘rin tutadi. Vitamin B12 va folat esa DNK sintezi, hujayra bo‘linishi va qon yaratilishi jarayonlarida muhim kofermentlar hisoblanadi. Shu sababli ularning tanqisligi gemopoezning buzilishiga, eritrotsitlar soni va sifatining o‘zgarishiga hamda klinik jihatdan kamqonlik sindromining shakllanishiga olib keladi.

Etiologiya

Mikronutriyentlar yetishmovchiligi bilan bog‘liq kamqonlikning kelib chiqish sabablari ko‘p omilli bo‘lib, ular oziqlanishdagi xatolar, organizmning oshgan ehtiyoji, surunkali kasalliklar, so‘rilish jarayonining buzilishi va qon yo‘qotishlar bilan bog‘liq bo‘lishi mumkin.

Temir tanqisligi kamqonligining eng ko‘p uchraydigan sababi noto‘g‘ri va nomutanosib ovqatlanishdir. Ratsionda temirga boy mahsulotlarning, ayniqsa go‘sht, jigar, dukkaklilar va ko‘katlarning yetarli bo‘lmasligi organizmga temir tushumining kamayishiga olib keladi. Bundan tashqari, surunkali qon yo‘qotishlar ham temir tanqisligining asosiy sabablaridan biridir. Ayollarda kuchli va uzoq davom etuvchi hayz qon ketishlari, bachadon patologiyalari, erkaklar va yoshi katta bemorlarda esa oshqozon-ichak tizimidan yashirin qon ketishlar ushbu holatga sabab bo‘lishi mumkin. Me’da va ichak kasalliklari, jumladan enteritlar, çölyakiya, atrofik gastrit kabi holatlar temirning ichaklarda so‘rilishini izdan chiqaradi.

Vitamin B12 va folat yetishmovchiligi bilan bog‘liq kamqonlik ham o‘ziga xos etiologik omillarga ega. Uzoq muddat vegetarian yoki hayvon mahsulotlari keskin cheklangan dieta B12 tanqisligiga olib kelishi mumkin, chunki ushbu vitamin asosan hayvon mahsulotlarida uchraydi. Oshqozon shilliq qavatining atrofiyasi, ichki omil yetishmovchiligi, me’da rezektsiyasi holatlari B12 ning so‘rilishini yomonlashtiradi. Folat yetishmovchiligi esa ovqat tarkibida yangi sabzavot va ko‘katlarning kamligi, homiladorlik davrida ehtiyojning oshishi, ayrim antikonvulsant va sitostatik preparatlarning qabul qilinishi bilan bog‘liq bo‘lishi mumkin.

Shunday qilib, mikronutriyent tanqisligi ko‘pincha birgina emas, balki bir necha omilning birgalikdagi ta’siri natijasida shakllanadi. Bu esa bemorni baholashda kompleks yondashuvni talab qiladi.

Patogenez

Temir tanqisligida asosiy patogenetik mexanizm gemoglobin sintezining buzilishi bilan bog‘liq. Temir gem molekulasining muhim tarkibiy qismi bo‘lgani sababli uning yetishmasligi eritrotsitlarda gemoglobin miqdorining kamayishiga olib keladi. Natijada kichik hajmli va rang ko‘rsatkichi past bo‘lgan eritrotsitlar hosil bo‘ladi, ya’ni mikrotsitar-gipoxrom kamqonlik rivojlanadi. Bunday eritrotsitlar kislorodni yetarli darajada tashiy olmaydi, bu esa to‘qimalarda gipoksiya holatini keltirib chiqaradi.

Vitamin B12 va folat tanqisligida esa asosiy o‘zgarish DNK sintezining buzilishidir. Bu holat tez bo‘linuvchi hujayralar, ayniqsa suyak iligidagi eritroid qator hujayralariga kuchli ta’sir ko‘rsatadi. Hujayra yadrosi yetilishi sustlashadi, sitoplazma esa nisbatan tezroq rivojlanadi. Natijada yirik, ammo funksional jihatdan yetuk bo‘lmagan megaloblast hujayralar paydo bo‘ladi. Bu jarayon megaloblastik anemiyaning morfologik asosini tashkil etadi. B12 tanqisligi holatlarida qo‘shimcha ravishda asab tizimi zararlanishi ham kuzatilishi mumkin, chunki ushbu vitamin nerv tolalarining mielin qavati shakllanishida ham muhim rol o‘ynaydi.

Demak, temir, B12 va folat tanqisligi turli mexanizmlar orqali kamqonlikka olib keladi, biroq barcha holatlarda yakuniy natija to‘qimalarga kislorod yetkazib berishning pasayishi hamda organizmning umumiy funksional holatining yomonlashuvi bilan namoyon bo‘ladi.

Klinik kechishi

Mikronutriyentlar yetishmovchiligida kamqonlikning klinik ko‘rinishi tanqislik turi, davomiyligi, og‘irlik darajasi va bemorning yoshi hamda umumiy holatiga qarab farqlanadi. Ko‘pchilik bemorlarda kasallik sekin-asta rivojlanadi va dastlabki bosqichlarda noaniq simptomlar bilan namoyon bo‘ladi.

Eng ko‘p uchraydigan shikoyatlar umumiy holsizlik, tez charchash, ish qobiliyatining pasayishi, bosh aylanishi va bosh og‘rig‘idan iborat. Bemorlar ko‘pincha zinadan ko‘tarilganda yoki jismoniy zo‘riqishda tezda charchab qolish, yurak urishining tezlashuvi va hansirashni qayd etadilar. Teri va shilliq qavatlarning oqarishi ham kamqonlikning muhim klinik belgilari sirasiga kiradi.

Temir tanqisligida ba’zan o‘ziga xos sideropenik belgilar ham kuzatiladi. Jumladan, tirnoqlarning mo‘rtlashishi, soch to‘kilishi, terining qurishi, og‘iz burchaklarida yoriqlar paydo bo‘lishi, til shilliq qavatida atrofik o‘zgarishlar kuzatilishi mumkin. Ayrim hollarda bemorlarda bo‘r, muz, xom guruch yoki boshqa noodatiy moddalarga nisbatan ishtaha paydo bo‘lishi ham temir tanqisligiga xos belgi sifatida baholanadi.

Vitamin B12 va folat tanqisligi bilan bog‘liq kamqonlikda umumiy anemik belgilar bilan birga glossit, tilning silliqlashishi, ishtahaning pasayishi, vazn kamayishi kuzatilishi mumkin. B12 yetishmovchiligida esa oyoq-qo‘llarda uvishish, sezgi buzilishi, yurishdagi beqarorlik, xotira susayishi kabi nevrologik belgilar paydo bo‘lishi ehtimoli mavjud.

Og‘ir holatlarda bemorda hushdan ketish, yaqqol nafas qisishi, yurak faoliyatining buzilishi, immunitetning pasayishi va surunkali infeksiyalarga moyillik kuchayadi. Shu sababli kasallikni erta bosqichda aniqlash katta amaliy ahamiyatga ega. Mikronutriyent yetishmovchiligi bilan bog‘liq kamqonlikni aniqlashda klinik belgilar bilan bir qatorda laborator va instrumental tekshiruvlar hal qiluvchi o‘rin tutadi. Diagnostika jarayonida nafaqat kamqonlik borligi, balki uning turi va sababi ham aniqlanishi lozim.

Birinchi bosqichda umumiy qon tahlili bajariladi. Ushbu tekshiruv orqali gemoglobin miqdori, eritrotsitlar soni, gematokrit, eritrotsitlarning o‘rtacha hajmi va boshqa ko‘rsatkichlar baholanadi. Temir tanqisligida odatda mikrotsitar va gipoxrom o‘zgarishlar aniqlanadi. Megaloblast anemiyada esa eritrotsitlar hajmi kattalashgan bo‘ladi.

Temir almashinuvini baholash uchun zardob ferritini, transferinning temir bilan to‘yinganligi, zardob temiri va umumiy temir bog‘lash qobiliyati aniqlanadi. Ferritinning kamayishi organizmdagi temir zaxirasining kamayganini ko‘rsatadi. Vitamin B12 va folat yetishmovchiligida ularning qondagi miqdori aniqlanadi. Zarurat bo‘lsa, gomotsistein va metilmalon kislotasi kabi biokimyoviy markerlardan ham foydalaniladi.

Ba’zi murakkab holatlarda suyak iligi tekshiruvi o‘tkazilishi mumkin. U eritropoez holatini, megaloblastik o‘zgarishlarni yoki boshqa gematologik kasalliklarni differensial tashxis qilishda muhim ahamiyatga ega. Shuningdek, yashirin qon yo‘qotish manbaini aniqlash maqsadida oshqozon-ichak tizimini tekshirish, ayollarda ginekologik ko‘rik o‘tkazish zarur bo‘ladi.

To‘g‘ri tashxis faqat gemoglobin miqdorini aniqlash bilangina cheklanmaydi. Asosiy maqsad — kamqonlikning kelib chiqish sababini topish va shunga mos ravishda davolash rejasini ishlab chiqishdir.

Davolash

Mikronutriyentlar yetishmovchiligi bilan bog‘liq kamqonlikni davolash etiologik omilni bartaraf etish va yetishmayotgan moddalarning o‘rnini to‘ldirishga qaratiladi. Davolash har bir bemorning yoshi, klinik holati, laborator ko‘rsatkichlari va asosiy kasalliklarini hisobga olgan holda individual tarzda olib borilishi kerak.

Temir tanqisligi kamqonligida asosiy usul temir preparatlarini qo‘llashdir. Yengil va o‘rta og‘irlikdagi holatlarda odatda peroral temir preparatlari tavsiya etiladi. Agar ichaklarda so‘rilish buzilgan bo‘lsa, peroral preparatlar samara bermasa yoki bemorda og‘ir kamqonlik kuzatilsa, parenteral temir preparatlari qo‘llanilishi mumkin. Davolash uzoq muddat davom ettiriladi, chunki faqat gemoglobin miqdorini normallashtirish emas, balki organizmdagi temir zaxirasini tiklash ham muhim hisoblanadi.

Vitamin B12 tanqisligida sianokobalamin yoki gidroksokobalamin preparatlari, asosan inyeksiya shaklida buyuriladi. Folat tanqisligida esa foliy kislotasi preparatlari qo‘llanadi. Biroq B12 tanqisligi inkor qilinmasdan turib faqat folat berish nevrologik asoratlarni yashirishi mumkin, shu sababli differensial yondashuv talab etiladi.

Og‘ir kamqonlik, gemodinamik buzilishlar yoki hayot uchun xavfli holatlarda qon quyish masalasi ko‘rib chiqiladi. Shu bilan birga, qon ketish manbaini to‘xtatish, oshqozon-ichak yoki ginekologik kasalliklarni davolash, ovqatlanishni to‘g‘rilash kabi etiologik chora-tadbirlar ham albatta amalga oshirilishi zarur.

Og‘ir holatlarda qon quyish amalga oshiriladi

Kamqonlikning oldini olishda profilaktik yondashuv eng samarali va iqtisodiy jihatdan maqbul yo‘llardan biri hisoblanadi. Profilaktikaning asosiy yo‘nalishi to‘g‘ri, muvozanatli va mikronutriyentlarga boy ovqatlanishni ta’minlashdan iborat. Ratsionga temirga boy mahsulotlar — qizil go‘sht, jigar, tuxum, dukkakli ekinlar, ismaloq, ko‘katlar va yong‘oqlarni kiritish tavsiya etiladi. Vitamin B12 asosan hayvon mahsulotlarida bo‘lgani sababli uning manbalariga alohida e’tibor qaratish kerak.

Homilador ayollar, emizikli onalar, bolalar, o‘smir qizlar, surunkali kasalliklarga chalingan bemorlar va qariyalar xavf guruhiga kiradi. Ushbu toifalarda profilaktik temir va folat qo‘shimchalari buyurilishi mumkin. Homiladorlik davrida foliy kislotasini muntazam qabul qilish nafaqat anemiyaning, balki homilada nerv naychasi nuqsonlarining oldini olishda ham muhim ahamiyatga ega.

Aholi o‘rtasida sog‘lom ovqatlanish bo‘yicha tushuntirish ishlarini olib borish, muntazam tibbiy ko‘riklarni tashkil etish, xavf guruhidagi shaxslarni erta skriningdan o‘tkazish profilaktikaning muhim tarkibiy qismlaridir. Ayniqsa, birlamchi bo‘g‘in tibbiyotida kamqonlikni erta aniqlashga qaratilgan dasturlarni takomillashtirish zarur.

Kamqonlik dunyo miqyosida keng tarqalgan patologik holatlardan biri bo‘lib, u millionlab insonlarning salomatligiga ta’sir ko‘rsatadi. Jahon sog‘liqni

saqlash tashkiloti ma’lumotlariga ko‘ra, dunyo aholisining sezilarli qismi kamqonlikdan aziyat chekadi. Ayniqsa, bolalar, reproduktiv yoshdagi ayollar va homilador ayollar bu borada eng yuqori xavf guruhiga kiradi.

Rivojlanayotgan mamlakatlarda noto‘g‘ri ovqatlanish, sanitariya sharoitlarining yetarli emasligi, surunkali infeksiyalar va tibbiy xizmatlardan foydalanish imkoniyatining cheklanganligi sababli mikronutriyent tanqisligi bilan bog‘liq kamqonlikning uchrash darajasi yanada yuqori bo‘ladi. Bu esa ushbu muammoni nafaqat tibbiy, balki ijtimoiy va iqtisodiy muammo sifatida ham baholash zarurligini ko‘rsatadi.

Kamqonlik mehnat unumdorligining pasayishiga, bolalarda bilim o‘zlashtirish jarayonining susayishiga, homiladorlik va tug‘ruq bilan bog‘liq asoratlarning ortishiga olib keladi. Shu bois uni kamaytirish sog‘liqni saqlash tizimining ustuvor yo‘nalishlaridan biri bo‘lib qolmoqda.

Xulosa

Mikronutriyentlar yetishmovchiligi bilan bog‘liq kamqonlik zamonaviy tibbiyotning dolzarb muammolaridan biridir. Temir, vitamin B12 va folat tanqisligi organizmda qon yaratilishi, kislorod tashilishi va hujayra bo‘linishi jarayonlarining izdan chiqishiga sabab bo‘ladi. Kasallikning dastlabki belgilari ko‘pincha noaniq bo‘lgani uchun uni erta aniqlash faqat klinik kuzatuv va laborator tekshiruvlarni uyg‘un qo‘llash orqali mumkin.

Kamqonlikni samarali davolash uchun uning sababini aniqlash, yetishmayotgan mikronutriyentlarni to‘ldirish va asosiy etiologik omillarni bartaraf etish zarur. Shu bilan birga, profilaktik chora-tadbirlar, xususan to‘g‘ri ovqatlanish, xavf guruhlarini muntazam nazorat qilish va tibbiy savodxonlikni oshirish ushbu patologiyaning tarqalishini kamaytirishda muhim rol o‘ynaydi.

Demak, mikronutriyent yetishmovchiligi bilan bog‘liq kamqonlikni erta tashxislash va oldini olish nafaqat individual salomatlikni saqlash, balki jamiyat salomatligini mustahkamlashda ham katta ahamiyatga ega.

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BOLALARDA BRONXIAL ASTMANING TARQALISH DINAMIKASI VA XAVF OMILLARINI BAHOLASH

Annotatsiya: *Ushbu maqolada bolalarda bronxial astmaning tarqalish dinamikasi hamda uning rivojlanishiga ta’sir etuvchi asosiy xavf omillari tahlil qilinadi. Kasallikning yosh, ekologik va ijtimoiy omillar bilan bog‘liqligi o‘rganilib, zamonaviy epidemiologik ma’lumotlar asosida baholash ishlari olib borilgan. Shuningdek, bronxial astmaning oldini olish, erta aniqlash va samarali boshqaruv choralarini takomillashtirish yo‘llari ko‘rib chiqiladi. Tadqiqot natijalari bolalar salomatligini muhofaza qilishda muhim ahamiyat kasb etadi.*

Kalit so‘zlar: *bronxial astma, bolalar salomatligi, epidemiologiya, tarqalish dinamikasi, xavf omillari, allergiya*

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DYNAMICS OF THE PREVALENCE OF BRONCHIAL ASTHMA IN CHILDREN AND ASSESSMENT OF RISK FACTORS

Annotation: *This article analyzes the dynamics of the prevalence of bronchial asthma in children and the main risk factors influencing its development. The relationship between the disease and age, environmental, and social factors is studied, and an assessment is carried out based on modern epidemiological data. In addition, the ways to improve prevention, early diagnosis, and effective management of bronchial asthma are considered. The results of the study are of great importance in protecting children’s health.*

Keywords: *bronchial asthma, child health, epidemiology, prevalence dynamics, risk factors, allergy*

Bronxial astma bugungi kunda bolalar orasida keng tarqalgan surunkali kasalliklardan biri hisoblanadi. So‘nggi yillarda ushbu kasallikning uchrash chastotasi sezilarli darajada ortib borayotgani kuzatilmoqda. Ayniqsa, rivojlanayotgan davlatlarda ekologik va ijtimoiy omillarning o‘zgarishi bilan bog‘liq holda bronxial astma bilan kasallanish darajasi oshmoqda. Tadqiqotlar shuni ko‘rsatadiki, bolalarda bronxial astma ko‘proq maktabgacha va maktab yoshida aniqlanadi. Bunda shaharlarda yashovchi bolalarda kasallik darajasi qishloq hududlariga nisbatan yuqoriroq bo‘lishi kuzatiladi. Bunga asosiy sabab sifatida havoning ifloslanishi, sanoat chiqindilari va transport vositalari ta’siri

ko‘rsatiladi. So‘nggi epidemiologik ma’lumotlarga ko‘ra, bronxial astma bilan kasallanish darajasi yil sayin oshib bormoqda. Bu esa kasallikni erta aniqlash va nazorat qilish tizimini takomillashtirish zarurligini ko‘rsatadi. Ayniqsa, bolalarda kasallikni kech aniqlash uning og‘ir shakllarga o‘tishiga olib kelishi mumkin. Tarqalish dinamikasini o‘rganishda yosh, jins va ijtimoiy omillar muhim rol o‘ynaydi. Masalan, o‘g‘il bolalarda astma erta yoshda ko‘proq uchrasa, qizlarda o‘smirlik davrida ko‘payishi kuzatiladi. Bu holat gormonal o‘zgarishlar bilan bog‘liq bo‘lishi mumkin. Shuningdek, global miqyosda bronxial astmaning ortib borishi urbanizatsiya jarayonlari bilan chambarchas bog‘liq. Zamonaviy turmush tarzi, yopiq muhitda ko‘proq vaqt o‘tkazish, sun’iy oziq-ovqat mahsulotlari iste’moli ham kasallik rivojlanishiga ta’sir etadi. Umuman olganda, bronxial astmaning tarqalish dinamikasi ko‘p omillarga bog‘liq bo‘lib, uni kompleks o‘rganish orqali samarali profilaktika choralarini ishlab chiqish mumkin.

Bronxial astma rivojlanishida turli xil xavf omillari muhim rol o‘ynaydi. Ushbu omillarni shartli ravishda ichki (endogen) va tashqi (ekzogen) guruhlarga ajratish mumkin. Har bir omil alohida yoki birgalikda kasallikning yuzaga kelishiga ta’sir ko‘rsatadi. Ichki omillar orasida eng muhimlaridan biri — irsiy moyillikdir. Agar ota-onalardan birida allergik kasalliklar yoki bronxial astma mavjud bo‘lsa, bolada ushbu kasallik rivojlanish ehtimoli yuqori bo‘ladi. Bu holat immun tizimining genetik xususiyatlari bilan bog‘liq bo‘lib, organizmning allergenlarga nisbatan yuqori sezuvchanligini ta’minlaydi. Immun tizimining yetilmaganligi ham bolalarda astma rivojlanishiga sabab bo‘lishi mumkin. Ayniqsa, erta yoshda turli infeksiyalar bilan tez-tez kasallanish nafas yo‘llarining sezuvchanligini oshiradi. Bu esa keyinchalik bronxial astmaga olib kelishi mumkin. Tashqi omillar ichida eng muhimlaridan biri — atrof-muhitning ifloslanishidir. Sanoat korxonalari, transport vositalari chiqindilari, chang va kimyoviy moddalar bolalar organizmiga salbiy ta’sir ko‘rsatadi. Ayniqsa, yirik shaharlarda yashovchi bolalarda astma ko‘proq uchrashi aynan shu omillar bilan izohlanadi. Allergenlar ham muhim xavf omillaridan biridir. Uy changi, hayvon junlari, o‘simlik changlari va mog‘or sporasi bolalarda allergik reaksiyalarni keltirib chiqaradi. Ushbu allergik jarayonlar esa bronxial astmaning rivojlanishiga olib keladi. Oziqlanish ham muhim omillardan hisoblanadi. Sun’iy qo‘shimchalarga boy oziq-ovqat mahsulotlarini iste’mol qilish, vitaminlar va mikroelementlarning yetishmasligi immun tizimining zaiflashishiga sabab bo‘ladi. Bu esa kasallikka moyillikni oshiradi. Ijtimoiy omillar ham e’tibordan chetda qolmasligi kerak. Ota-onalarning sog‘lom turmush tarziga amal qilmasligi, uyda chekish, gigiyena qoidalariga rioya qilmaslik bolalar salomatligiga salbiy ta’sir qiladi. Ayniqsa, passiv chekish bolalarda bronxial astma rivojlanishining asosiy sabablaridan biri hisoblanadi. Shuningdek, stress va psixologik omillar ham kasallik rivojlanishiga ta’sir etadi. Bolaning ruhiy holati, oilaviy muhit va ijtimoiy sharoit uning umumiy sog‘lig‘iga bevosita ta’sir ko‘rsatadi.

Bolalarda bronxial astmani erta aniqlash va to‘g‘ri tashxis qo‘yish kasallikni samarali boshqarishning asosiy omillaridan biridir. Tashxis jarayonida klinik belgilar, laborator va instrumental tekshiruv usullari muhim o‘rin tutadi.

Kasallikning asosiy klinik belgilariga nafas qisilishi, yo‘tal, ko‘krak qafasida siqilish hissi va xirillash kiradi. Ushbu belgilar ko‘pincha kechasi yoki jismoniy faollikdan so‘ng kuchayadi. Bolalarda bu simptomlar davriy ravishda namoyon bo‘lishi bilan xarakterlanadi. Tashxis qo‘yishda bemorning anamnezi muhim ahamiyatga ega. Ota-onadan bolaning kasallik tarixi, allergik reaksiyalar mavjudligi, oilaviy kasalliklar haqida ma’lumot olinadi. Bu ma’lumotlar kasallikni aniqlashda muhim yordam beradi. Laborator tekshiruvlar orasida qon tahlili, immunologik testlar va allergik sinamalar qo‘llaniladi. Bu usullar orqali organizmning allergenlarga nisbatan reaksiyasi aniqlanadi. Ayniqsa, immunoglobulin E (IgE) darajasining oshishi allergik jarayon mavjudligini ko‘rsatadi. Instrumental tekshiruvlar ichida spirometriya eng samarali usullardan biridir. Ushbu usul orqali nafas olish funksiyasi baholanadi va bronxlar torayishi aniqlanadi. Bolalarda spirometriya o‘tkazish biroz murakkab bo‘lishi mumkin, ammo bu usul kasallikni aniqlashda muhim ahamiyatga ega. Shuningdek, pikfloumetriya usuli ham keng qo‘llaniladi. Bu usul yordamida nafas chiqarish tezligi o‘lchanadi va kasallikning og‘irlik darajasi baholanadi. Bu usul oddiy va uy sharoitida ham qo‘llash mumkinligi bilan ajralib turadi. Differensial tashxis ham muhim bosqich hisoblanadi. Bronxial astmani boshqa nafas yo‘llari kasalliklaridan farqlash zarur. Masalan, bronxit, pnevmoniya yoki boshqa allergik kasalliklar bilan chalkashmasligi kerak. Zamonaviy tibbiyotda bronxial astmani baholash uchun maxsus xalqaro standartlar mavjud. Ushbu standartlar asosida kasallik darajasi aniqlanadi va individual davolash rejasi tuziladi. Umuman olganda, bronxial astmani tashxis qilish kompleks yondashuvni talab qiladi. To‘g‘ri va o‘z vaqtida qo‘yilgan tashxis kasallikni nazorat qilish va asoratlarning oldini olishda muhim ahamiyatga ega.

Bronxial astmaning oldini olish va uning tarqalishini kamaytirish zamonaviy tibbiyotning dolzarb muammolaridan biridir. Profilaktika choralarini samarali tashkil etish orqali kasallik rivojlanishini sezilarli darajada kamaytirish mumkin. Birlamchi profilaktika kasallikning oldini olishga qaratilgan bo‘lib, sog‘lom turmush tarzini shakllantirishni o‘z ichiga oladi. Homiladorlik davridan boshlab onaning sog‘lom ovqatlanishi, zararli odatlardan voz kechishi bolada kasallik rivojlanish xavfini kamaytiradi. Ikkinchi darajali profilaktika kasallikni erta aniqlash va uning rivojlanishini to‘xtatishga qaratilgan. Bunda bolalarni muntazam tibbiy ko‘rikdan o‘tkazish, allergik kasalliklarni vaqtida davolash muhim ahamiyatga ega. Uchinchi darajali profilaktika esa kasallik bilan yashayotgan bemorlarning hayot sifatini yaxshilashga qaratilgan. Bu bosqichda dori vositalari bilan davolash, nafas mashqlari va reabilitatsiya muhim rol o‘ynaydi. Atrof-muhitni sog‘lomlashtirish ham muhim omillardan biridir. Havoning ifloslanishini kamaytirish, yashash sharoitlarini yaxshilash va gigiyena qoidalariga rioya qilish kasallikning oldini olishda muhim rol o‘ynaydi. Shuningdek, ota-onalar va bolalar o‘rtasida tibbiy savodxonlikni oshirish zarur. Kasallik belgilari, xavf omillari va profilaktika choralarini bilish orqali astmaning oldini olish mumkin. Zamonaviy tibbiyotda innovatsion usullar, jumladan,

individual davolash rejalarini tuzish, yangi dori vositalaridan foydalanish va reabilitatsiya dasturlarini qo‘llash kasallikni samarali boshqarishga yordam beradi.

Xulosa

Bolalarda bronxial astma zamonaviy pediatriyada dolzarb muammolardan biri bo‘lib, uning tarqalish dinamikasi yil sayin ortib borayotgani kuzatilmoqda. Ushbu maqolada olib borilgan tahlillar shuni ko‘rsatadiki, bronxial astmaning rivojlanishi ko‘p omilli jarayon bo‘lib, irsiy moyillik, ekologik sharoit, allergenlar, ijtimoiy muhit va immun tizimi holati muhim ahamiyatga ega. Ayniqsa, urbanizatsiya jarayonlari, havoning ifloslanishi va passiv chekish bolalar salomatligiga salbiy ta’sir ko‘rsatib, kasallik xavfini oshirmoqda. Tadqiqot davomida bronxial astmani erta aniqlash va to‘g‘ri baholash kasallikning og‘ir asoratlarsiz kechishini ta’minlashda muhim omil ekanligi aniqlandi. Klinik belgilarni chuqur tahlil qilish, zamonaviy diagnostika usullaridan foydalanish va differensial tashxisni to‘g‘ri olib borish samarali davolash strategiyasini tanlash imkonini beradi. Ayniqsa, spirometriya va allergik testlarning ahamiyati yuqori baholanadi. Profilaktika masalasi bronxial astmaga qarshi kurashishda asosiy yo‘nalishlardan biri hisoblanadi. Birlamchi, ikkilamchi va uchlamchi profilaktika choralarini kompleks ravishda amalga oshirish orqali kasallik tarqalishini kamaytirish mumkin. Ota-onalar va bolalar o‘rtasida tibbiy savodxonlikni oshirish, sog‘lom turmush tarzini shakllantirish va ekologik omillarni nazorat qilish muhim ahamiyat kasb etadi..

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TALABALARNI XALQ TABOBATIGA TAYYORLASHDA TIZIMLI YONDASHUV ASOSIDA EKOLOGIK KOMPETENTLIGINI RIVOJLANTIRISHNI METODIK TAKOMILLASHTIRISH TEXNOLOGIYASINI BAHOLASH

Annotatsiya: *Tadqiqotda tibbiyot oliy ta’lim muassasalari talabalarining xalq tabobatiga tayyorlash jarayonida ekologik kompetentligini tizimli yondashuv asosida rivojlantirishning metodik takomillashtirish texnologiyasi asoslanadi. Farg‘ona jamoat salomatligi tibbiyot instituti (FJSTI) va Andijon davlat tibbiyot instituti (ADTI) talabalari o‘rtasida 125 nafardan iborat tajriba va nazorat guruhlari shakllantirildi. Bioekologiya fani misolida tajriba guruhida umumlashtirilgan OSCE ko‘rsatkichi 85,28 ballni, nazorat guruhida 71,96 ballni tashkil etdi (p<0,001). Natijalar taklif etilgan texnologiyaning samaradorligini tasdiqlaydi.*

Tayanch so‘zlar: *xalq tabobati, ekologik kompetentlik, tizimli yondashuv, bioekologiya, OSCE, metodik texnologiya.*

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EVALUATING THE METHODOLOGY FOR ENHANCING THE ECOLOGICAL COMPETENCE OF STUDENTS IN TRADITIONAL MEDICINE TRAINING THROUGH A SYSTEMATIC APPROACH

Abstract: *The study substantiates a technology for methodological improvement of ecological competence development in medical students being prepared for folk medicine practice, based on a systems approach. Experimental and control groups of 125 students each were formed at Fergana Medical Institute of Public Health (FJSTI) and Andijan State Medical Institute (ADTI). In the Bioecology course, the aggregated OSCE indicator reached 85.28 points in the experimental group versus 71.96 points in the control group (p<0.001), confirming the effectiveness of the proposed technology.*

Keywords: *folk medicine, ecological competence, systems approach, bioecology, OSCE, methodological technology.*

KIRISH

Zamonaviy tibbiyot ta’limida talabalarning ekologik kompetentligini shakllantirish dolzarb 632 mpiric 632 e muammo sifatida e’tirof etilmoqda. O‘zbekiston Respublikasi Prezidentining 2023-yil 22-fevraldagi PF-30-son

Farmoni bilan tasdiqlangan “O‘zbekiston—2030” strategiyasida aholi salomatligini muhofaza qilish, shu jumladan milliy an’anaviy tabobatni ilmiy asosda rivojlantirish vazifalari belgilab berilgan. Xalq tabobati o‘simliklar, tabiiy vositalar va ekologik muhit bilan uzviy bog‘liq bo‘lib, 633mpir mutaxassisdan yuksak ekologik savodxonlik va tizimli fikrlashni taqozo etadi [1, 3].

Tizimli yondashuv talabaning bilim, ko‘nikma va qadriyatlar majmuini o‘zaro bog‘lagan holda shakllantirishni, bioekologik jarayonlarni yaxlit idrok etishni ta’minlaydi [2, 5]. Xususan, bioekologiya fani xalq tabobatida qo‘llaniladigan o‘simlik xomashyosining ekologik tozaligi, biogeokimyoviy doiralar va inson salomatligi o‘rtasidagi aloqalarni o‘rganish imkonini beradi [4, 7]. Biroq amaldagi o‘quv jarayonida ushbu aloqalar ko‘pincha fragmentar tarzda yoritilmoqda, bu 633 mpiri‘lajak 633 mpir-shifokorning kompleks ekologik kompetentligini to‘liq shakllantirmaydi [6, 8].

Tadqiqotning maqsadi — tibbiyot 633 mpiric 633 e talabalarini xalq tabobatiga tayyorlashda tizimli yondashuv asosida ekologik kompetentligini rivojlantirishning metodik takomillashtirish texnologiyasini ishlab chiqish va uning samaradorligini bioekologiya fani misolida 633mpiric asoslashdan iborat.

MATERIAL VA USULLAR

Tadqiqot 2024—2025-o‘quv yili davomida ikki oliy tibbiy ta’lim muassasasida olib borildi. Tajriba guruhi Farg‘ona jamoat salomatligi tibbiyot instituti (FJSTI) talabalaridan (n=125), nazorat guruhi esa Andijon davlat tibbiyot instituti (ADTI) talabalaridan (n=125) shakllantirildi. Tanlov stratifikatsiyalangan tasodifiy namuna olish usuli bilan amalga oshirildi; guruhlar jinsi, yoshi va boshlang‘ich o‘zlashtirish darajasi bo‘yicha statistik jihatdan teng edi ($p>0,05$).

Tajriba guruhida bioekologiya fani bo‘yicha muallif tomonidan ishlab chiqilgan tizimli yondashuvga asoslangan metodik texnologiya qo‘llanildi. Texnologiya to‘rt bosqichdan iborat: (1) motivatsion-diagnostik, (2) nazariy-kognitiv, (3) amaliy-integrativ va (4) refleksiv-baholash bosqichlari. Mazmunli jihatdan texnologiya xalq tabobatida qo‘llaniladigan shifobaxsh o‘simliklarning ekologik xavfsizligi, biogeotsenozlardagi o‘rni, antropogen ta’sirga chidamliligi va farmakoekologik xususiyatlari bo‘yicha integratsiyalashgan modullarni o‘z ichiga oldi [5, 9]. Nazorat guruhida an’anaviy o‘qitish metodikasi saqlab qolindi.

Talabalarning ekologik kompetentligi besh tarkibiy qism bo‘yicha (nazariy bilim, amaliy ko‘nikma, kommunikativ kompetentlik, ekologik tahlil, xalq tabobati tamoyillari) Obyektiv Strukturlangan Klinik Imtihon (OSCE) formatida 100 balli tizimda baholandi. Qo‘shimcha ravishda “Ekologik kompetentlik darajasi” muallif testi (30 savol; Cronbach $\alpha=0,87$) va V.A. Yasvin metodikasi asosidagi ekologik munosabat so‘rovnomasi qo‘llanildi [10-11].

Statistik ishlov berish SPSS Statistics 26.0 dasturida amalga oshirildi. O‘rtacha arifmetik qiymat (M), standart og‘ish (SD) va 95% ishonchli interval hisoblandi. Taqsimotning normalligi Shapiro-Wilk testi bilan tekshirildi. Mustaqil guruhlar orasidagi farqlar Styudent t-mezoni hamda Mann-Whitney U-mezoni yordamida, sifat ko‘rsatkichlari χ^2-mezoni bilan, effektning kattaligi Koen d ko‘rsatkichi orqali baholandi. $p<0,05$ qiymati statistik ishonchli deb qabul qilindi.

NATIJALAR

Pedagogik eksperimentning yakuniy bosqichida olingan OSCE natijalari tajriba va nazorat guruhlari o‘rtasida sezilarli farq mavjudligini ko‘rsatdi. FJSTI talabalarining besh tarkibiy qism bo‘yicha umumlashtirilgan o‘rtacha ko‘rsatkichi M=85,28±4,60 ni tashkil etgan holda, ADTI talabalarida ushbu qiymat M=71,96±6,44 ga teng bo‘ldi. Styudent t-mezoni bo‘yicha farq statistik ishonchli (t=18,84; df=248; p<0,001), effekt kattaligi Koen d=2,38 — “katta effekt” darajasiga mos keladi.

Shapiro-Wilk testi har ikki guruhda ma’lumotlar taqsimoti normaga yaqinligini tasdiqladi (FJSTI: W=0,983, p=0,142; ADTI: W=0,976, p=0,089). Mann-Whitney U-mezoni ham parametrik mezon xulosasini qo‘llab-quvvatladi (U=1652,5; Z=–9,47; p<0,001). χ^2-mezoni yordamida “yuqori darajadagi ekologik kompetentlik” (≥80 ball) ulushini taqqoslash FJSTIda 78,4% (98/125), ADTIda 21,6% (27/125) ni ko‘rsatdi (χ^2=79,36; df=1; p<0,001).

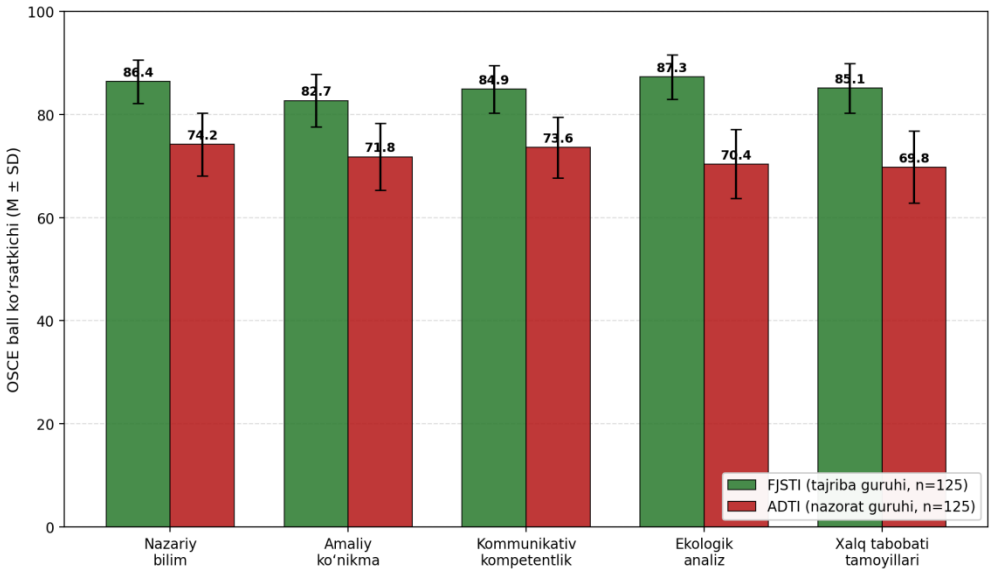
Ekologik tahlil komponenti bo‘yicha eng yuqori farq qayd etildi (Δ12,20 ball foydasiga: 87,3 vs 70,4), bu taklif etilgan texnologiyaning aynan ekologik-tizimli fikrlash tarkibini rivojlantirishga yo‘naltirilgan modullari samaradorligini ko‘rsatadi. Kommunikativ kompetentlik bo‘yicha ham tajriba guruhi 11,30 ballga ustunlikka ega bo‘ldi, bu xalq tabobati tamoyillarini bemor bilan muloqotda to‘g‘ri izohlash ko‘nikmasining yaxshilanganini dalolatlaydi.

1-jadval.

FJSTI va ADTI talabalarining OSCE komponentlari bo‘yicha taqqoslanma natijalari (M±SD)

Komponent	FJSTI (n=125)	ADTI (n=125)	Farq (Δ)	t-mezon	p
Nazariy bilim	86,4±4,2	74,2±6,1	+12,2	18,41	<0,001
Amaliy ko‘nikma	82,7±5,1	71,8±6,5	+10,9	14,74	<0,001
Kommunikativ kompetentlik	84,9±4,6	73,6±5,9	+11,3	16,89	<0,001
Ekologik tahlil	87,3±4,3	70,4±6,7	+16,9	23,73	<0,001
Xalq tabobati tamoyillari	85,1±4,8	69,8±7,0	+15,3	20,08	<0,001
O‘rtacha (umumiy)	**85,28±4,60**	**71,96±6,44**	**+13,32**	**18,84**	**<0,001**

Ekologik munosabat so‘rovnomasi tajriba guruhida “yuqori” darajadagi ekologik ongga ega talabalar ulushining 34,4% dan 76,8% gacha o‘sganini, nazorat guruhida esa bu ko‘rsatkich 31,2% dan 42,4% gacha ko‘payganini qayd etdi. Bu farq χ^2=28,12 (p<0,001) ishonchli sath bilan tasdiqlanadi.



1-rasm. FJSTI va ADTI talabalarining OSCE komponentlari bo‘yicha natijalarini qiyosiy tahlili (M±SD; n=125+125)

MUHOKAMA

Olingan natijalar tizimli yondashuv asosidagi metodik texnologiyaning bioekologiya fani misolida talabalarning ekologik kompetentligini rivojlantirishda samarali ekanligini ko‘rsatmoqda. Koen d=2,38 qiymati pedagogik tadqiqotlarda kamdan-kam uchraydigan “juda katta” effekt darajasiga to‘g‘ri keladi [6]. Olingan ma’lumotlar xalqaro tadqiqotlar natijalari bilan hamohang: K. Mpoudem va hammualliflari (2024) Afrika universitetlarida integrativ ekologik ta’lim modullarini qo‘llash orqali klinik qarorlar sifati 18,4% ga yaxshilanganini qayd etgan [8].

Xalq tabobati kontekstida ekologik kompetentlikni shakllantirish shifobaxsh o‘simliklarni yig‘ish va qayta ishlashdagi ekologik xavfsizlik, bioxilma-xillikning muhofazasi va antropogen ifloslanishni baholash masalalarini qamrab oladi. Texnologiyaning to‘rt bosqichli strukturasi talabalarga bilim, ko‘nikma va qadriyat tizimini bosqichma-bosqich shakllantirishga imkon beradi, bu esa E.V. Pisarev va N.O. Yakovleva (2023) tomonidan ta’riflangan kompetentlik-bosqichli modelga mos keladi [9]. Shuningdek, D. Hayot va F. To‘xtayevning (2024) O‘zbekiston sharoitidagi ekologik ta’lim bo‘yicha natijalari bilan uyg‘unlik mavjud [2].

Tadqiqotning ilmiy yangiligi shundan iboratki, ilk bor xalq tabobati yo‘nalishidagi talabalar uchun bioekologiya fani asosida ekologik kompetentlikni tizimli rivojlantirishning empirik asoslangan texnologiyasi ishlab chiqildi. Tadqiqotning cheklovlari sifatida ikki muassasa doirasida o‘tkazilganligi va uzoq muddatli kuzatuvning yo‘qligini ko‘rsatish mumkin; bu kamchiliklar keyingi bosqichda respublika miqyosidagi ko‘p markazli tadqiqot bilan bartaraf etiladi.

XULOSA

Tizimli yondashuvga asoslangan metodik takomillashtirish texnologiyasi xalq tabobatiga yo‘naltirilgan tibbiyot talabalarining ekologik kompetentligini

rivojlantirishda yuqori samaradorlikka ega. Bioekologiya fani bo‘yicha o‘tkazilgan OSCE natijalari tajriba guruhida nazorat guruhiga nisbatan o‘rtacha 13,32 ballga (18,51% nisbiy o‘sish) yuqori bo‘lganligi statistik ishonchli tasdiqlandi ($p<0,001$; Koen $d=2,38$). Taklif etilgan texnologiyani O‘zbekiston Respublikasi tibbiyot oliy o‘quv yurtlarining xalq tabobati yo‘nalishi o‘quv dasturiga joriy etish maqsadga muvofiq hisoblanadi.

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THE ROLE OF IMMUNE DISORDERS IN THE DEVELOPMENT OF EXUDATIVE MIDDLE OTITIS IN CHRONIC ADENOIDITIS IN CHILDREN

Abstract: *Background: Otitis media with effusion involves non-purulent fluid in the middle ear and conductive or mixed hearing loss. Eustachian tube dysfunction, often linked to chronic adenoiditis, is a key factor. The pharyngeal tonsil supports local immunity, and reduced secretory IgA may promote disease development.*

Objective: This study will examine how various components of mucosal immune defense (including IgA, IL-6, IL-10, and IFN-γ) are reflected in the symptoms and progression of chronic adenoiditis (CA). In parallel, their role in the predisposition to developing otitis media with effusion (EOM) in the presence of CA will be investigated.

Materials and Methods: The study included children with chronic adenoiditis, with or without otitis media with effusion. Diagnosis was based on clinical data, otomicroscopy, nasopharyngeal endoscopy, tympanometry, and audiology. Nasal lavage fluid was analyzed for secretory IgA and cytokines, and results were compared with healthy controls.

Result: The study demonstrated that the imbalance of immune markers in nasal secretions reflects enhanced inflammation and impaired local immune homeostasis in children with chronic adenoiditis and otitis media with effusion.

Conclusion: In children with chronic adenoiditis, especially those complicated by otitis media with effusion, local levels of IgA, IL-6, and IL-10 are decreased, while the frequency of IFN-γ detection is increased. This indicates weakened protective mechanisms of the nasal and nasopharyngeal mucosa and a higher risk of involvement of the middle ear mucosa in the pathological process.

Keywords: *exudative otitis media, adenoiditis, immunoglobulins, interleukin, immunity.*

Introduction

Exudative otitis media (EOM) is a condition in which the middle ear inflames without suppuration, but with the formation of fluid of various compositions (serous, mucoid, or mucoid) in its cavity. This leads to hearing

impairment manifested as conductive or mixed hearing loss. It is believed that auditory tube dysfunction, often caused by chronic adenoiditis (CA), plays a key role in the development of EOM[1]. In preschool and primary school-aged children, chronic adenoiditis (CA) is a fairly common problem affecting from 18% to 55% of upper respiratory tract diseases. This means that it plays a very important role among ENT diseases in this age group. [4]. A characteristic feature of chronic adenoiditis is its prolonged nature, frequent exacerbations, and the inability to completely eliminate the pathological changes. Associated pathology encompasses various organs and systems and is represented by a wide range of comorbidities, the number of which can be counted by the tens. [3]. The pharyngeal tonsil is an important element of the lymphoepithelial pharyngeal ring and actively participates in the formation of local immunity of the upper respiratory tract. The pharyngeal tonsil, being a key component of the nasal-associated lymphoid tissue (NALT) in the nasal cavity and paranasal sinuses, plays a crucial role in attracting functionally active immune cells to the respiratory tract mucosa. In addition, it modulates the strength of immune responses and stimulates the production of secretory immunoglobulin A (sIgA). [2] Based on modern data, the ciliated epithelium of the pharyngeal tonsils of the nasal cavity and nasopharynx provides IgA synthesis to a greater extent than the palatine tonsils. [2]. The nasal cavity, being the entrance gateway to the respiratory tract, primarily experiences the maximum impact of pathogenic environmental factors. Immunoglobulin A (IgA) plays a central role in protecting the mucous membranes, especially the respiratory tract, acting as the first line of defense. When IgA levels decrease due to weakened local or general immunity, the protective barrier of the auditory tube's mucous membrane is disrupted. This may contribute to the development of exudative otitis media (ESO). [6, 7]. The process of secretory IgA formation involves the differentiation of B-lymphocytes into plasma cells under the influence of cytokines such as IL-6, IFN-γ, and IL-10, produced by T-helpers. [4]. Important it should be noted that IL-6 and IFN-γ primarily stimulate inflammation, whereas IL-10, in contrast, suppresses inflammatory reactions and controls the strength of the immune response.

Materials and Methods

The study included 44 children of both sexes, aged 2 to 7 years, diagnosed with chronic adenoiditis in remission. The first group consisted of 24 patients with isolated chronic inflammation of the pharyngeal tonsil, while the second group comprised 20 children who were diagnosed with otitis media with effusion secondary to chronic adenoiditis. The diagnosis was verified based on clinical and anamnestic data, otomicroscopy results using an operating microscope, and endoscopic examination of the nasopharynx using a 2.7 mm rigid endoscope with a 0° viewing angle (Karl Storz, Germany). The functional state of the middle ear was assessed by tympanometry (type B or C) using an Interacoustics tympanometer (Denmark). To assess auditory function, an audiological examination was conducted, which included pure-tone audiometry. This examination, performed using an Interacoustics audiometer (Denmark), diagnosed

grade I or II conductive hearing loss. For laboratory analysis, samples were collected from the nasal cavity. These samples consisted of nasal lavage fluid obtained by irrigating the nasal passages with 2-4 milliliters of sterile isotonic sodium chloride solution. The resulting fluid was centrifuged at 3000 rpm, after which the supernatant was separated and frozen at -18°C until further analysis. The level of secretory immunoglobulin A (IgA) was measured by enzyme-linked immunosorbent assay (ELISA) using commercially available kits from Human GmbH (Germany), which are widely used in laboratory practice in Central Asian countries. A solid-phase enzyme-linked immunosorbent assay with commercial reagent kits from DRG International (Germany) was used to measure IL-6, IFN-γ, and IL-10. Cytokine concentrations were calculated in picograms per 1 g of protein in the nasal lavage fluid. The total protein level in the study samples was determined by the biuret method using reagents from Human GmbH (Germany). To process the clinical and anamnestic information in both cohorts, a questionnaire was used to systematically assess the key manifestations of chronic adenoiditis: impaired nasal breathing, nocturnal snoring, rhinolalia, pathological nasal discharge, and cough. The severity of each symptom was rated on a five-point scale, where 1 point corresponded to the complete absence of the symptom and 5 points to its maximum severity. Intermediate values (2, 3, 4) reflected minimal, moderate, and above-average symptom intensity, respectively. To assess mucosal immunity parameters, a control group of 15 apparently healthy children of a corresponding age was included. Statistical analysis of the data was performed using the Statistica 8.0 software package. The median (Me) and interquartile range (Q25-Q75) were calculated as part of the descriptive statistics. Quantitative indicators between independent samples were compared using the non-parametric Wilcoxon rank-sum test. Differences were considered statistically significant at $p < 0.05$.

Results

The evaluation of patient complaints demonstrated that the severity of nasal breathing difficulty and snoring during sleep did not differ statistically between the groups. However, symptoms such as rhinorrhea, cough, and nasal voice were significantly less pronounced in children from the first group (CA) compared to children from the second group (CA with EOM). Clinical and anamnestic data are presented in Diagram 1. A comparative analysis of the questionnaires revealed that the second group of patients had a statistically significant higher total score for all symptoms than the first group ($p = 0.017$, Diagram 1). In the samples taken from the control group participants, secretory immunoglobulin A was present in every case (100%). Moreover, its concentration was significantly higher than in patients from both clinical groups. Detailed data on the concentration of secretory IgA and cytokines in nasal washes are provided in Table 1. Severity of Clinical Symptoms in Children with Chronic Adenoiditis and with EOM. The diagram displays the median (Me) and interquartile range (Q25-Q75) for five clinical symptoms in two patient groups: CA (n=24) and CA+EOM (n=20).

The severity of clinical symptoms in children with chronic adenoiditis and concurrent exudative otitis media.(Me.Q25-Q75)

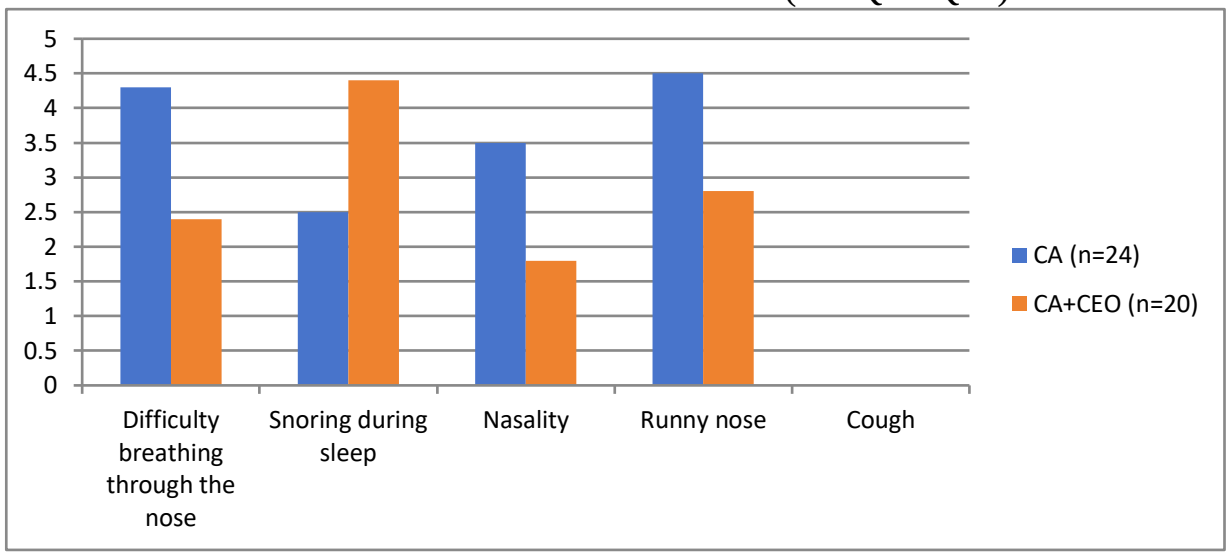

Table 1.

IgA and cytokine levels in nasal washings in patients with chronic adenoiditis and OME, pg/g protein (Me, Q25-Q75).

Parameter	Control group (n=15)	CA (Group 1, n=24)	CA + OME (Group 2, n=20)	p1	p2
IgA	40,2 (28,0–65,0)	23,5 (18,0–35,0)	12 (4,0–20,0)	0,03 / 0,05	0,0005 / 0,008
IL-6	42,0 (5,0–240,0)	7,5 (4,0–21,0)	7,25 (2,5–12,0)	0,03 / 0,02	0,006
IL-10	0 (0–0)	0 (0–0)	0 (0–4,0)	—	—
IFN-γ	0 (0–0)	0 (0–1,0)	0 (0–3,8)	0,07 / 0,09	—

Note: Me - median, Q25-Q75 - interquartile range; p1 - significance level of differences compared to the control group; p2 - significance level of differences between the two groups.

In the group of patients with isolated chronic adenoiditis (CA), IgA was detected in nasal wash samples in 92% of cases. A similar detection rate for this immunoglobulin (92%) was also noted in children with CA complicated by otitis media with effusion (EOM).

According to the results of statistical analysis, IgA levels in patients of the first group showed a downward trend compared to the control group. However, despite this trend, the observed differences were not statistically significant ($p = 0.006$). At the same time, children in the second group had a significant decrease in IgA concentration relative to control values (12 [4.0-20.0] pg/g of total protein; $p = 0.0005$). Additionally, the IgA level in patients with a combination of CA and EOM was found to be statistically significantly lower compared to the values in children with uncomplicated CA ($p = 0.008$).

The study of the cytokine profile of nasal lavage in healthy children demonstrated that interleukin-6 (IL-6) was detected in the vast majority of samples

(over 80%) and was characterized by the highest concentrations compared to both clinical groups, reaching 42.0 [5.0-240.0] pg/g of total protein.

Regarding interleukin-10 (IL-10) and interferon-γ (IFN-γ), the median values in the control group were zero. Nevertheless, IL-10 was detected in 21% of the examined children, and in the positive samples, its concentration was 20.5 [5.0-34.0] pg/g of protein. Interferon-γ was detected only in isolated cases (6.3%), and its content was at a minimal level, not exceeding the sensitivity threshold of the test systems used.

Table 3.
Analysis of the prevalence and levels of IL-10 and IFN-γ in positive nasal wash samples from patients with CA and EOM.

Group	IL-10, Me (Q25-Q75), pg/g protein	Frequency of positive samples, %	IFN-γ, Me (Q25-Q75), pg/g protein	Frequency of positive samples, %
Control (n=15)	20,5 (5,0–34,0)	22	–	6
CA (Group 1, n=24)	17,0 (12,5–40,0)	13	16,5 (15,0–21,0)	17
CA + OME (Group 2, n=20)	–	9	26,0 (4,0–120,0)	31

In children with chronic adenoiditis without concomitant otitis media with effusion, a statistically significant deficiency of IL-6 in the nasal secretion was recorded compared to their healthy peers (median 7.5 pg/g protein; p = 0.03). Notably, the median values of IL-10 and IFN-γ in this group were zero. The analysis showed that IL-10 was present in 13% of the samples studied, which is approximately half its detection frequency in the control group. However, in the samples where IL-10 was detected, its concentration did not differ from the control values. At the same time, IFN-γ was detected in 17% of samples, which is almost three times more frequent than in healthy children, with a median concentration of 16.5 pg/g of protein in positive samples.

The study results indicate that children with CA and EOM have a marked decrease in IL-6 concentration (7.5 [4.0-21.0] pg/g protein; p = 0.02) (Table 1), which is a statistically significant difference from the control group. Regarding IL-10 and IFN-γ, their median values generally did not differ from the control and the CA without EOM groups, remaining at zero. However, despite this, a trend toward an increased IFN-γ level was recorded compared to the control group (p = 0.09). A more detailed analysis showed that IL-10 was detected very rarely (in 9% of cases), whereas IFN-γ was detected significantly more often (in 31% of cases), and its concentrations in these positive samples were quite high (26.0 [4.0-120.0] pg/g protein, Table 3). A more detailed analysis showed that IL-10 was detected extremely rarely (9% of cases), while IFN-γ was detected significantly more frequently (31% of cases), and in these positive samples, its concentrations were quite high. (26.0 [4.0-120.0] pg/g protein, table.

The comparative analysis established that IFN-γ levels in positive samples did not show statistically significant fluctuations between the clinical groups. At the same time, the interpretation of the IL-10 data is limited, as its concentration in the second group was minimal (trace amounts), which prevents a full comparison.

Discussion

The findings of the present study confirm that chronic adenoiditis, particularly when complicated by otitis media with effusion, is associated with impaired local mucosal immunity. Children with these conditions demonstrated decreased levels of secretory IgA and IL-6 in nasal secretions, along with rare detection of IL-10 and relatively frequent presence of IFN-γ, indicating a shift toward a pro-inflammatory Th1 response. These results highlight the critical role of local immune factors in maintaining the protective function of the nasopharyngeal mucosa and preventing the spread of inflammation to the middle ear.

The study emphasizes the importance of monitoring immune markers in children with chronic adenoiditis to identify those at higher risk for otitis media with effusion. Supporting local mucosal immunity, for example through targeted interventions or immunomodulatory strategies, may help reduce disease progression. Despite these findings, ongoing evaluation of mucosal immune status remains essential, as fluctuations in immune responses can influence susceptibility to middle ear pathology over time.

This approach aligns with previous research demonstrating that local immune deficiencies contribute to the development and persistence of otitis media with effusion in children with adenoid hypertrophy.

Conclusion

The intensification of chronic adenoiditis symptoms in patients of the second group (with exudative otitis media) statistically confirms a more active inflammation. The study of immune markers in nasal rinse water revealed similar trends in both groups of patients compared to the control group: a decrease in the level of immunoglobulin A (IgA) and a decrease in the production of interleukin-6 (IL-6). In this case, interleukin-10 (IL-10) was detected rarely, and interferon-γ (IFN-γ) was detected relatively frequently. Low IgA levels, and in some cases its complete absence, indicate the key role of this protective protein in maintaining the immune homeostasis of the nasopharyngeal mucosa and nasopharynx, which is provided by the local immune system (NALT).

The detection of IFN-γ in nasal secretions reflects the shift in immune balance towards the predominance of type 1 T-helpers in chronic inflammation of the pharyngeal tonsils. This imbalance was most pronounced in patients with EOS, which corresponds to data presented in the works of S. Matkovic and co-authors [6]. The presence of IFN-γ, on the one hand, indicates its pro-inflammatory effect when inflammation spreads to the middle ear, and on the other hand, confirms its participation in the regulation of local IgA production in the nasopharynx.

Consequently, a decrease in local IgA, IL-6, and IL-10 levels, along with the appearance of IFN-γ in nasal flush, indicates a weakening of the mucous

membrane's protective mechanisms and the depletion of its local reserves. This can contribute to the spread of the pathological process to the mucous membrane of the middle ear.

Thus, a decrease in the local production of IgA, IL-6, and IL-10, along with the detection of IFN-γ in nasal flushing water, indicates a weakening of the mucous membrane's protective mechanisms and the depletion of its functional capabilities. This, in turn, can contribute to the development of a pathological process in the mucous membrane of the middle ear.

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ECOLOGICAL AND RECLAMATION MONITORING USING GEOSPATIAL TECHNOLOGIES IN THE NORTHERN DISTRICTS OF KARAKALPAKSTAN: A CASE STUDY OF KARAUZYAK DISTRICT WITH COMPARATIVE ANALYSIS TO CHIMBAY DISTRICT

Abstract: *This article presents a comprehensive framework for ecological and reclamation monitoring in the northern districts of the Republic of Karakalpakstan, with a specific focus on Karauzyak district—one of the least studied and most environmentally vulnerable territories in the Aral Sea region. Using a combination of remote sensing data (Landsat-8/9, Sentinel-2, MODIS), field-based soil and groundwater measurements, and Geographic Information System (GIS) analyses, this study examines the spatial and temporal dynamics of soil salinization, groundwater behavior, and vegetation degradation over the period 2000-2024.*

Keywords: *Ecological monitoring, reclamation monitoring, GIS, remote sensing, soil salinization, Karauzyak district, Chimbay district, Aral Sea region, groundwater dynamics, land degradation, ecological risk zoning, comparative analysis.*

Introduction

The Aral Sea ecological crisis has created one of the world's most pressing environmental monitoring challenges. Across the 2.5 million hectares of irrigated land in the lower Amu Darya basin—including the autonomous republic of Karakalpakstan—land degradation processes unfold at rates and spatial patterns that conventional monitoring systems cannot adequately track. Soil salinization, the primary degradation process, is both dynamic (changing seasonally with irrigation and evaporation) and irreversible in human timeframes once severe thresholds are exceeded. Groundwater tables, which control the direction and magnitude of salt flux, respond to irrigation management decisions made thousands of kilometers upstream on the Amu Darya. Vegetation cover, including natural halophytic communities that stabilize soils, degrades through a combination of direct anthropogenic pressure (overgrazing, fuelwood collection)

and indirect climate-driven changes (drought intensification, dust storm frequency).

Against this backdrop, systematic monitoring is not merely a scientific exercise but a prerequisite for adaptive land management. Without reliable, spatially explicit, and temporally consistent data on land condition, interventions cannot be targeted, their effectiveness cannot be evaluated, and early warning of impending degradation thresholds cannot be provided. Yet monitoring capacity in Karakalpakstan remains severely limited. The Soviet-era network of observation wells and soil monitoring plots has largely collapsed, with fewer than 30% of wells operational and fewer than 10% sampled annually. Remote sensing data, while increasingly available at no cost, requires technical expertise for processing and interpretation that is scarce at the district level. International projects have filled some gaps—notably the German Society for International Cooperation (GIZ) project "Ecologically Oriented Regional Development in the Aral Sea Region" (2019-2023), which developed a GIS-based monitoring system for Chimbay district—but these efforts have not been systematically extended to adjacent districts.

Study Area: Karauzyak District

Karauzyak district is bounded by the Republic of Kazakhstan to the north and west, Chimbay district to the west-southwest, and the Amu Darya river to the east. The district's territory spans elevations from 52 meters above sea level in the irrigated southern zone to 62 meters in the northern desert (the Aralkum surface slopes gently northward toward the former sea). Topographic relief is minimal—less than 3 meters variation across most irrigated areas—but subtle differences in microtopography exert strong control over water ponding, runoff, and salt accumulation.

The climate is hyper-arid and sharply continental. Based on data from the Karauzyak meteorological station (1970-2024), mean annual temperature is 11.2°C, with July mean of 28.5°C (absolute maximum 46.2°C) and January mean of -7.8°C (absolute minimum -33.4°C). Annual precipitation averages 98 mm, falling primarily as brief, intense spring storms (March-May accounts for 45% of annual total). Potential evapotranspiration (reference crop ET0) averages 1,350 mm/year, meaning that natural precipitation meets less than 8% of the water demand of most crops. Southwest winds prevail, with mean velocity of 4.5 m/s and frequent dust storms (20-30 days/year) that transport salt-rich sediments from the Aralkum onto agricultural fields.

Of the 78,400 hectares classified as agricultural land in Karauzyak district, 54,200 hectares (69%) are irrigated cropland, 18,600 hectares (24%) are rainfed or fallow land, and 5,600 hectares (7%) are under orchards or vineyards (District Statistical Office, 2024). The predominant crop rotation is cotton-wheat-fallow, with cotton (25,000 ha), winter wheat (18,000 ha), and alfalfa (4,000 ha) occupying most of the irrigated area. Small plots of vegetables (potato, onion, tomato) and forage crops (sorghum, maize) are cultivated on household garden plots (dekhan farms) totaling 3,200 hectares.

For comparative purposes, Chimbay district—located immediately west of Karauzyak—was selected as a reference. Chimbay shares similar climate, hydrogeology, and agricultural systems but has been the subject of more intensive monitoring due to the GIZ project (2019-2023), which established 42 groundwater observation wells, implemented annual soil sampling at 156 points, and developed a GIS database integrating these measurements with satellite remote sensing data. Key characteristics of the two districts are compared in Table 5.

Table 5.
Comparative characteristics of Karauzyak and Chimbay districts

Parameter	Karauzyak	Chimbay
Total area (ha)	589,800	604,900
Irrigated area (ha)	54,200	58,300
Canal lining proportion (%)	15	38
Drainage density (km/km²)	0.31	0.62
Observation wells (#, operational)	8	42
Groundwater monitoring frequency	None (ad hoc)	Monthly
Soil sampling frequency	None (ad hoc)	Biennial
GIS database exists?	No	Yes
Remote sensing training	None	Widespread

Materials and Methods

Three satellite data sources were utilized to capture different temporal and spatial scales of land surface dynamics:

Landsat archive (2000-2024). All available Level-2 surface reflectance scenes from Landsat-5 TM (2000-2011), Landsat-7 ETM+ (2000-2017, excluding SLC-off stripes), Landsat-8 OLI (2013-2024), and Landsat-9 OLI-2 (2022-2024) were acquired via the USGS EarthExplorer portal. Scene selection prioritized cloud-free (<10% cloud cover) acquisitions during the late summer dry season (August-September), when soil salinity signals are maximized due to minimum soil moisture and maximum surface salt concentration. A total of 48 usable scenes spanning 2000, 2005, 2010, 2015, 2020, and 2024 were processed. Preprocessing included conversion to surface reflectance, masking of clouds and cloud shadows (FMask algorithm), and subsetting to the Karauzyak district boundary.

Sentinel-2 (2017-2024). Level-2A products (surface reflectance with scene classification) from Sentinel-2A and 2B were accessed through the Copernicus Open Access Hub. With 10-meter resolution in visible and near-infrared bands—superior to Landsat's 30-meter resolution—Sentinel-2 enabled more detailed

mapping of field-scale variability. Scene selection followed the same late-summer, cloud-free criteria as Landsat, yielding 32 scenes from 2017, 2019, 2021, and 2024.

MODIS (2000-2024). MOD13Q1 vegetation index products (250-meter resolution, 16-day composites) from the Terra satellite were used to characterize vegetation phenology and long-term trends. The Normalized Difference Vegetation Index (NDVI) and Enhanced Vegetation Index (EVI) were extracted for growing season months (April-September) for each year 2000-2024.

All processing was conducted in Google Earth Engine (GEE), a cloud-based platform for petabyte-scale geospatial analysis. GEE's computational infrastructure enabled batch processing of the entire Landsat and MODIS time series without local data downloads or high-performance computing requirements.

Soil salinity cannot be measured directly from optical remote sensing, but empirical relationships exist between surface reflectance and salt content, particularly in the visible and shortwave infrared regions. Previous studies (Scudiero et al., 2015; Fan et al., 2021) have developed spectral indices that correlate with salinity, with performance varying by arid region. Based on a literature review and preliminary testing with Karauzyak field data, three indices were selected:

Salinity Index (SI) =(B+R)/2 where B=blue band reflectance, R = red band reflectance. This index, originally developed for non-vegetated saline soils in northwestern China, emphasizes the spectral flattening effect of salt crusts.

Normalized Difference Salinity Index (NDSI) = (R - NIR) / (R + NIR)
where NIR = near-infrared reflectance. NDSI exploits the inverse relationship between salinity and the NIR absorption feature characteristic of non-saline minerals.

Canopy Response Salinity Index (CRSI) = √[(NIR * R) - (G * B)] / √[(NIR * R)+(G*B)] where G = green band reflectance. CRSI is designed for partially vegetated surfaces, accounting for the combined signal of soil and vegetation.

For each Landsat and Sentinel-2 scene, these indices were computed and compiled into annual composites for 2000, 2005, 2010, 2015, 2020, and 2024.

Field sampling was conducted during two campaigns (August 2023 and April 2024) at 84 locations distributed across Karauzyak district using a stratified random design. Strata were defined by the 2024 NDSI value (low, medium, high) to ensure representation of the full range of salinity conditions. At each location:

Geographic coordinates were recorded using a handheld GPS (Garmin GPSMAP 65s, ±3 m accuracy).

Soil samples were collected from 0-10 cm (surface) and 10-30 cm (root zone) depths using a stainless steel auger. Three subsamples within a 10-m radius were composited per depth.

Electrical conductivity (EC) of a 1:5 soil-water extract was measured in the laboratory within 48 hours of collection. For conversion to saturated paste EC (ECe)—the standard for crop salinity tolerance—a regional calibration factor of 3.8 (determined by the Karakalpakstan Soil Science Institute) was applied.

Soil texture was determined by the hydrometer method, and pH was measured in a 1:2 water suspension.

For each sampling point, the corresponding remote sensing indices (SI, NDSI, CRSI) were extracted from the 2024 composites. Linear regression was used to develop a site-specific calibration equation predicting log-transformed ECe from index values. The final model, selected based on Akaike Information Criterion (AIC), was:

$\log10(ECe) = 0.62 + 4.13*NDSI - 2.87*SI + \varepsilon$

($R^2 = 0.74$, RMSE = 0.23 log10 units, n=84)

This model was applied to the full remote sensing archive (2000-2024) to generate time-series maps of predicted ECe.

Groundwater data for Karauzyak district were obtained from three sources: (1) the Karakalpakstan Branch of Uzgidromet (state hydrometeorological service), which maintains 8 observation wells with monthly measurements; (2) local Water Consumer Associations (WCA), which track water levels at 12 irrigation wells; and (3) a dedicated field campaign in October 2023 measuring depth-to-water at 45 abandoned wells or hand-dug pits. Data were compiled for the period 2000-2024, though completeness varied: the state wells have continuous records, but the WCA and campaign data are temporally limited.

For spatial analysis, groundwater depth (m below surface) and total dissolved solids (TDS, g/L) were interpolated using ordinary kriging with a spherical semivariogram model. For temporal analysis, linear and nonlinear trends were fitted to well-specific time series to estimate rates of water table change.

Using MODIS NDVI time series (2000-2024), two metrics were calculated for each 250-m pixel:

Growing season integrated NDVI (GS-NDVI). The sum of daily NDVI from April 1 to September 30, which approximates total green biomass production. To reduce cloud and atmospheric noise, daily values were smoothed using the Savitzky-Golay filter.

In addition, land cover classification was performed on the 2024 Sentinel-2 mosaic using a random forest classifier trained on 500 reference points (identified through high-resolution Google Earth imagery). Classes included: cotton, wheat, alfalfa, fallow/other crop, natural halophytic vegetation, salt crust, bare soil, and water.

Integration of salinization, groundwater, and vegetation data into an ecological risk zoning scheme followed a multi-criteria decision analysis (MCDA) approach analogous to the hydromodular zoning described in Article 1, but with different criteria reflecting the broader monitoring focus. Three composite indices were aggregated:

Salinization risk index (SRI): Weighted combination of current ECe (2024, weight 0.5) and trend in ECe (ΔECe/year, weight 0.5). Higher values indicate more severe and/or rapidly worsening salinity.

Groundwater risk index (GRI): Weighted combination of depth to water (inverse, weight 0.4), TDS (weight 0.3), and rate of water table rise (weight 0.3). Higher values indicate shallow, saline, rising groundwater.

Vegetation degradation risk index (VRI): Weighted combination of current GS-NDVI relative to district mean (weight 0.5) and Mann-Kendall trend (weight 0.5). Higher values indicate low and/or declining vegetation productivity.

These three indices were standardized to 0-100 scales and aggregated using equal weights into an overall Ecological Risk Score (ERS). Natural breaks classification of the ERS across the district produced three risk categories (R1, R2, R3).

To enable systematic comparison with Chimbay district, equivalent indicators were compiled for Chimbay using data from the GIZ project database (provided with permission). Landsat and Sentinel-2 processing was replicated for Chimbay using the same methods described in Sections 3.1-3.3 above. Groundwater and soil data for Chimbay came from the GIZ monitoring network (42 wells, 156 soil points). Differences between districts were tested for statistical significance using two-sample t-tests (for continuous variables) or chi-square tests (for categorical variables).

Results

The 2024 soil salinity map (Figure 2, Table 6) shows widespread salt-affected conditions across Karauzyak district. Only 27.0% of the district's area (159,200 ha) is non-saline (ECe < 2 dS/m), and this class is almost entirely confined to the southern peripheral areas where irrigation is absent or groundwater is deepest. The rest of the district—73.0%—is salt-affected to varying degrees, with the largest share (29.1%) in the weakly saline category (ECe 2-4 dS/m). Notably, nearly 19% of the district (111,800 ha) is moderately to very strongly saline (ECe > 8 dS/m), conditions that preclude conventional agriculture and require either salt-tolerant halophytes, fallowing, or costly reclamation.

Table 6.
Soil salinity distribution in Karauzyak district (2024)

Salinity class	ECe range (dS/m)	Area (ha)	% of district
Non-saline	<2	159,200	27.0
Weakly saline	2-4	171,600	29.1
Moderately saline	4-8	147,200	25.0
Strongly saline	8-15	85,300	14.5
Very strongly saline	>15	26,500	4.4

The temporal trajectory of salinization (Figure 3) reveals accelerating degradation over the 24-year study period. Between 2000 and 2024, the total salt-

affected area increased from 385,400 ha (65.4% of district) to 430,400 ha (73.0%)—an absolute increase of 45,000 ha and a relative increase of 7.6 percentage points. However, the composition of salt-affected area changed more dramatically: the combined area of strongly and very strongly saline lands increased from 82,200 ha (13.9% of district) to 111,800 ha (18.9%), representing a 36.0% increase in the severely degraded class.

By decade, the rate of salinization accelerated: 2000-2010 saw an increase of 2.1 percentage points in total salt-affected area; 2010-2024 saw an increase of 5.5 percentage points. This acceleration coincides with documented declines in Amu Darya flow (average annual discharge at the Kyzketken gauge decreased from 52 km³ in 2000-2010 to 38 km³ in 2010-2024), which has reduced leaching and concentrated salts in the remaining irrigated areas.

Groundwater depth and quality have followed trajectories consistent with salinization trends (Table 7). Over the 24-year period, mean groundwater depth decreased from 4.2 m to 2.8 m—a shallowing of 1.4 m, equivalent to an average rise of 5.8 cm per year. The rise was not linear, however; most of the change occurred after 2010 (2.9 cm/year in 2000-2010 vs. 8.1 cm/year in 2010-2024). This post-2010 acceleration matches the documented decline in irrigation water deliveries: with less water supplied to fields, less water is transpired by crops, and less is lost to evaporation from canals and fields, resulting in reduced consumptive use and more water remaining to recharge groundwater.

Groundwater mineralization increased in parallel, from a district-wide mean of 3.1 g/L TDS in 2000 to 4.8 g/L in 2024. The rate of increase was more uniform over time (approximately 0.07 g/L/year). Importantly, the spatial pattern of mineralization does not mirror depth: the highest TDS values (6-8 g/L) occur in the northern desert areas where groundwater is deep (>5 m) but has been concentrated by decades of evaporation from the former Aral Sea bed. In the irrigated zone, TDS values range from 3-5 g/L—marginally acceptable for salt-tolerant crops but requiring careful management to prevent yield decline.

Table 7.

Groundwater parameters in Karauzyak district (2000 vs. 2024)

Parameter	2000	2024	Change
Mean depth (m)	4.2	2.8	-1.4 m (shallower)
% area with depth < 2 m	12%	28%	+16 percentage points
Mean TDS (g/L)	3.1	4.8	+1.7 g/L
% area with TDS > 5 g/L	18%	41%	+23 percentage points

The MODIS NDVI analysis (Figure 4) revealed divergent trajectories across land cover classes. For irrigated cropland (cotton, wheat, alfalfa fields as mapped from Sentinel-2), mean GS-NDVI declined by 0.042 per decade ($p < 0.001$),

equivalent to a 14% reduction in integrated vegetation productivity over 24 years. This decline is consistent with reported yield declines from district agricultural statistics and reflects the cumulative impacts of salinization and water scarcity.

Significant negative NDVI trends ($p < 0.05$) were detected on 37% of the district's land area; significant positive trends on 8%; and no significant trend on the remaining 55%. Positive trends were concentrated in the southernmost irrigated area, where continued investment in drainage (though inadequate by design standards) has partially mitigated degradation.

Integration of salinization, groundwater, and vegetation indices into the Ecological Risk Score produced three risk zones with distinct management implications (Table 8, Figure 5).

Zone R1 (High Risk Zone). This zone occupies 84,600 ha (14.3% of district), located primarily in the northern irrigated margin and in a belt along the former shoreline. In Zone R1, groundwater is very shallow (mean 1.4 m depth) and saline (mean TDS 6.2 g/L); surface soils are strongly to very strongly saline (ECe > 12 dS/m); and vegetation—where present—is declining rapidly (mean GS-NDVI trend -0.032/year). Conventional irrigated agriculture is not feasible in this zone without major infrastructure investments that are economically improbable. The recommended management priority is either: (a) abandonment and transition to passive ecological restoration (allowing natural halophyte communities to stabilize soils) where land tenure permits; or (b) introduction of highly salt-tolerant cash crops such as Salicornia europaea (sea asparagus), which can be irrigated with brackish water and produces oilseed or forage. Pilot trials of Salicornia in neighboring Kazakhstan have achieved ECe tolerances up to 40 dS/m—far beyond conventional crops.

Zone R2 (Moderate Risk Zone). Occupying 235,000 ha (39.9% of district), Zone R2 surrounds the degraded core and extends southward through most of the irrigated area. Groundwater depth (mean 3.1 m) and TDS (mean 3.9 g/L) are intermediate, and soil salinity is weakly to moderately saline (ECe 4-8 dS/m). Agriculture is practiced on 58% of Zone R2 area, but productivity is declining. The management priority is preventive: maintain existing drainage, adopt the zone-specific irrigation regimes developed in Article 1, and transition away from cotton (higher salt sensitivity) toward wheat and forage crops (moderate sensitivity). Without intervention, portions of Zone R2 will transition to R1 conditions within 15-20 years at current degradation rates.

Zone R3 (Relatively Safe Zone). The southernmost 270,000 ha (45.8% of district) constitute Zone R3, where groundwater remains deep (mean >5 m) and fresh (mean TDS 2.1 g/L), soils are non-saline or weakly saline (ECe < 4 dS/m), and vegetation trends are stable or increasing. However, "safe" is a relative term: even in Zone R3, groundwater depth decreased by 0.8 m between 2000 and 2024, indicating that salinization risk is expanding southward. The priority is maintenance monitoring: continue annual satellite-based assessment of NDVI and salinity indices, with targeted field sampling every 3-5 years to detect any incipient degradation.

Table 8.
Characteristics of ecological risk zones in Karauzyak district

Parameter	Zone R1 (High)	Zone R2 (Moderate)	Zone R3 (Relatively Safe)
Area (ha)	84,600	235,000	270,000
Proportion (%)	14.3	39.9	45.8
Groundwater depth (m)	1.4 ± 0.6	3.1 ± 0.9	5.3 ± 1.2
Groundwater TDS (g/L)	6.2 ± 1.3	3.9 ± 0.8	2.1 ± 0.5
Soil ECe (dS/m)	12.8 ± 3.1	5.9 ± 1.4	2.3 ± 0.9
NDVI trend (Δ/year)	-0.032 ± 0.008	-0.014 ± 0.006	-0.002 ± 0.004
% irrigated cropland	12%	58%	30%
Productivity trend	Rapidly declining	Slowly declining	Stable

The comparison between Karauzyak and Chimbay districts (Table 9) reveals systematically worse conditions in Karauzyak across all indicators, with the magnitude of difference statistically significant for most parameters ($p < 0.05$). Karauzyak has 13% higher total salt-affected area (73% vs. 65% of district), 34% higher proportion of strongly/very strongly saline soils (19% vs. 14%), and 21% shallower groundwater (2.8 m vs. 3.4 m mean depth). The rate of degradation also differs: salinization expanded at 0.32 percentage points per year in Karauzyak vs. 0.28 percentage points per year in Chimbay, and groundwater rose at 5.8 cm/year vs. 4.7 cm/year.

These differences are plausibly attributable to the infrastructure and management factors identified in Table 5. Karauzyak's lower canal lining proportion (15% vs. 38%) means greater seepage to groundwater, directly contributing to water table rise. Its lower drainage density (0.31 vs. 0.62 km/km²) means less capacity to remove excess water from the root zone, perpetuating waterlogged conditions that accelerate salinization. Critically, the absence of a systematic monitoring system in Karauzyak—compared to the GIZ-supported system in Chimbay—has allowed degradation to proceed without detection or response. Farmers and water managers in Karauzyak, lacking the salinity maps and zone-specific recommendations available to their counterparts in Chimbay, continue to apply uniform irrigation schedules that overwater some fields (worsening waterlogging) and underwater others (increasing stress).

Table 9.
Comparative indicators: Karauzyak vs. Chimbay districts (2024 values)

Indicator	Karauzyak	Chimbay	Difference (%)	Statistical significance
Salt-affected area (% of district)	73.0%	67.3%	+8.5%	$p < 0.01$
Severe salinity (ECe >8 dS/m, % of district)	18.9%	14.1%	+34%	$p < 0.001$
Mean groundwater depth (m)	2.8 ± 0.9	3.4 ± 1.0	-21%	$p < 0.001$
Groundwater rise rate (cm/year, 2000-2024)	5.8	4.7	+23%	$p < 0.05$
Mean NDVI (cropland, GS)	0.29 ± 0.07	0.33 ± 0.08	-12%	$p < 0.01$
NDVI trend (Δ/year)	-0.014	-0.010	-40%	$p < 0.05$

Conclusions

This study provides the first comprehensive geospatial assessment of land degradation dynamics in Karauzyak district, northern Karakalpakstan, and establishes a replicable monitoring framework that can be operationalized with limited resources. The key conclusions are:

Land degradation in Karauzyak district is widespread (73% of district salt-affected) and accelerating, with severely saline lands increasing by 36% over 24 years. Groundwater has shallowed by 1.4 m (mean depth now 2.8 m) and increased in salinity by 55% (mean TDS now 4.8 g/L). Accelerated degradation since 2010 coincides with reduced Amu Darya flow and inadequate infrastructure maintenance.

Three ecological risk zones were delineated: High Risk Zone R1 (14.3% of district), where conventional agriculture is no longer feasible; Moderate Risk Zone R2 (39.9%), requiring preventive management; and Relatively Safe Zone R3 (45.8%), requiring maintenance monitoring. For each zone, specific management priorities are proposed.

Comparative analysis with Chimbay district—which received external investment in monitoring and infrastructure—reveals systematically worse conditions in Karauzyak, with 13% higher salinity extent, 21% shallower groundwater, and 40% steeper vegetation decline. The difference appears driven by infrastructure (lower canal lining and drainage density) and institutional (absence of systematic monitoring) factors rather than intrinsic biophysical differences.

A low-cost satellite-based monitoring system can be implemented in Karauzyak for $25,000-35,000 in first-year costs and $10,000-15,000 annually thereafter—modest relative to the value of agricultural production at risk. This system would provide early warning of degradation hotspots, enable targeting of interventions, and create accountability for management outcomes.

The methodology developed for Karauzyak is transferable to other northern districts of Karakalpakstan (Moynaq, Taxtako'pir, Kungrad) that currently lack monitoring capacity. Regional scaling would require coordination across districts and investment in training at the Karakalpakstan Ministry of Agriculture level.

The Aral Sea crisis is often framed as an irreversible catastrophe, but the findings of this study suggest a more nuanced interpretation: while some lands (Zone R1) are indeed beyond conventional agricultural recovery, other lands (Zones R2 and R3) can be maintained or even improved through better management informed by monitoring. The cost of inaction—continued degradation of 73% of the district—will be borne by the rural population of Karauzyak through declining yields, rising production costs, and eventual loss of agricultural livelihoods. The cost of action—implementing the monitoring framework proposed here and acting on its recommendations—is modest by comparison. The question is not whether monitoring is technically feasible, but whether the political will and institutional capacity can be mobilized to sustain it.

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FIZIKA FANIDAN “NOTEKIS HARAKATDA TEZLIK” MAVZUSINI TUSHUNTIRISHDA MASALALARNING O‘RNI

Annotatsiya. *Ushbu maqolada fizika fanidan* ***notekis harakatda tezlik*** *mavzusini o‘rganishda masalalarning o‘quv jarayonidagi didaktik va metodik ahamiyati tahlil qilingan. Tadqiqot davomida zamonaviy ta’lim texnologiyalari hamda turli tipdagi masalalardan foydalanish orqali o‘quvchilarning ushbu mavzuni puxta o‘zlashtirishiga erishish yo‘llari ko‘rsatib berildi. Maqolada tajriba asosidagi ma’lumotlar, ilg‘or metodik usullar hamda ularni amaliyotda qo‘llash bo‘yicha tavsiyalar bayon etilgan.*

Tayanch so‘zlar: *notekis harakat, tezlik, masala, fizika, ta’lim, metodika, didaktika, zamonaviy texnologiya, eksperiment, samaradorlik.*

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THE IMPORTANCE OF PROBLEMS IN EXPLAINING THE TOPIC OF “SPEED IN UNEVEN MOTION” IN PHYSICS

Abstract*. This article analyzes the didactic and methodological significance of problems in the learning process when studying the topic of velocity in non-uniform motion in physics. The study demonstrates ways for students to achieve a deep understanding of this topic using modern educational technologies and various types of problems. The article presents empirical data, advanced methodological methods, and recommendations for their practical application.*

Key words: *uneven motion, speed, problem, physics, education, methodology, didactics, modern technologies, experiment, efficiency.*

KIRISH

Fizika fani tabiiy hodisalarni o‘rganishda, ularning mazmunini, sabab natijasini hamda atrofimizdagi voqeliklarni ilmiy asosda tushuntirishda o‘ta muhim ahamiyatga ega. O‘quvchilarning fizika faniga qiziqishini oshirish va mavzularni chuqur o‘zlashtirishlari uchun nazariy bilimlarning hayotiy misollar va amaliy masalalar bilan uyg‘unligiga alohida e'tibor qaratish lozim. Xususan, **"Notekis harakatda tezlik"** mavzusini o‘rganishda masalalar yechish orqali o‘quvchilar bu harakat turini yaxshiroq anglab olishadi, fizik kattaliklar va

qonuniyatlar o‘rtasidagi bog‘liqlikni mustahkam tushunib olishlari mumkin bo‘ladi.

Masalalar yechish — olingan nazariy bilimlarni amaliyotda tatbiq etish, tahlil qilish, mustaqil fikrlashni rivojlantirish va muayyan muammolarni hal etish ko‘nikmasini shakllantirishda asosiy vosita hisoblanadi. Aynan notekis harakatda tezlik tushunchasi matematik ifodalar, grafiklar va hayotiy holatlar bilan bog‘liq holda to‘g‘ri va samarali tushuntirilganda, o‘quvchilarda fizik dunyoqarash ancha kengayadi va mavzu yaxshiroq o‘zlashtiriladi.

Mazkur maqolada **"Notekis harakatda tezlik" mavzusini o‘rganishda masalalarning tutgan o‘rni, ularning didaktik ahamiyati va samarasi** haqida fikr yuritiladi hamda tegishli misollar orqali mavzuni qay darajada mukammal tushuntirish mumkinligi ko‘rsatib beriladi.

ADABIYOTLAR TAHLILI

Fizika fanida, jumladan **notekis harakatda tezlik** tushunchasini o‘rganishda masalalarning didaktik ahamiyati ko‘plab ilmiy va metodik adabiyotlarda keng yoritilgan. Turli mualliflarning monografiyalari, o‘quv qo‘llanmalari va ilmiy maqolalarida fizika ta’limi samaradorligini oshirish uchun masalalar yechish metodikasiga asosiy e’tibor qaratilgan. Jumladan, Rimkevichning A.P. “Fizikadan masalalar to'plami” da harakatning turlari, matematik modellari va grafik ifodalari orqali o‘quvchilarning mustaqil fikrlash ko‘nikmasi rivojlanishi haqida muhim mulohazalar keltirilgan.

Shuningdek, V.G. Demidov va M.V. Kuklin kabi metodistlarning tadqiqotlarida notekis harakatni tushuntirishda masalalarni hayotiy vaziyatlarga bog‘lash orqali o‘quvchida motivatsiyani oshirish usullari tavsiya etilgan. Ularning asarlarida masalalar yechish fizika nazariyasini chuqur anglash va amaliy qo‘llash uchun eng samarali vosita ekanligi ilmiy asoslangan. Mahalliy va xorijiy adabiyotlarda ham, o‘quvchilarning intellektual rivojlanishida masalalarning tutgan o‘rni, tahlil qilish metodlari va zamonaviy texnologiyalar yordamida vizualizatsiya qilish usullari ko‘rsatilgan.

Pedagogik va didaktik adabiyotlarda notekis harakat mavzusini o‘rgatishda o‘qituvchi oldiga quyidagi vazifalar qo‘yilishi takidlanadi: masalalar orqali ilg‘or nazariy tushunchalarni real hayotdagi muammolar bilan bog‘lash, grafiklik metodlar, tajriba va simulyatsiyalarni birlashtirish. Zamonaviy fizika darslarida masalalarning interaktiv tahlili, o‘quvchilarning mustaqil va jamoaviy ishlarini tashkil qilishda ham ahamiyati ortib bormoqda.

Adabiyotlar tahlili natijasida aniqladiki, **notekis harakatda tezlik** mavzusini chuqur o‘zlashtirish uchun turli tipdagi masalalar va ularni tahlil qilish metodikasini mukammal qo‘llash, o‘quvchilar bilimini mustahkamlash va ilg‘or o‘qitish usullarini joriy etish ilmiy asoslangan yondashuv sifatida tan olinadi.

TADQIQOT METODOLOGIYASI

Mazkur tadqiqotda **notekis harakatda tezlik** mavzusini o‘qitishda masalalarning didaktik va metodik ahamiyati hamda ularning o‘quvchilar bilimini chuqur o‘zlashtirishdagi o‘rni o‘rganildi. Tadqiqot quyidagi asosiy bosqichlarda olib borildi:

Ilmiy adabiyotlarni o‘rganish va tahlil qilish – notekis harakat va uni o‘qitish bo‘yicha mavjud ilmiy va metodik manbalar, darsliklar, maqolalar tahlil qilindi. Shuningdek, zamonaviy ta’lim texnologiyalari, masalalarning o‘qitishdagi yondashuvlari ham ko‘rib chiqildi.

Amaliy tajriba va kuzatuvlar – fizika fani darslarida notekis harakat bo‘yicha masalalarning o‘quvchilarga ta’siri hamda ularning tezlik haqidagi tushunchalarini shakllantirishdagi samaradorligi o‘rganildi. Bu bosqichda an’anaviy va innovatsion yondashuvlarning farqlari solishtirildi.

Masalalar to‘plamini ishlab chiqish va sinovdan o‘tkazish – tadqiqot doirasida notekis harakatga oid har xil tipdagi masalalar (nazariy, grafik, eksperiment asosidagi, hayotiy vaziyatlar asosida tuzilgan) tanlab olindi va ular dars jarayonida qo‘llanildi. Masalalarning tahlili va yechish metodikasi alohida o‘rganildi.

So‘rovnoma va intervyular tashkil etish – tadqiqot ishtirokchilari sifatida fizika o‘qituvchilari va o‘quvchilardan anonim so‘rovnomalar olindi hamda intervyular o‘tkazildi. Ushbu usul orqali masalalarning dars samaradorligiga ta’siri, ularni tushunishda uchraydigan qiyinchiliklar, eng yaxshi amaliy yondashuvlar aniqlab olindi.

Olingan natijalarni tahlil qilish va umumlashtirish – to‘plangan ma’lumot va kuzatuvlar asosida masalalarning notekis harakat mavzusini o‘zlashtirishda tutgan o‘rni, samarali metodikalar va takliflar ishlab chiqildi.

Tadqiqot metodi sifatida taqqoslash, kuzatish, statistik va sifatli tahlil, ta’lim jarayonini eksperiment tarzida tashkil qilish usullari uyg‘unlashtirildi. Bu esa mavzuning amaliy va nazariy jihatlarini mukammal ochib berishga yordam berdi.

MUHOKAMA VA NATIJALAR TAHLILI

Umumiy o‘rta ta'lim maktablarida fizikaning, ayniqsa, kinematika bo‘limiga oid mavzularni oldindan tanlab olingan masalalarni ishlab ko‘rsatish orqali tushuntirish maqsadga muvofiqdir. Quyida o‘rta maktablarning fizika fanining kinematikaga oid “Notekis harakatda tezlik” mavzusini o‘tishda masalalar yechishdan foydalanish haqida fikr yuritiladi. Darsning maqsadi - o‘quvchilarda notekis harakatda o‘rtacha tezlik va oniy tezliklar haqida tasavvurlar hosil qilish, o‘rtacha tezlikni topish ko‘nikmasini hosil qilishdir. Dars rejasiga ko‘ra yangi mavzuning bayoni uchun 15 minut, uni mustahkamlash uchun savol-javoblar o‘tkazish va masala yechishga 15 minut vaqt ajratish ko‘zda tutilgan.

Bizningcha mavzuning bayoni uchun 5...7 minut, qolgan vaqtda (23...25 minut) esa mavzuga oid masalalar yechib ko‘rsatilishi mumkin. Bunda masalalarning shartlari turlicha bo‘lishiga alohida e’tibor qaratiladi.

Ma’lumki, notekis harakatda o‘rtacha tezlik jism bosib o‘tgan yo‘lning shu yo‘lni o‘tish uchun ketgan vaqtga nisbati kabi aniqlanadi:

$$\vartheta_{\text{ўр}} = \frac{S}{t} \quad (1)$$

Ko‘pincha butun yo‘l bir necha qismlarga bo‘lingan hollarda, yo‘lning o‘sha qismlaridagi tezliklar yoki sarflangan vaqtlar ma'lum bo‘lsa o‘rtacha tezlikni topish uchun (1) formula turlicha ko‘rinishlarga keladi:

$$\vartheta_{ўр} = \frac{S}{t} = \frac{S_1 + S_2 + S_3 + ... + S_n}{t_1 + t_2 + t_3 + ... + t_n} = \frac{\vartheta_1 \cdot t_1 + \vartheta_2 \cdot t_2 + \vartheta_3 \cdot t_3 + ... + \vartheta_n \cdot t_n}{t_1 + t_2 + t_3 + ... + t_n} \quad (2)$$

Darsda notekis harakatda o‘rtacha tezlikni topishga doir quyidagi masalalarni ishlab ko‘rsatish va tushuntirish uchun tavsiya qilinadi.

1-masala. Yo‘lovchi birinchi 30 minutda 3 km yo‘l bosdi, keyingi 1 soatda esa 4,5 km/soat tezlik bilan yurdi. Yo‘lovchining butun yo‘l davomidagi o‘rtacha tezligini toping (km/soat).

Berilgan:

$$t_1 = 30мин. = 0{,}5coam; \quad S_1 = 3км; \quad t_2 = 1coam; \quad \vartheta_2 = 4{,}5\frac{км}{coam}$$

Topish kerak: $\vartheta_{ўр} = ?$

Yechilishi

Yo‘lovchi harakatining o‘rtacha tezligi u bosib o‘tgan butun yo‘lni shu yo‘lni o‘tish uchun ketgan vaqtga nisbatiga teng. Masala shartiga ko‘ra butun yo‘l 2 qismga bo‘lingan, ya'ni: $S = S_1 + S_2$. U holda o‘rtacha tezlik:

$$\vartheta_{ўр} = \frac{S}{t} = \frac{S_1 + S_2}{t_1 + t_2}$$

Bu yerda $S_2 = \vartheta_2 \cdot t_2$ bo‘lgani uchun $\vartheta_{ўр} = \frac{S_1 + \vartheta_2 \cdot t_2}{t_1 + t_2} = \frac{3 + 4{,}5 \cdot 1}{0{,}5 + 1} \cdot \frac{км}{coam} = 5\frac{км}{coam};$ Javob: $\vartheta_{ўр} = 5\frac{км}{coam}$

2-masala. Avtomobil yo‘lning dastlabki uchdan bir qismini 54 km/soat tezlik bilan, qolganini 72 km/soat tezlik bilan bosib o‘tgan bo‘lsa, uning butun yo‘l davomidagi o‘rtacha tezligini toping (m/s).

Berilgan:

$$\vartheta_1 = 54\frac{км}{coam} = 15\frac{м}{c}; \quad \vartheta_2 = 72\frac{км}{coam} = 20\frac{м}{c}$$

Topish kerak: $\vartheta_{ўр} = ?$

Yechilishi. Masala shartiga ko‘ra butun yo‘l 2 qismga bo‘lingan, ya'ni: $S = S_1 + S_2$, $S_1 = \frac{1}{3} \cdot S$ va $S_2 = \frac{2}{3} \cdot S$

Bu yerda t_1 va t_2 mos ravishda S_1 va S_2 yo‘llarni bosib o‘tish uchun ketgan vaqtlar ekanini hisobga olsak, $t_1 = \frac{S_1}{\vartheta_1} = \frac{S}{3 \cdot \vartheta_1}$ va $t_2 = \frac{S_2}{\vartheta_2} = \frac{2 \cdot S}{3 \cdot \vartheta_2}$

U holda o‘rtacha tezlik: $\vartheta_{ўр} = \frac{S}{t} = \frac{S_1 + S_2}{t_1 + t_2} = \frac{S}{\frac{S}{3 \cdot \vartheta_1} + \frac{2 \cdot S}{3 \cdot \vartheta_2}} = \frac{3 \cdot \vartheta_1 \cdot \vartheta_2}{2 \cdot \vartheta_1 + \vartheta_2}$

Hisoblaymiz: $\vartheta_{ўр} = \frac{3 \cdot \vartheta_1 \cdot \vartheta_2}{2 \cdot \vartheta_1 + \vartheta_2} = \frac{3 \cdot 15 \cdot 20}{2 \cdot 15 + 20} \cdot \frac{м}{c} = 18\frac{м}{c}$. Javob: $\vartheta_{ўр} = 18\frac{м}{c}$

.

3-masala. Avtomobil manzilga borishda yo‘lning dastlabki yarmini 60 km/soat tezlik bilan, ikkinchi yarmini uchdan birini 70 km/soat tezlik bilan va qolgan qismini 80 km/soat tezlik bilan bosib o‘tgan bo‘lsa, uning butun yo‘l davomidagi o‘rtacha tezligini toping (km/soat).

Berilgan:

$$\vartheta_1 = 60\frac{км}{coam};\ \vartheta_2 = 70\frac{км}{coam};\ \vartheta_3 = 80\frac{км}{coam}$$

Topish kerak: $\vartheta_{ўр} = ?$

Yechilishi. Masala shartiga ko‘ra butun yo‘l 3 qismga bo‘lingan, ya'ni: $S = S_1 + S_2 + S_3$, $S_1 = \frac{S}{2}$, $S_2 = \frac{1}{2}\cdot S\cdot\frac{1}{3} = \frac{S}{6}$ va $S_3 = \frac{1}{2}\cdot S\cdot\frac{2}{3} = \frac{S}{3}$

Bu yerda t_1, t_2 va t_3 mos ravishda S_1, S_2 va S_3 yo‘llarni bosib o‘tish uchun ketgan vaqtlar ekanini hisobga olsak, $t_1 = \frac{S_1}{\vartheta_1} = \frac{S}{2\cdot\vartheta_1}$, $t_2 = \frac{S_2}{\vartheta_2} = \frac{S}{6\cdot\vartheta_2}$ va $t_3 = \frac{S_3}{\vartheta_3} = \frac{S}{3\cdot\vartheta_3}$

U holda o‘rtacha tezlik:

$$\vartheta_{ўр} = \frac{S}{t} = \frac{S_1+S_2+S_3}{t_1+t_2+t_3} = \frac{S}{\frac{S}{2\cdot\vartheta_1}+\frac{S}{6\cdot\vartheta_2}+\frac{S}{3\cdot\vartheta_3}} = \frac{6\cdot\vartheta_1\cdot\vartheta_2\cdot\vartheta_3}{2\cdot\vartheta_1\cdot\vartheta_2+\vartheta_1\cdot\vartheta_3+3\cdot\vartheta_2\cdot\vartheta_3}$$

Hisoblaymiz:

$$\vartheta_{ўр} = \frac{6\cdot\vartheta_1\cdot\vartheta_2\cdot\vartheta_3}{2\cdot\vartheta_1\cdot\vartheta_2+\vartheta_1\cdot\vartheta_3+3\cdot\vartheta_2\cdot\vartheta_3} = \frac{6\cdot60\cdot70\cdot80}{2\cdot60\cdot70+60\cdot80+3\cdot70\cdot80}\cdot\frac{км}{coam} = 67{,}2\frac{км}{coam}.$$

Javob: $\vartheta_{ўр} = 67{,}2\frac{км}{coam}$.

4-masala. Agar jism butun yo‘l uchun ketgan vaqtning dastlabki uchdan ikki qismida 36 km/soat tezlik bilan, qolgan qismida 54 km/soat tezlik bilan harakatlangan bo‘lsa, uning butun yo‘l bo‘yicha o‘rtacha tezligi topilsin.

Berilgan:

$$\vartheta_1 = 36\frac{км}{coam} = 10\frac{м}{c};\ \vartheta_2 = 54\frac{км}{coam} = 15\frac{м}{c}$$

Topish kerak: $\vartheta_{ўр} = ?$

Yechilishi. Agar jismning butun yo‘l uchun ketgan vaqtini t deb belgilasak, u holda t_1 va t_2 yo‘lning birinchi va ikkinchi qismlarini bosib o‘tish uchun ketgan vaqtlardir.

Masala shartiga ko‘ra: $t_1 = \frac{2\cdot t}{3}$ va $t_2 = \frac{t}{3}$

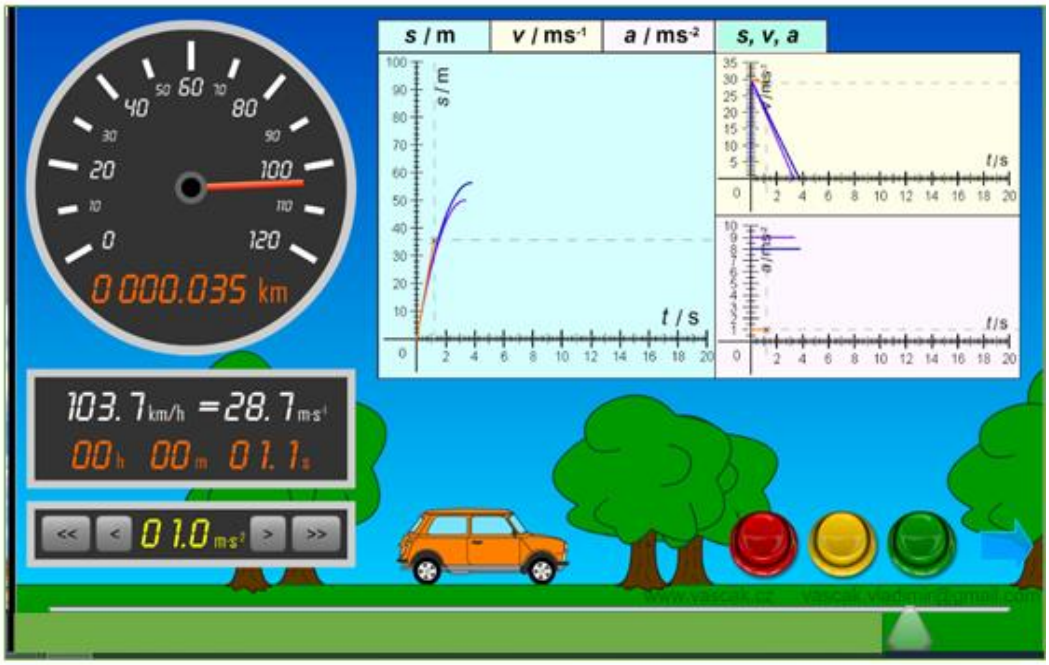
Jismning t_1 va t_2 vaqtlarda bosib o‘tgan yo‘llari mos ravishda S_1 va S_2 bo‘lsa, ular uchun quyidagi ifodalarni olamiz: $S_1 = \vartheta_1 \cdot t_1 = \frac{2 \cdot \vartheta_1 \cdot t}{3}$ va $S_2 = \vartheta_2 \cdot t_2 = \frac{\vartheta_2 \cdot t}{3}$

U holda o‘rtacha tezlik: $\vartheta_{\text{ўр}} = \frac{S}{t} = \frac{S_1 + S_2}{t} = \frac{\frac{2 \cdot \vartheta_1 \cdot t}{3} + \frac{\vartheta_2 \cdot t}{3}}{t} = \frac{2 \cdot \vartheta_1 + \vartheta_2}{3}$

Hisoblaymiz: $\vartheta_{\text{ўр}} = \frac{2 \cdot \vartheta_1 + \vartheta_2}{3} = \frac{3 \cdot 10 + 15}{3} \cdot \frac{м}{с} = 15 \frac{м}{с}$

Javob: $\vartheta_{\text{ўр}} = 15 \frac{м}{с}$.

O‘quvchilarga darslikda ko‘rsatilgan mavzuga oid 2-mashq va 7-sinf fizika fanidan metodik qo‘llanmada keltirilgan qo‘shimcha masalalarni uyga vazifa sifatida berish mumkin. Yana shu bilan birgalikda raqamli ta’lim resurslari deb nomlangan platformada mavzular kesimida interaktiv topshiriqlardan bajarishlarini tushuntirib beriladi. Men vascak.uz saytida maktab o‘quvchilari uchun berilgan mavzuga oid animatsiya orqali tushunganlarini esse qilib yozishlarini topshiriq uchun tavsiya etaman.



XULOSA

Agar yo'lning yarmi yoki ma'lum qismlari turli tezlikda bosib o'tilgan bo'lsa, vaqtni har bir bo'lak uchun alohida topib, so'ng umumiy formulaga qo'yish kerak. Agar harakat vaqti teng bo'laklarga bo'lgan bo'lsa, o'rtacha tezlik tezliklarning o'rta arifiga teng bo'lishi kerak (faqat shu xususiy!) isbotlab ko'rsatish kerak.

1-toifaga kiruvchi masala turlarida to'g'ridan-to'g'ri yo'l va vaqt berilgan bo‘lib, oddiy hisoblar orqali o‘rtacha tezlik aniqlashni,

2- toifaga kiruvchi masala turlarida "Yo'lning yarmi" yoki "uchdan bir qismi" kabi nisbiy ulushlar berilgan bo‘lsa, o'quvchi butun yo‘lni S deb uni va o‘zgaruvchilarni topishni;

3-toifa kiruvchi masala turlarida esa “Aralash” holda fizik kattaliklari beriladi. (vaqt va tezlik berilgan, lekin yo'l noma'lum). Bunda o‘quvchi mantiqiy ketma-ketlik asosida so‘ralgan kattalikni aniqlashni o'rganadi.

Kinematika bo'limining fundamental birikmalaridan biri bu - notekis harakatdir. Tabiatda va texnikada har qanday harakatlanuvchi notekis harakterga ega. O'quvchilar ko'pincha tekis harakat (tezlik o'zgarmas bo'lgan holat) muammosini oson o'zlashtiradilar, biroq harakat tezligi tezlik o'zgarganda "o'rtacha tezlik" tezligini aniqlashda qiyinchilikka duch keladilar. Buning uchun ushbuni quruq nazariya bilan emas, balki hayotiy va mantiqiy masalalar orqali tushuntirilsa yanada samarali natijaga erishiladi.

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KO‘P YILLIK DUKKAKLI O‘TLAR URUG‘LARINI SKARIFIKATSIYA QILISH USULLARINING TAHLILI

Annotatsiya: *Mazkur maqolada ko‘p yillik dukkakli o‘tlar urug‘larini skarifikatsiya qilish usullari ilmiy jihatdan tahlil qilingan. Urug‘larning qattiq qobig‘i bilan bog‘liq muammolar, ularning unuvchanligiga ta’siri hamda skarifikatsiya usullarining (mexanik, termik, kimyoviy va radiochastotali) samaradorligi o‘rganilgan. Tadqiqot natijalari shuni ko‘rsatadiki, mexanik skarifikatsiya usuli ishlab chiqarish sharoitida eng samarali va istiqbolli hisoblanadi.*

Kalit so‘zlar: *urug‘, skarifikatsiya, dukkakli o‘tlar, unuvchanlik, mexanik ishlov, texnologiya.*

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ANALYSIS OF SCARIFICATION METHODS OF PERENNIAL LEGUME SEEDS

Abstract: *This article provides a scientific analysis of scarification methods for perennial legume seeds. The issues related to hard seed coats, their effect on germination, and the efficiency of different scarification methods (mechanical, thermal, chemical, and radio-frequency) are examined. The results indicate that mechanical scarification is the most effective and promising method under production conditions.*

Keywords: *seeds, scarification, legumes, germination, mechanical treatment, technology.*

Ko‘p yillik dukkakli o‘tlar urug‘lari qattiq urug‘lilik xususiyati bilan ajralib turadi. Ularning bir vaqtda unib chiqishini ta’minlash maqsadida mahalliy va xorijiy tadqiqotchilar tomonidan ekishdan oldingi ishlov berishning turli usullari va texnologik uslublari ishlab chiqilgan. Ushbu barcha usullar qattiq urug‘larning tashqi qobig‘ini buzishga qaratilgan bo‘lib, natijada suv va kislorodning urug‘ embrioniga kirishi ta’minlanadi.

Ko‘p yillik dukkakli o‘tlarning (beda, yaylov bedasi, lyupin) ekish materialida qattiq urug‘lar ulushi yuqori bo‘ladi. Qattiq urug‘lilik biologik belgi sifatida foydali bo‘lib, u o‘simliklardan keyingi yillarda yangi o‘simliklarning unib chiqishiga imkon yaratadi.

Ba’zi dukkakli o‘tlar urug‘larida qattiq urug‘lilik darajasi 95% gacha yetadi, bu esa ekishdan oldin skarifikatsiya o‘tkazishni talab qiladi, ya’ni urug‘ning qalin qobig‘ida tirnalish va yoriqlar hosil qilish zarur bo‘ladi. Natijada qattiq urug‘lar suv va havoni o‘tkaza boshlaydi, tez shishadi va unib chiqadi. Ushbu usul urug‘larning unuvchanligini 82–95% gacha oshiradi.

Shu bilan birga, skarifikatsiyani ekishdan 8–10 kun oldin o‘tkazish lozim, chunki skarifikatsiya qilingan urug‘lar vaqt o‘tishi bilan unuvchanligini yo‘qotadi.

Urug‘larni skarifikatsiya qilishning bir necha usullari mavjud: **termik, kimyoviy, radiochastotali va mexanik**.

Termik skarifikatsiya usulining asosida urug‘larga harorat orqali ta’sir ko‘rsatish yotadi. Yuqori va past haroratlarning almashib turishi samarali natija berishi aniqlangan. Termik skarifikatsiyani bir necha usulda amalga oshirish mumkin bo‘lib, tanlanadigan usul yetishtirilayotgan ekin turiga bog‘liq.

Mexanik usullardan urug’larni skarifikatsiya (lot. scarifico tirnayman, tilaman) qilish qo‘llaniladi – sebarga, lyupin va boshqalar urug’larining qattiq qobig’ining sirtiga zarar yetkazish (qum yoki metall bilan maydalash, tirnalash mashinalarida).

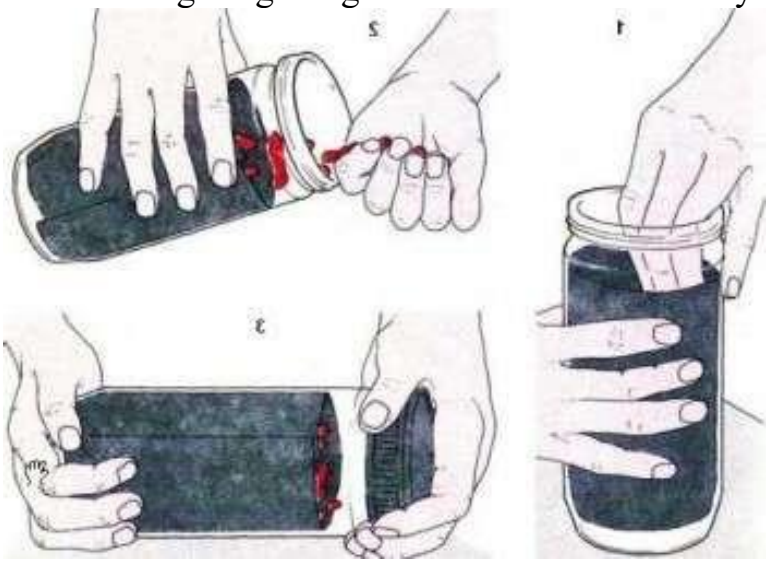
Kimyoviy usul - konsentrlangan sulfat kislota, spirt yoki oddiy suv bilan urug’larga ishlov berish. (mas, polizchilikda qovun, qovoq, tarvuz urug‘lari, paxtachilikda chigit unishini yaxshilash uchun ekish oldidan ivitiladi, namlanadi)

Termik usul: urug’larni 30-40 ℃ haroratda bir necha daqiqadan bir necha kungacha ishlov berish yoki ularni 5-11 soniya davomida qaynoq suvga solib olish.

Sh.M.Fozilov, F.A.Tojiyevalarning [41] ma’lumotlariga ko‘ra, urug‘larning unuvchanligini oshirish, ularning fiziologik faolligini rag‘batlantirish hamda dastlabki o‘sish bosqichlarini tezlashtirish uchun bir qator maxsus agrobiologik usullar qo‘llaniladi. Ular orasida **impaksiya**, **skarifikatsiya**, **starifikatsiya** va **yarovizatsiya** usullari eng samarali hisoblanadi.

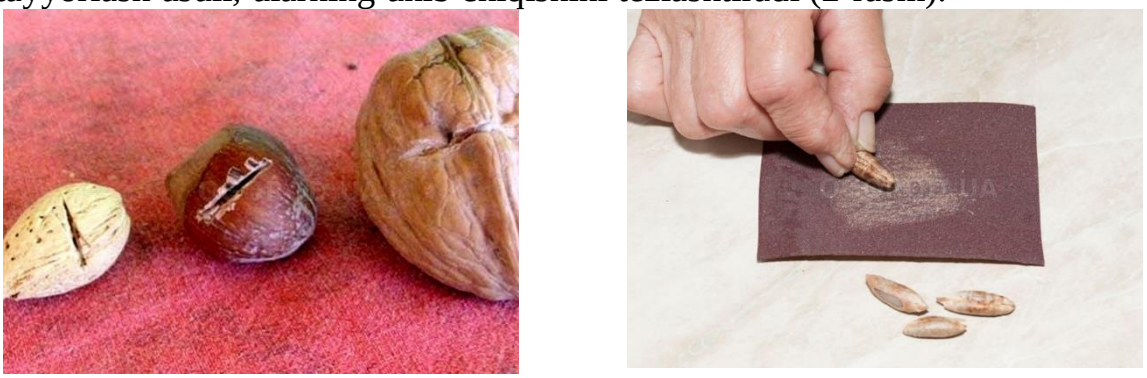
[41] Sh.M.Fozilov, F.A.Tojiyeva. O’simliklar fiziologiyasidan qisqacha izohli lug‘at. Lug’at. - T.: “PUBLISHING HIGH FUTURE” OK nashriyoti, 2024. – 102 bet.

Impaksiya — bu urug’larni bir-birlari yoki idish devoriga uriltirib qobig’ini shikastlashdir. Bunda urug‘larning bir-biriga va ularni o‘rab turgan idishning devorlariga ta’sir ettirib urug‘larni ekishdan oldin tayyorlash usuli bo‘lib, unda urug‘larning unib chiqish uchun muhim bo‘lgan qismida po‘stlog‘i parchalanadi. Urug‘ning o‘ziga shikastlanish kuzatilmaydi (1-rasm).



1-rasm. Impaksiya metodi jarayoni

Skarifikatsiya – 1. Qattiq po‘stli urug‘larning unishini tezlatish maqsadida ishqalash, metall elakdan o‘tkazish, ba’zan kislotalar ta’sir etish. 2. Urug‘ning suv o‘tkazmaydigan qoplamlariga mexanik shikast yetkazish - embrionga zarar bermasdan ularni qum yoki maydalangan shisha bilan maydalash natijasida chigit po‘stini yorishdan iborat bo‘lgan urug‘larni ekishdan oldin tayyorlash usuli, ularning unib chiqishini tezlashtiradi (2-rasm).



2-rasm. Skarifikatsiya usulida qattiq po‘stli urug‘larga ishlov berish

Urug‘larni radiochastotali ishlov berishda namuna ikki parallel metall plastinka orasiga joylashtiriladi, ular kuchli elektron tebranish generatorining bir qismi hisoblanadi. Namuna elektr zanjirining tarkibiy qismiga aylanib, plastinkalar (elektrodlar) orasida hosil bo‘lgan elektromagnit maydon energiyasini yutadi.

Bunday ishlov berish natijasida eng asosiy ta’sir — haroratning oshishidir. Agar butun namuna (urug‘lar partiyasi) bir xil elektromagnit maydon ta’sirida bo‘lsa, qizish bir tekisda sodir bo‘ladi. Qizish darajasi elektromagnit maydon

chastotasi, uning kuchlanishi, material ichidagi maydon kuchlanishi, elektrodlarning joylashuvi, namunaning o‘lchami va shakli, shuningdek, uning zichligi va issiqlik sig‘imiga bog‘liq.

Amaliyotda ko‘p yillik dukkakli o‘tlar urug‘laridagi qattiq urug‘likni kamaytirish uchun ko‘pincha skarifikatsiya uchun mo‘ljallanmagan turli qurilmalar (beda maydalagichlar, bolg‘ali maydalagichlar, turli aralashtirgichlar) qo‘llaniladi. Natijada, bunday uskunalar yordamida ishlov berishda urug‘ embrioni zararlanishi sababli salbiy natijalar kuzatiladi.

Mexanik skarifikatsiya usuli urug‘larga faol ishchi organlar orqali bevosita ta’sir ko‘rsatish asosida amalga oshiriladi. O‘z navbatida, mexanik ishlov berish usuli ishchi organlarning urug‘larga ta’siriga ko‘ra quyidagi turlarga bo‘linadi: silliqlash va markazdan qochma kuch hisobiga skarifikatsiya.

Xulosa

Ko‘p yillik dukkakli o‘tlar urug‘larida qattiq urug‘lilik ularning unuvchanligini cheklaydi, shu sababli ekishdan oldin skarifikatsiya qilish zarur. Tahlillar shuni ko‘rsatadiki, mavjud usullar orasida mexanik skarifikatsiya eng samarali, sodda va iqtisodiy jihatdan maqbul hisoblanadi. Ushbu usul urug‘larning unuvchanligini oshirib, qishloq xo‘jaligida yuqori natijalarga erishishga imkon beradi.

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TOG‘RAYHON *(ORIGANUM TYTTANTHUM)* O‘SIMLIGINING BIOEKOLOGIK XUSUSIYATLARI

Annotatsiya. *Ushbu maqolada tog‘rayhon (Origanum tyttanthum) o‘simligining bioekologik xususiyatlari, morfologik tuzilishi, tarqalishi, ekologik omillarga moslashuvi hamda dorivor ahamiyati yoritilgan. O‘simlikning o‘sishi, rivojlanishi, urug‘ unuvchanligi va tabiiy resurs sifatidagi ahamiyati tahlil qilingan. Tog‘rayhonning farmatsevtika, oziq-ovqat va xalq tabobatida qo‘llanilish istiqbollari ko‘rsatib berilgan.*

Kalit so‘zlar. *Tog‘rayhon, bioekologiya, dorivor o‘simlik, introduksiya, urug‘ unuvchanligi, efir moyi, ekologik moslashuv.*

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BIOECOLOGICAL CHARACTERISTICS OF ORIGANUM TYTTANTHUM PLANT

Abstract. *This article describes the bioecological characteristics of Origanum tyttanthum, including its morphological structure, distribution, adaptation to environmental factors, and medicinal importance. The growth, development, seed germination, and significance of the plant as a natural resource were analyzed. Prospects for its use in pharmaceuticals, food industry, and traditional medicine are presented.*

Keywords: *Origanum tyttanthum, bioecology, medicinal plant, introduction, seed germination, essential oil, ecological adaptation.*

Tog’rayhon (Origanum tyttanthum) - yalpizdoshlar (Lamiaceae) oilasiga kiradigan ko’p yillik efir moyli o’simlik hisoblanadi. Uni tog’ qora rayhoni, o’rmon yalpizi, sebinak ham deyishadi. Tog’rayhonning bo’yi 30-60 ba’zan 90 smgacha yetadi. Tog’rayhonning ildizpoyalari o’rmalovchi tuproqning 0,5 smdan 8 smgacha bo’lgan qismida joylashadi. Poyasi tik o’sadi, bir nechta yuqori qismi

shoxlangan, tukli hamda to’rt qirrali bo’ladi. Barglari oddiy, bandli, cho’zinchoq 2-4sm uzunlikda va 1-2,5sm kenglikda bo’ladi, poyada qarama-qarshi joylashadi. Barg yuzasi ko’zga tashlanadigan bezlar bilan qoplangan. Gullari pushti rangda mayda boshoqqa yig’ilib rovaksimon to’pgul hosil qiladi. Iyul-avgust oylarida gullaydi. Mevasi 4ta tuxum simon jigarrang tuksiz boladi. Sentabr oyida yetiladi[1].

Begmatov A.M. va boshqalarning qayd etilishicha, tog‘rayhon asosan tog‘ yonbag‘irlarida, quyoshli yoki yarim soyali joylarda, nam va chirindiga boy tuproqlarda yaxshi o‘sadi. Tashqi muhit omillari qulay bo‘lsa, o‘simlikning o‘sish jarayonlari jadallashadi, noqulay sharoitda esa sustlashadi. U o‘rtacha issiqlik va yuqori yorug‘lik talab qiluvchi o‘simlikdir. Tog‘rayhon dorivor xususiyatlari bilan ham qadrlanadi. U viruslar, infeksiyalar va mikroblarga qarshi kurashuvchi xususiyatga ega bo‘lib, tabiiy antibiotik sifatida e’tirof etiladi. Maqolada uning og‘iz bo‘shlig‘idagi mikroblarning 99 foizigacha yo‘q qilish xususiyati borligi, tishdagi tosh va kariyesga qarshi foydali ekani ta’kidlangan. Shuningdek, qaynatma va damlamalari milklarni mustahkamlashda qo‘llanadi. Urug‘ unuvchanligi bo‘yicha o‘tkazilgan tajribalarda tog‘rayhon urug‘lari laboratoriya sharoitida yuqori natija ko‘rsatgan. Mart oyida 18°C haroratda urug‘lar 4 kunda unib chiqa boshlagan va jami 87 foiz urug‘ ungan. Dala sharoitida esa tuproq-iqlim ta’siri sababli unuvchanlik nisbatan past bo‘lgan. Kuzda ekilgan urug‘larning unib chiqish foizi bahorgi ekishga nisbatan yuqoriroq kuzatilgan[2].

Tog‘rayhon (**Origanum tyttanthum Gontsch.**) qimmatli efir moyli, dorivor va ziravor o‘simliklardan biri sanaladi. So‘nggi yillarda tabiiy mahsulotlarga bo‘lgan talab ortib borayotgani sababli ushbu o‘simlikka qiziqish kuchaygan. Ayniqsa, farmatsevtika, oziq-ovqat va tibbiyot sohalarida undan samarali foydalanish muhim ahamiyat kasb etadi. Tog‘rayhon tabiiy resurs sifatida iqtisodiy jihatdan ham foydali hisoblanadi. U nafaqat xalq tabobatida, balki sanoat korxonalari uchun xomashyo manbai bo‘lib xizmat qiladi. Shu bois tog‘li hududlarda ushbu o‘simlik zaxiralarini saqlash va ko‘paytirish muhim vazifa hisoblanadi. Urug‘larining unish energiyasi yuqori bo‘lib, laboratoriya tajribalarida urug‘larning asosiy qismi 7 kundan 22 kungacha unib chiqqan. Bu esa tog‘rayhonni urug‘ orqali ko‘paytirish qulayligini ko‘rsatadi[3].

Ushbu o‘simlik O‘zbekiston, Tojikiston, Qozog‘iston hamda Markaziy Osiyoning boshqa tog‘li hududlarida tabiiy holda uchraydi. Tog‘rayhon bioekologik jihatdan tog‘ va adir mintaqalariga moslashgan bo‘lib, asosan quyoshli yonbag‘irlarda, toshloq va chirindiga boy tuproqlarda yaxshi o‘sadi.

Tog‘rayhon yorug‘sevar o‘simlik bo‘lib, ochiq maydonlarda yaxshi rivojlanadi. Yetarli quyosh nuri tushadigan joylarda uning poyasi baquvvat, barglari yirik va efir moyi miqdori yuqori bo‘ladi. Yarim soyali joylarda ham o‘sishi mumkin, biroq bunday sharoitda gullashi va biologik faol moddalari kamayishi kuzatiladi. O‘simlik o‘rtacha issiqlikni xush ko‘radi va qurg‘oqchilikka nisbatan chidamli hisoblanadi. Shu sababli tog‘rayhon yoz oylarida namlik kam bo‘lgan hududlarda ham o‘sib rivojlana oladi.

Tog‘rayhonning ildiz tizimi yaxshi rivojlangan bo‘lib, tuproqning chuqur qatlamlaridan namlik va oziq moddalari oladi. Bu xususiyat o‘simlikning qurg‘oqchil hududlarga moslashishida muhim rol o‘ynaydi. U qumoq, shag‘alli, yengil va unumdor tuproqlarda yaxshi o‘sadi. Og‘ir, botqoqlashgan va sho‘rlangan tuproqlar o‘simlik rivojlanishiga salbiy ta’sir ko‘rsatadi.

Fenologik jihatdan tog‘rayhon bahorda vegetatsiyani boshlaydi. Aprel–may oylarida yangi novdalar hosil qiladi, iyun–sentabr oylarida gullaydi, urug‘lari esa yoz oxiri va kuz boshlarida pishadi. Gullari mayda, pushti yoki binafsha rangda bo‘lib, kuchli xushbo‘y hid taratadi. Ushbu hid efir moylari mavjudligi bilan bog‘liq. Gullash davrida tog‘rayhon asalari va boshqa changlatuvchi hasharotlarni jalb qiladi, bu esa ekotizimda muhim ahamiyat kasb etadi.

Tog‘rayhon urug‘ va vegetativ usulda ko‘payadi. Urug‘larining unuvchanligi yaxshi bo‘lib, qulay harorat va namlikda tez unib chiqadi. Ko‘p yillik o‘simlik bo‘lgani sababli bir joyda bir necha yil davomida o‘sib, har yili qayta vegetatsiyaga kiradi.

Bioekologik nuqtai nazardan tog‘rayhon tabiiy landshaftlarni mustahkamlashda ham muhim ahamiyatga ega. Uning ildizlari tuproq eroziyasining oldini oladi, ayniqsa tog‘ yonbag‘irlarida tuproqni ushlab turishga yordam beradi. Shuningdek, efir moylari va biologik faol moddalarga boy bo‘lgani sababli farmatsevtika, oziq-ovqat va xalq tabobatida keng foydalaniladi.

Xulosa.

Tadqiqot natijalariga ko‘ra, tog‘rayhon (Origanum tyttanthum) tog‘ va adir mintaqalariga yaxshi moslashgan, qurg‘oqchilikka chidamli hamda yorug‘sevar ko‘p yillik dorivor o‘simlik hisoblanadi. O‘simlik tabiiy va madaniy sharoitda muvaffaqiyatli o‘sib, yuqori urug‘ unuvchanligini namoyon etadi. Tarkibidagi efir moylari va biologik faol moddalar sababli farmatsevtika, oziq-ovqat hamda xalq tabobatida katta ahamiyatga ega. Shu bois tog‘rayhonni muhofaza qilish, ko‘paytirish va plantatsiya usulida yetishtirish dolzarb hisoblanadi.

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BIRLAMCHI TIBBIY – SANITARIYA YORDAMI SHAROITIDA 2-TIP QANDLI DIABETNI ERTA ANIQLASH TIZIMINI BAHOLASH

Annotatsiya: *Ushbu maqolada birlamchi tibbiy-sanitariya yordami sharoitida 2-tip qandli diabetni erta aniqlash tizimi va uning samaradorligi tahlil qilinadi. Kasallikni erta bosqichda aniqlash, xavf guruhlarini belgilash va skrining dasturlarining ahamiyati o‘rganiladi. Shuningdek, diagnostika usullari, profilaktik yondashuvlar va sog‘liqni saqlash tizimidagi amaliy mexanizmlar baholanadi. Tadqiqot natijalari diabetning asoratlarini kamaytirish va aholining sog‘liq darajasini yaxshilashda muhim ahamiyatga ega.*

Kalit so‘zlar: *2-tip qandli diabet, erta aniqlash, birlamchi tibbiy yordam, skrining, glyukoza, insulin rezistentligi*

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ASSESSMENT OF THE EARLY DETECTION SYSTEM OF TYPE 2 DIABETES IN PRIMARY HEALTH CARE SETTINGS

Annotation: *This article analyzes the early detection system of type 2 diabetes in primary health care settings and evaluates its effectiveness. The importance of early diagnosis, identification of risk groups, and screening programs is examined. In addition, diagnostic methods, preventive approaches, and practical mechanisms within the health care system are assessed. The results of the study highlight the significance of reducing diabetes-related complications and improving the overall health status of the population.*

Keywords: *Type 2 diabetes, early detection, primary health care, screening, glucose, insulin resistance*

2-tip qandli diabet (T2DM) bugungi kunda butun dunyo bo‘yicha tez sur’atlarda tarqalib borayotgan surunkali metabolik kasalliklardan biri hisoblanadi. Jahon sog‘liqni saqlash tashkiloti ma’lumotlariga ko‘ra, diabet bilan kasallanganlar soni yil sayin ortib bormoqda va uning asosiy qismi aynan 2-tip diabetga to‘g‘ri keladi. Bu holat nafaqat tibbiy, balki ijtimoiy-iqtisodiy muammo sifatida ham katta ahamiyat kasb etadi. 2-tip diabetning asosiy xususiyati insulin rezistentligi va nisbiy insulin yetishmovchiligi hisoblanadi. Kasallik ko‘pincha sekin rivojlanadi va uzoq vaqt davomida yashirin kechishi mumkin. Shu sababli ko‘plab bemorlarda kasallik faqat asoratlar paydo bo‘lgandan keyin aniqlanadi. Bu

esa erta aniqlash tizimining dolzarbligini yanada oshiradi. Birlamchi tibbiy-sanitariya yordami (BTSY) tizimi 2-tip diabetni erta aniqlashda asosiy bo‘g‘in hisoblanadi. Chunki aholining katta qismi aynan birlamchi bo‘g‘in shifokorlari bilan birinchi marta muloqot qiladi. Shu sababli skrining, profilaktik ko‘riklar va xavf guruhlarini aniqlash aynan shu bosqichda amalga oshirilishi kerak. Kasallikning tarqalishiga ta’sir etuvchi asosiy omillar orasida noto‘g‘ri ovqatlanish, kamharakat turmush tarzi, semizlik, stress va genetik moyillik muhim o‘rin tutadi. Ayniqsa, urbanizatsiya jarayonlari va fast-food mahsulotlarining ko‘payishi kasallik darajasining oshishiga olib kelmoqda. Epidemiologik ma’lumotlar shuni ko‘rsatadiki, 2-tip diabet ko‘proq o‘rta va katta yoshdagi aholida uchraydi, ammo so‘nggi yillarda yoshlar orasida ham keskin o‘sish kuzatilmoqda. Bu esa kasallikni erta aniqlash va profilaktika tizimini kuchaytirishni talab qiladi. Shunday qilib, 2-tip qandli diabetning keng tarqalishi va uning yashirin kechishi birlamchi tibbiy bo‘g‘inda erta aniqlash tizimini baholash va takomillashtirishni dolzarb vazifaga aylantiradi.

Birlamchi tibbiy-sanitariya yordami sharoitida 2-tip qandli diabetni erta aniqlash tizimi sog‘liqni saqlashning eng muhim profilaktik yo‘nalishlaridan biri hisoblanadi. Ushbu bosqichda asosiy maqsad kasallikni simptomlar paydo bo‘lishidan oldin yoki juda erta bosqichda aniqlash orqali uning asoratlarini oldini olishdir. Erta aniqlash tizimi asosan skrining dasturlari orqali amalga oshiriladi. Skrining — bu klinik belgilari bo‘lmagan, lekin xavf guruhiga kiruvchi shaxslarda kasallikni aniqlashga qaratilgan tizimli tekshiruvlar majmuasidir. 2-tip diabet uchun skrining odatda och qoringa glyukoza darajasini o‘lchash, glyukozaga tolerantlik testi (OGTT) va glikozillangan gemoglobin (HbA1c) ko‘rsatkichlarini aniqlash orqali amalga oshiriladi. Birlamchi bo‘g‘inda skrining ko‘proq xavf guruhlariga yo‘naltirilgan bo‘ladi. Xavf guruhiga quyidagilar kiradi: ortiqcha vaznga ega shaxslar, semizlik bilan og‘riganlar, 45 yoshdan katta bemorlar, oilaviy anamnezida diabet mavjud bo‘lganlar, arterial gipertoniya va dislipidemiya bilan og‘riganlar. Ushbu guruhlarda diabet rivojlanish ehtimoli yuqori bo‘lganligi sababli muntazam tekshiruvlar muhim ahamiyatga ega. Erta aniqlash jarayonida laborator va klinik usullar birgalikda qo‘llaniladi. Laborator usullar glyukoza metabolizmini baholasa, klinik usullar bemorning umumiy holati, antropometrik ko‘rsatkichlari (BMI, bel aylanasi) va simptomlarni o‘rganishga qaratiladi. Shuningdek, arterial bosimni o‘lchash va lipid profilini aniqlash ham kompleks baholashda muhim rol o‘ynaydi. So‘nggi yillarda elektron tibbiyot tizimlari skrining jarayonini yanada samarali qilish imkonini bermoqda. Elektron registrlar orqali bemorlar monitoring qilinadi, xavf guruhlari avtomatik aniqlanadi va shifokorlarga ogohlantirish tizimi yo‘lga qo‘yiladi. Bu esa erta aniqlash samaradorligini sezilarli darajada oshiradi. Bundan tashqari, aholi orasida sog‘lom turmush tarzini targ‘ib qilish ham skrining tizimining muhim qismi hisoblanadi. Chunki profilaktika choralari bilan birgalikda kasallikning rivojlanish ehtimoli kamayadi. Aholiga to‘g‘ri ovqatlanish, jismoniy faollik va vazn nazorati bo‘yicha tushuntirish ishlari olib borilishi zarur.

2-tip qandli diabetni erta aniqlash tizimining samaradorligi sog‘liqni saqlash tizimining sifat ko‘rsatkichlarini belgilovchi muhim omillardan biridir. Samaradorlikni baholashda asosiy mezonlar kasallikning erta bosqichda aniqlanish darajasi, asoratlar kamayishi va bemorlarning hayot sifati yaxshilanishi hisoblanadi. Tadqiqotlar shuni ko‘rsatadiki, muntazam skrining o‘tkaziladigan hududlarda diabet erta bosqichda ko‘proq aniqlanadi. Bu esa yurak-qon tomir kasalliklari, nefropatiya, retinopatiya kabi og‘ir asoratlarning oldini olish imkonini beradi. Demak, erta aniqlash tizimi nafaqat diagnostika, balki profilaktika vazifasini ham bajaradi. Samaradorlikni baholashda tibbiy statistik ma’lumotlar muhim rol o‘ynaydi. Masalan, yangi aniqlangan diabet holatlarining qanchalik erta bosqichda topilgani, HbA1c ko‘rsatkichlarining o‘rtacha darajasi va asoratlar chastotasi tahlil qilinadi. Ushbu ko‘rsatkichlar tizimning ishlash sifatini aniqlashga yordam beradi. Bundan tashqari, bemorlarning davolanishga jalb etilishi ham muhim indikator hisoblanadi. Erta aniqlangan bemorlar odatda parhez, jismoniy faollik va dori vositalariga nisbatan yuqori rioya ko‘rsatadi. Bu esa kasallikni nazorat qilishni osonlashtiradi. Birlamchi bo‘g‘inda ishlovchi tibbiyot xodimlarining malakasi ham samaradorlikka bevosita ta’sir qiladi. Agar shifokorlar va hamshiralar diabetning erta belgilarini yaxshi bilsalar, diagnostika sifati ham oshadi. Shu sababli doimiy o‘quv dasturlari va treninglar muhim hisoblanadi. Elektron sog‘liqni saqlash tizimlari samaradorlikni oshirishda katta rol o‘ynaydi. Ma’lumotlarni raqamlashtirish, bemorlarni kuzatish va avtomatik tahlil qilish tizimlari diagnostika jarayonini tezlashtiradi va xatolarni kamaytiradi.

2-tip qandli diabetni erta aniqlash tizimini takomillashtirish sog‘liqni saqlash tizimining ustuvor yo‘nalishlaridan biri hisoblanadi. Ushbu jarayon diagnostika sifatini oshirish, aholi qamrovini kengaytirish va profilaktik chora-tadbirlarni kuchaytirishga qaratilgan. Birinchi navbatda, skrining dasturlarini kengaytirish zarur. Aholining barcha qatlamlarini, ayniqsa xavf guruhlarini muntazam tekshiruvdan o‘tkazish kasallikni erta aniqlash imkonini oshiradi. Bu jarayonda mobil tibbiy brigadalar va ko‘chma diagnostika markazlari muhim rol o‘ynaydi. Ikkinchi yo‘nalish — tibbiyot xodimlarining malakasini oshirish. Birlamchi bo‘g‘inda ishlovchi shifokorlar va hamshiralar diabetning erta belgilarini aniqlash, xavf guruhlarini baholash va skrining natijalarini to‘g‘ri talqin qilish bo‘yicha doimiy o‘qitilishi kerak. Uchinchi muhim yo‘nalish — aholi o‘rtasida tibbiy savodxonlikni oshirish. Odamlar diabet xavf omillari, belgilari va profilaktikasi haqida yetarli bilimga ega bo‘lsa, erta murojaat qilish darajasi oshadi. Bu esa kasallikni erta bosqichda aniqlashga yordam beradi. To‘rtinchi yo‘nalish — raqamli texnologiyalarni keng joriy etish. Elektron tibbiy kartalar, mobil ilovalar va sun’iy intellekt asosidagi tahlil tizimlari diabetni erta aniqlashni sezilarli darajada yaxshilaydi. Beshinchi yo‘nalish — sog‘lom turmush tarzini targ‘ib qilish. To‘g‘ri ovqatlanish, jismoniy faollik va stressni kamaytirish diabet rivojlanish xavfini kamaytiradi. Shu sababli profilaktika ishlari tizimli ravishda olib borilishi kerak.

Xulosa

2-tip qandli diabet bugungi kunda keng tarqalgan va jiddiy asoratlarga olib keluvchi surunkali kasalliklardan biridir. Uni erta aniqlash tizimi birlamchi tibbiy-sanitariya yordami darajasida muhim ahamiyatga ega bo‘lib, kasallikning og‘ir asoratlarini oldini olishga xizmat qiladi. Maqolada erta aniqlash tizimi, skrining usullari, xavf guruhlari bilan ishlash va laborator diagnostika imkoniyatlari tahlil qilindi. Natijalar shuni ko‘rsatadiki, muntazam skrining va profilaktik yondashuvlar kasallikni erta bosqichda aniqlash imkonini oshiradi. Samaradorlikni oshirish uchun tibbiyot xodimlarining malakasini oshirish, zamonaviy texnologiyalarni joriy etish va aholi o‘rtasida sog‘lom turmush tarzini targ‘ib qilish muhimdir. Shu bilan birga, elektron sog‘liqni saqlash tizimlari diagnostika jarayonini tezlashtiradi va sifatini oshiradi. Umuman olganda, 2-tip qandli diabetni erta aniqlash tizimini takomillashtirish kasallikning tarqalishini kamaytirish, bemorlar hayot sifatini yaxshilash va sog‘liqni saqlash tizimi samaradorligini oshirishda muhim ahamiyatga ega.

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BIOLOGIYA FANINI O‘QITISH JARAYONIDA O‘QUVCHILARDA RIVOJLANADIGAN KOMPETENSIYALAR

Annotatsiya*: Mazkur maqolada biologiya fanini o‘qitish jarayonida o‘quvchilarda shakllanadigan muhim kompetensiyalar, ularni rivojlantirish yo‘llari hamda biologiya fanining asosiy g‘oya, nazariya, qonuniyat va tushunchalarini o‘zlashtirish masalalari yoritilgan. Shuningdek, o‘quvchilarda ilmiy dunyoqarashni shakllantirish, tabiat va jamiyatga ongli munosabatni tarkib toptirish, ta’lim-tarbiya samaradorligini oshirishda o‘qituvchining roli haqida fikrlar bayon etilgan.*

Kalit so‘zlar: *Barkamol shaxs, ilmiy dunyoqarash, tafakkur, ekologik madaniyat, estetik tarbiya, iqtisodiy tarbiya, jismoniy tarbiya, gigiyenik tarbiya, mehnat tarbiyasi, kompetensiya.*

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COMPETENCIES DEVELOPED IN STUDENTS DURING THE PROCESS OF TEACHING BIOLOGY

Abstract. *This article discusses the key competencies developed in students during the teaching of biology, ways of improving them, and issues related to mastering the main ideas, theories, laws, and concepts of biological science. It also highlights the formation of students’ scientific worldview, the development of a conscious attitude toward nature and society, and the role of the teacher in increasing the effectiveness of the educational process.*

Keywords. *well-rounded personality, scientific worldview, thinking, ecological culture, aesthetic education, economic education, physical education, hygienic education, labor education, competency.*

Barkamol shaxsni tarbiyalash va uni jamiyatning faol a’zosi sifatida shakllantirish jarayoni, avvalo, o‘quvchilarda ilmiy dunyoqarashni tarkib toptirishni talab etadi. Tabiat haqidagi yetakchi fanlardan biri hisoblangan biologiya fani bu borada muhim ahamiyat kasb etadi. Shu sababli biologiya fanining mazmuni o‘quvchilarda ilmiy tafakkur, kuzatuvchanlik hamda tabiat hodisalariga ongli munosabatni rivojlantirish uchun keng imkoniyatlarga ega.

Ilmiy dunyoqarashni shakllantirishda biologiya fanining o‘rni beqiyosdir. O‘quvchilar biologik obyektlarning tuzilishi, rivojlanishi va hayot faoliyati qonuniyatlarini o‘rganish orqali tabiatdagi jarayonlarning o‘zaro bog‘liqligini anglaydilar. Natijada ularda ilmiy bilimlar asosida e’tiqod va qarashlar tizimi shakllanadi. Biologik qonuniyatlarni tushunish “tabiat – inson – jamiyat” tizimining uzviy bog‘liqligini anglashga xizmat qiladi.

Biologiya fanining botanika bo‘limida o‘simliklarning yaxlit organizm sifatidagi xususiyatlarini o‘rganish jarayonida o‘quvchilar tabiatni asrash, yashil boyliklarni ko‘paytirish va ulardan oqilona foydalanish zarurligini tushunib yetadilar. Mazkur bilimlar o‘quvchilarning atrof-muhitga bo‘lgan munosabati va kundalik xatti-harakatlariga ham bevosita ta’sir ko‘rsatadi. Shu bois o‘qituvchi mavzularni yoritishda tabiiy resurslarning inson hayotidagi o‘rni va ularni asrash zaruriyatiga alohida e’tibor qaratishi lozim.

O‘quvchilarda ekologik madaniyatni shakllantirish biologiya ta’limining muhim vazifalaridan biridir. Bunda tabiatning yaxlit tizim ekanligi, inson va tabiat o‘rtasidagi o‘zaro bog‘liqlik haqidagi bilimlarni o‘zlashtirish katta ahamiyatga ega. Shuningdek, o‘quvchilar tiklanadigan va tiklanmaydigan tabiiy boyliklar farqini bilishi, ulardan tejamkorlik bilan foydalanish ko‘nikmalariga ega bo‘lishi zarur. Atrof-muhitni muhofaza qilish, ko‘kalamzorlashtirish va ekologik tadbirlarda faol ishtirok etish orqali ularda ekologik mas’uliyat hissi rivojlanadi.

Estetik tarbiya ham biologiya fanini o‘qitish jarayonining ajralmas qismidir. O‘simliklar, gullar, mevalar va tabiat manzaralarining go‘zalligini kuzatish o‘quvchilarda nafis did va go‘zallikni his etish qobiliyatini shakllantiradi. O‘quvchilar tabiatdagi uyg‘unlik va mukammallikni anglash orqali estetik dunyoqarashga ega bo‘ladilar. Biologiya xonalari, tajriba maydonlari va tirik tabiat burchaklarining ozoda hamda tartibli bo‘lishi ham bu jarayonda muhim rol o‘ynaydi.

Iqtisodiy tarbiya berishda ham biologiya fanining imkoniyatlari katta. O‘quvchilar o‘simlik va hayvonot dunyosining mahsuldorligini oshirish, tuproq unumdorligini saqlash, hosildorlikni ko‘paytirish kabi masalalar bilan tanishadilar. Bu esa ularda iqtisodiy tafakkur, mehnatga mas’uliyat va resurslardan samarali foydalanish ko‘nikmalarini shakllantiradi.

Jismoniy va gigiyenik tarbiya biologiya ta’limi bilan uzviy bog‘liqdir. Inson organizmining tuzilishi, salomatlikni saqlash, sog‘lom turmush tarzi, gigiyena qoidalariga rioya qilish kabi mavzular o‘quvchilarda sog‘lom hayot kechirish madaniyatini rivojlantiradi. Natijada ular o‘z salomatligini asrash va mustahkamlash zarurligini chuqur anglaydilar.

Mehnat tarbiyasi barkamol shaxsni shakllantirishning muhim omillaridan biri sanaladi. Laboratoriya va amaliy mashg‘ulotlar davomida o‘quvchilar mikroskop bilan ishlash, preparatlar tayyorlash, tajribalar o‘tkazish, mustaqil izlanish olib borish kabi ko‘nikmalarni egallaydilar. Ushbu amaliy malakalar kelajakda ularning kasbiy faoliyatida muhim ahamiyat kasb etishi mumkin.

Xulosa qilib aytganda, biologiya fanini o‘qitish jarayonida o‘quvchilarda ilmiy dunyoqarash, ekologik madaniyat, estetik did, iqtisodiy tafakkur,

mehnatsevarlik hamda sog‘lom turmush ko‘nikmalari shakllanadi. Shu sababli biologiya fanini zamonaviy pedagogik yondashuvlar asosida o‘qitish ta’lim sifatini oshirishda muhim omil hisoblanadi.

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BIOLOGIYA DARSLARIDA O‘QITUVCHINING PEDAGOGIK-PSIXOLOGIK KASBIY KOMPETENTLIGI

Annotatsiya: *Mazkur maqolada biologiya darslarida ta’lim sifatini oshirish jarayonida bo‘lajak o‘qituvchilarning o‘z ustida muntazam ishlashi, bilim, ko‘nikma va malakalarini takomillashtirib borishi hamda ularda kasbiy kompetentlikni rivojlantirish masalalari yoritilgan. Shuningdek, pedagogik va psixologik yondashuvlarning ahamiyati, innovatsion texnologiyalarni qo‘llash orqali ta’lim samaradorligini oshirish yo‘llari tahlil etilgan.*

Kalit so’zlar: *kompetentlik, ta’lim jarayoni, dars, kommunikatsiya, tarbiya, kompyuter texnologiyalari, innovatsiya, biologik-pedagogik metodika, dars metodlari, bilish faoliyati, subyekt-subyekt munosabatlari, individual ta’lim, kichik guruhlarda o‘qitish.*

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PROFESSIONAL PEDAGOGICAL AND PSYCHOLOGICAL COMPETENCE OF THE TEACHER IN BIOLOGY CLASSES

Abstract. *This article highlights issues of improving the quality of education in biology lessons, continuous self-development of future teachers, enhancement of their knowledge, skills, and abilities, as well as the development of professional competence. It also analyzes the importance of pedagogical and psychological approaches and ways to increase educational effectiveness through innovative technologies.*

Keywords. *competence, educational process, lesson, communication, upbringing, computer technologies, innovation, biological-pedagogical methodology, teaching methods, cognitive activity, subject-subject relations, individual learning, small group teaching.*

Biologiya darslarida o’qituvchining o’rtasidagi o’zaro munosabatlarda ularning umumiy manfaatlarini ifodalovchi omil maqsad bo’lib, shu maqsadga erishishda barcha o’qituvchilarda tabiatan faollik va layoqat mavjud bo’ladi, agar belgilangan maqsad umumiy manfaatlar uchun xizmat qilmasa va u o’z vaqtida, muvofiqlashtirilmasa, bo’lajak o’qituvchilarda mazkur maqsadga, o’zaro aloqa va

munosabatlarning maqsadi, mazmun-mohiyatining o'qituvchilar tomonidan o'ziga xos tushunilishi ularning pedagogik kompetentligi shakllanganlik darajasiga bog'liq bo'ladi.

O'qituvchilarda kasbiy kompetentlikni rivojlantirishda o'zaro ta'sir jarayoni mazkur jarayonining samaradorligiga ta'sir ko'rsatuvchi qator omillar orqali ifodalanadi. Mazkur fikrga asoslangan holda, o'qtuvchilarda kasbiy kompetentlikni rivojlantirish vositasi hisoblanuvchi va bu jarayonga bevosita ta'sir ko'rsatuvchi omillarga to'xtalib o'tamiz.

O'qituvchilarda biologiya fani darslarida kasbiy kompatentlikni rivojlantirish vositalaridan biri – ular faoliyat ko'rsatayotgan va yashayotgan muhit bo'lib, bu o'qituvchilarda kasbiy kompatentlikni rivojlantirish jarayoni subektlarining o'zaro ta'sirini amalaga oshiruvchi tashqi omillardan biri hisoblanadi. Bunday biologic ta'lim – tarbiyaviy muhitda o'zaro ta'sir ko'rsatuvchi ishtirokchilarning suhbati va o'qituvchining o'zini-o'zi rivojlantirishi asosida kompetentlikning rivojlantirish rivojlanish jarayoni vujudga keladi, mazkur omil ota-onalar, ijtimoiy muhit va jamiyatning zamonaviy talablari ta'siri ostida bo'ladi.

O'qituvchilar o'rtasidagi aloqa-axborot almashinuvi, kommunikatsion jarayonlar hamda o'zaro munosabatlarning samimiyligi va natijaviyligi, bir tomondan axborotlarning yangiligi va ishonchliligiga bog'liq bo'lsa, ikkinchi tomondan, ularning ma'lum bir yo'nalishidagi tasavvuri va kompetentligi shakllanganlik va rivojlanganlik darajasiga ham bog'liq bo'ladi.

Ular o'rtasidagi aloqalarning vujudga kelishida, yani axborot almashinuvida, munosabatlarning o'rtasidagi aloqalarning vijudga kelishida, yani axborotlar almashinuvida, munosabatlarning qaysidir (ijobiy yoki salbiy) tarzida shakllanishida maqsad asosiy rol o'ynaydi va o'z navbatida, o'qituvchining kasbiy kompetentligi rivojlanishiga ham ta'sir etadi.

Zamonaviy shart-sharoitlarda biologik pedagogik muhitni tashkil etish va uni olib borish qobiliyati orqali pedagogning mutaxassisligidan kelib chiqib, kasbiy tayyorgarligi, ya'ni pedagogik boy tajribaliligi, o'qituvchilarning bilim, ko'nikma va malakasini muvofiqlashtirish, ta'lim jarayoni samaradorligini ta'minlashda kompetentli bo'lishi muhim ahamiyat kasb etadi.

Ta'lim muassasasi biologiya o'qituvchilarining pedagogik jarayonini ilmiy asosda tashkil etish va uni boshqarish hamda qulay ta'limiy muhitning shakllanishi uchun boshqarishning turli xil zamonaviy usullarini bilishi va ularga asoslanishi, rivojlantiruvchi g'oyalar yo'nalishini aniqlay olishi, ilg'or tajribalarni va fan texnika yutuqlarini muntazam o'rganib borishi, ularni o'z faoliyatiga tadbiq etib borishi, ta'lim-tarbiya jarayonida o'qituvchilarning mustaqil faoliyatini tashkil etish asosida ularning sub'ektivligi va faolligini oshira olishi zarur hisoblanadi.

Zamonaviy talablar asosida kompiyuterlashtirish va komp'yuter tarmoqlari negizida tashkil etish, ta'lim tizimidagi yangi pedagogik texnologiyalarni joriy va ijobiy tajribalarni ommalashtirish ta'lim sohasidagi eng muhim masalalardan hisoblanadi.

Ilmiy bilimlar haqqoniy voqelikni inson ongida aks etishidir. Tevarak-atrofni o‘rab olgan dunyoning qonuniyatlarini, narsa va hodisalarning xossalarini va ularning o‘zaro aloqalarini aks ettiruvchi bilim ilmiy bilimlar hisoblanadi. Ilmiy bilimlar tajribalar, tekshirishlar, tahlil qilish, isbotlash kabilarni talab etadi. Insoniyat ilmiy bilimlarini kengaytirib borgan sari haqiqiy voqelikka ma’lum darajada yaqinlashib boradi. Ilmiy jihatdan isbotlanmagan bilimlar ham mavjud va bu bilimlarni hali inson tahlil qilishi va chuqurroq o‘rganishi kerak bo‘ladi. Ta’lim jarayonida biz talabalarga isbotlab bo‘lingan, aniqlangan va amaliyotda tekshirib ko‘rilgan bilimlarni yetkazishimiz lozim.

Ta’limning ilmiyligi talabaning o‘quv materiallaridagi qonuniyatlarini aks ettirish, tushunish va o‘zlashtirishi uchun to‘g‘ri sharoit yaratish maqsadida zarurdir. Nazariy qoidalarni tushunish-materialini ilmiy asosda izohlab berishning muhim belgisi bo‘lib, u talabaning fikrlash faoliyatini xususiyatlarini belgilaydi. Ilmiy bilimlar ilmiyligicha qolib, voqeilikni har xil darajada aks ettirishi mumkin. Ilmiy izoh ta’limning hamma bosqichlarida, har bir sinfda ilmiylik qoidalari vazifalaridan biri nazariy ma’lumotlar tizimini shu ma’lumotlar tevarak–atrofdagi dunèni qanchalik chuqur aks etganligi nuqtai nazaridan bilib olishdir. Ilmiylik qoidasi barcha yosh guruhlardagi va turli o‘quv yurtlaridagi talabalarga o‘rganish uchun ilmiy jihatdan ishonarli, amalda sinab ko‘rilgan ma’lumotlar berilishini talab etadi.

Ilmiy bilimlarni egallash jarayonida talabalarda ilmiy dunyoqarash e’tiqod tarkib topadi, tafakkur rivojlanadi. Yetuk milliy kadrlarni tarbiyalash va yetishtirish uchun hozirgi zamon fan-texnikasining rivoji darajasidagi ilmiy bilimlarni egallashga erishish muhim. Shu bilan bir qatorda talabalarni ilmiy–tadqiqot usullari bilan ham tanishtirib boorish maqsadga muvofiq. Ilmiylik ta’limning mazmuniga ham, usullariga ham aloqadordir ya’ni darsliklar, o‘quv qo‘llanmalar, o‘quv dasturlari, o‘quv rejasi ilmiy asosda yaratilishi lozim.

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SUV RESURSLARINING GEOGRAFIK TAQSIMLANISHI VA ULARDAN OQILONA FOYDALANISH (QASHQADARYO VILOYATI MISOLIDA)

Annotatsiya. *Mazkur maqolada Qashqadaryo viloyatida suv resurslarining shakllanish omillari, ularning hududiy-geografik taqsimlanishi hamda zamonaviy sharoitdagi o‘zgarish tendensiyalari kompleks tahlil qilinadi. Tadqiqotda atmosfera yog‘inlarining balandlik mintaqalari bo‘yicha differensial taqsimlanishi, kichik daryolar oqimining ko‘p yillik dinamikasi, shuningdek, oqiziqlar rejimi va ularning gidroekologik ahamiyati o‘rganilgan. Shu bilan birga, iqlim o‘zgarishi va antropogen bosim sharoitida yuzaga kelayotgan suv tanqisligi muammolari hamda ularni bartaraf etishning ilmiy-amaliy yo‘nalishlari asoslab berilgan.*

Kalit so‘zlar. *suv resurslari, gidrologik rejim, oqiziqlar, suv tanqisligi, irrigatsiya, suv balansi, tejamkor sug‘orish texnologiyalari.*

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GEOGRAPHICAL DISTRIBUTION OF WATER RESOURCES AND THEIR RATIONAL USE (CASE STUDY OF KASHKADARYA REGION)

Abstract. *This article provides a comprehensive analysis of the factors influencing the formation of water resources in the Kashkadarya region, their territorial and geographical distribution, as well as current transformation trends under modern conditions. The study examines the differentiated distribution of atmospheric precipitation across altitudinal zones, the long-term dynamics of small river runoff, and the sediment regime along with its hydroecological significance. In addition, issues of water scarcity arising under conditions of climate change and anthropogenic pressure are discussed, and scientific and practical approaches to their mitigation are substantiated.*

Keywords: *water resources, hydrological regime, sediments, water scarcity, irrigation, water balance, water-saving irrigation technologies.*

Kirish

O‘zbekiston hududi asosan arid va yarim arid iqlim mintaqasida joylashganligi sababli suv resurslari tabiiy jihatdan cheklangan va notekis taqsimlangan. Bu esa suvdan foydalanishni strategik boshqaruv ob’ekti sifatida ko‘rib chiqishni taqozo etadi. Ayniqsa, Qashqadaryo viloyati kabi ichki havza hududlarida suv resurslarining shakllanishi va iste’moli o‘rtasidagi nomutanosiblik yanada keskinroq namoyon bo‘ladi.

Hududda suv resurslari asosan tog‘li mintaqalarda shakllanib, tekisliklarga oqib tushadi. Biroq suv iste’molining asosiy qismi aynan tekislik hududlariga to‘g‘ri keladi. Bu holat hududiy suv balansining buzilishiga sabab bo‘ladi.

Mustaqillik yillarida respublikada suv resurslarini boshqarish tizimi tubdan takomillashtirildi. Jumladan:

- suvni ko‘p talab qiladigan ekinlar maydoni qisqartirildi;
- suv tejovchi texnologiyalar (tomchilatib sug‘orish, yomg‘irlatib sug‘orish) joriy etildi;
- havza tamoyiliga asoslangan boshqaruv tizimi shakllantirildi.

Natijada umumiy suv iste’moli kamaygan bo‘lsa-da, iqlim o‘zgarishi va transchegaraviy suv omillari tufayli suv taqchilligi muammosi saqlanib qolmoqda. So‘nggi o‘n yilliklarda kam suvli yillarning takrorlanish chastotasi ortib borayotgani bu muammoning dolzarbligini yanada kuchaytirmoqda.

Adabiyotlar tahlili

Qashqadaryo viloyatida yer va suv resurslarining holati hamda ulardan oqilona foydalanish masalalari bo‘yicha respublika olimlari tomonidan salmoqli ilmiy tadqiqotlar olib borilgan. Ushbu izlanishlarda hududning tabiiy-geografik sharoiti, resurslarning shakllanish qonuniyatlari va ulardan foydalanish samaradorligi kompleks tarzda yoritilgan.

Jumladan, A.K.Karimov o‘z ilmiy ishlarida O‘zbekistonning markaziy va janubiy hududlaridagi yer resurslarining geologik tuzilishi, ularning morfostrukturaviy xususiyatlari hamda qishloq xo‘jaligida foydalanish imkoniyatlarini chuqur tahlil qilgan. Muallif tomonidan yer resurslaridan foydalanishda tabiiy-geografik omillarni hisobga olish zarurligi ilmiy asoslab berilgan.

E.T.Turdiyev tomonidan olib borilgan tadqiqotlarda suv resurslarini boshqarish tizimi, irrigatsiya tarmoqlarining texnik holati va ularning samaradorligini oshirish mexanizmlari keng yoritilgan. Olim o‘z ishlarida sug‘orish tizimlarini modernizatsiya qilish, suv taqsimotini optimallashtirish hamda suv yo‘qotilishini kamaytirishning ilmiy-amaliy asoslarini ishlab chiqqan.

Hududdagi ekologik muammolar, xususan, yer degradatsiyasi masalalari Q.R.Rashidov tomonidan atroflicha o‘rganilgan. Uning tadqiqotlarida tuproq eroziyasi, sho‘rlanish va degradatsiya jarayonlari tizimli tahlil qilinib, ularni kamaytirishning ilmiy asoslangan yo‘llari taklif etilgan.

Suv resurslarining iqtisodiy samaradorligi va ulardan foydalanishning innovatsion yo‘nalishlari A.D.Davronov tomonidan kengroq o‘rganilgan. Olim suv tejovchi texnologiyalarni joriy etish orqali suvdan foydalanish samaradorligini oshirish mumkinligini asoslab bergan hamda suv resurslarini boshqarishda iqtisodiy mexanizmlarning ahamiyatini ko‘rsatib bergan.

Shuningdek, A.T.Saloxiddinov, P.A.Xakimova va A.G‘.G‘ofurov lartomonidan olib borilgan ilmiy izlanishlarda mintaqaviy iqlim o‘zgarishlarining daryo oqimiga ta’siri chuqur tahlil qilingan. Ushbu tadqiqotlar natijasida iqlim o‘zgarishi sharoitida suv resurslarining kamayish tendensiyasi va uning gidrologik rejimga ta’siri ilmiy jihatdan asoslab berilgan.

Mazkur ilmiy ishlanmalar tahlili shuni ko‘rsatadiki, Qashqadaryo viloyatida suv resurslarini boshqarish tizimini takomillashtirishda integrallashgan yondashuv, ya’ni tabiiy-geografik, gidrologik, ekologik va iqtisodiy omillarni kompleks hisobga olish muhim ahamiyat kasb etadi.

Natijalar

Zamonaviy tadqiqot natijalari bo’yicha Qashqadaryo viloyatida suv resurslarining shakllanishi, hududiy taqsimlanishi va ulardan foydalanish darajasi murakkab tabiiy-geografik hamda antropogen omillar ta’sirida yuzaga kelishini ko‘rsatadi. Hududning gidrologik tizimi asosan tog‘li mintaqalarda shakllanuvchi oqimlarga bog‘liq bo‘lib, bu holat suv resurslarining makon bo‘yicha keskin differensial taqsimlanishiga olib keladi.

1-jadval

Qashqadaryo viloyatida suv resurslari

Yo‘nalish	Asosiy holat	Yechim
Shakllanish va taqsimlanish	Suv tog‘larda hosil bo‘lib, tekisliklarda iste’mol qilinadi (nomutanosiblik mavjud)	Hududiy qayta taqsimlash
Yog‘in va iqlim	Yog‘in notekis (600–800 mm vs 200–250 mm)	Suv balansini optimallashtirish
Daryolar rejimi	Mavsumiy va kamayib boruvchi oqim	Monitoring va nazorat
Suv tanqisligi	Iqlim va antropogen omillar ta’siri	Kompleks boshqaruv
Irrigatsiya	Eskirgan tizim, 35–40% yo‘qotish	Modernizatsiya
Samaradorlik	Suvdan foydalanish past	Tejamkor sug‘orish texnologiyalari

Suv resurslarining hududiy differensial taqsimlanishi. Kartografik va statistik tahlillar shuni ko‘rsatadiki, viloyat hududida atmosfera yog‘inlari miqdori balandlik ortishi bilan mutanosib ravishda oshib boradi. Hisor tizmasining g‘arbiy yonbag‘irlarida yillik yog‘in miqdori 600–800 mm ni tashkil etsa, Qarshi cho‘li hududlarida bu ko‘rsatkich 200–250 mm atrofida shakllanadi. Mazkur tafovut suv resurslarining shakllanish zonalari bilan iste’mol zonalari o‘rtasida keskin nomutanosiblikni yuzaga keltiradi.

Natijada viloyatning asosiy suv manbalari tog‘li hududlarda konsentratsiyalashgan bo‘lsa-da, suv iste’molining katta qismi irrigatsiya

dehqonchiligi rivojlangan tekislik hududlariga to‘g‘ri keladi. Bu esa suv resurslarini qayta taqsimlash zaruratini yuzaga keltiradi.

Kichik daryolar oqimi va gidrologik rejim. Viloyatdagi kichik daryolar asosan qor-yomg‘ir va qisman muzlik suvlari hisobiga to‘yinadi. Ularning gidrologik rejimi keskin mavsumiy xarakterga ega bo‘lib, maksimal suv sarfi bahor–yoz oylariga, minimal ko‘rsatkichlar esa kuz–qish davriga to‘g‘ri keladi.

Ko‘p yillik kuzatuv ma’lumotlari asosida aniqlanishicha, so‘nggi o‘n yilliklarda daryolar oqimining o‘rtacha ko‘rsatkichlarida pasayish tendensiyasi kuzatilmoqda. Bu holat, bir tomondan, iqlim o‘zgarishi natijasida qor qoplami va muzliklar hajmining qisqarishi bilan izohlansa, ikkinchi tomondan, yuqori oqimlarda suvdan xo‘jalik maqsadlarida ortiqcha foydalanish bilan bog‘liqdir.

Shu bilan birga, kichik daryolarning suv rejimi beqarorligi irrigatsiya tizimlarining ishonchliligiga ham salbiy ta’sir ko‘rsatmoqda.

Suvni tashilish dinamikasi va ularning gidroekologik ta’siri. Daryolar orqali tashiladigan yotqiziqlar miqdori hududning geomorfologik xususiyatlari bilan chambarchas bog‘liqligini ko‘rsatdi. Tog‘li hududlarda eroziya jarayonlarining faolligi tufayli oqiziqlar miqdori yuqori bo‘lib, bu daryo o‘zanlarining sayozlashuvi hamda irrigatsiya inshootlarining loyqalanishiga olib keladi.

Yotqiziqlar (asosan alyuvial jinslar) oqimi suv omborlarining foydali sig‘imini kamaytirib, ularning ekspluatatsiya muddatini qisqartiradi. Bundan tashqari, yotqiziqlar tarkibidagi minerallarning yuqoriligi sug‘oriladigan yerlarning sho‘rlanish jarayonini tezlashtiruvchi omillardan biri sifatida namoyon bo‘ladi.

Suv tanqisligi muammosi va uning kompleks sabablari. Hududda kuzatilayotgan suv tanqisligi ko‘p omilli jarayon bo‘lib, uning shakllanishida quyidagi asosiy sabablar muhim rol o‘ynaydi:

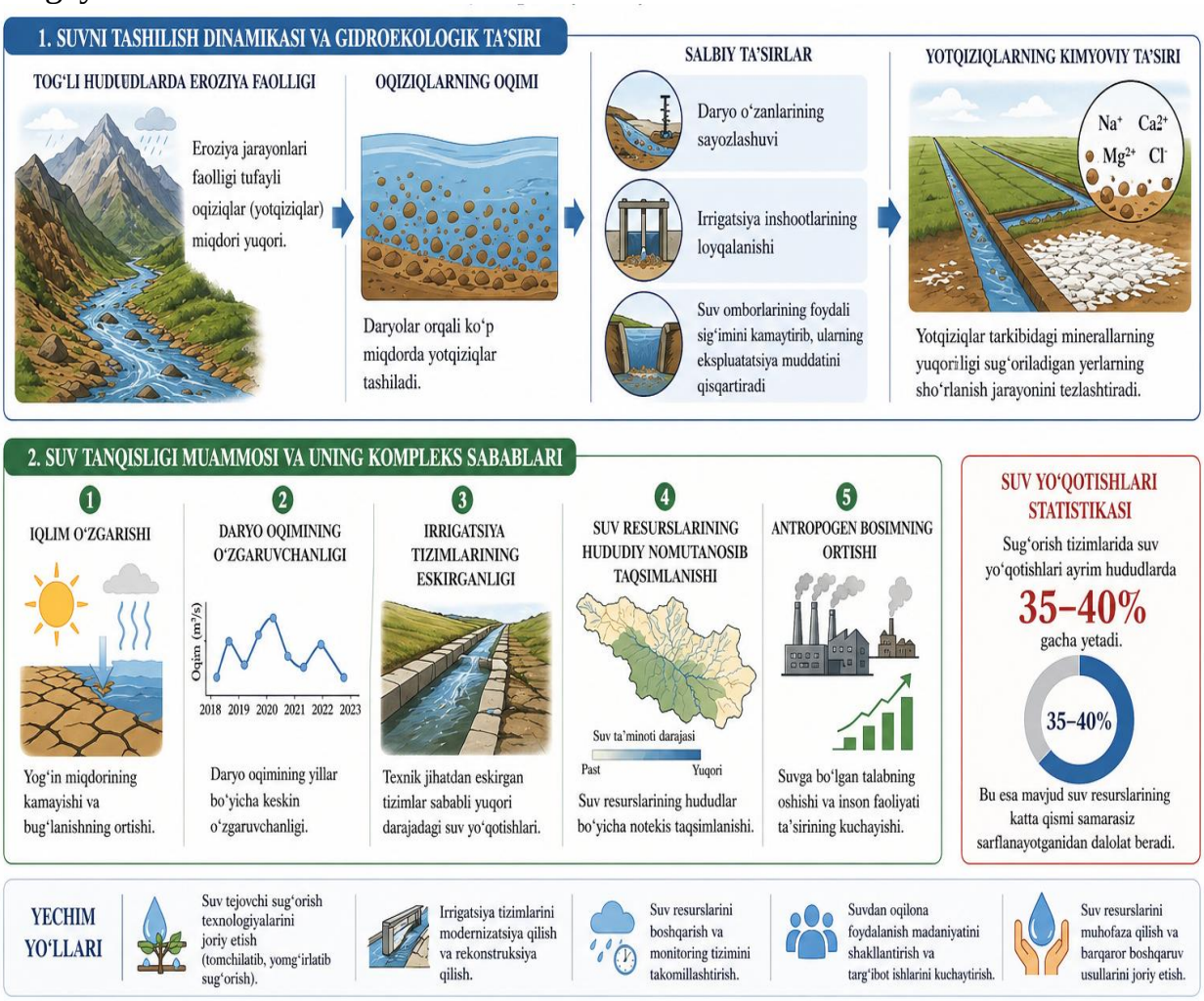
- iqlim o‘zgarishi natijasida yog‘in miqdorining kamayishi va bug‘lanishning ortishi;
- daryo oqimining yillar bo‘yicha keskin o‘zgaruvchanligi;
- irrigatsiya tizimlarining texnik jihatdan eskirganligi va yuqori darajadagi suv yo‘qotishlari;
- suv resurslarining hududiy nomutanosib taqsimlanishi;
- antropogen bosimning ortishi, xususan, suvga bo‘lgan talabning oshishi.

Statistik baholashlar sug‘orish tizimlarida suv yo‘qotishlari ayrim hududlarda 35–40% gacha yetishini ko‘rsatmoqda. Bu esa mavjud suv resurslarining katta qismi samarasiz sarflanayotganidan dalolat beradi.

Suv resurslaridan oqilona foydalanishning ustuvor yo‘nalishlari. Olingan natijalar asosida hududda suv resurslaridan foydalanish samaradorligini oshirish uchun quyidagi ilmiy-amaliy yo‘nalishlar ustuvor deb baholandi:

- suv tejovchi texnologiyalarni (tomchilatib va yomg‘irlatib sug‘orish) keng joriy etish;
- irrigatsiya infratuzilmasini modernizatsiya qilish va suv yo‘qotilishini kamaytirish;

- suv resurslarini boshqarishda raqamli monitoring tizimlarini joriy etish;
- suv balansini optimallashtirish asosida hududiy rejalashtirishni takomillashtirish;
- drenaj va kollektor suvlaridan qayta foydalanish mexanizmlarini kengaytirish.



1-rasm. Suv tashilish dinamikasi (Qashqadaryo viloyati misolida) infografik jadvali

Muhokama

Yuqoridagi natijalar tahlili shuni ko‘rsatadiki, Qashqadaryo viloyatida suv resurslari bilan bog‘liq muammolar faqat tabiiy omillar bilan emas, balki boshqaruv tizimidagi kamchiliklar bilan ham uzviy bog‘liqdir. Shu nuqtai nazardan, suv resurslarini boshqarishda integrallashgan (IWRM – Integrated Water Resources Management) yondashuvni joriy etish muhim ahamiyat kasb etadi.

Bunda suv resurslaridan foydalanish jarayonida tabiiy-geografik sharoitlar, iqtisodiy ehtiyojlar va ekologik cheklovlar o‘zaro uyg‘un holda hisobga olinishi zarur. Aks holda, mavjud suv resurslarining kamayishi va ularning sifat jihatidan yomonlashuvi hududning barqaror rivojlanishiga jiddiy tahdid solishi mumkin.

Xulosa

Qashqadaryo viloyatida suv resurslarining shakllanishi va taqsimlanishi tabiiy-geografik omillar bilan chambarchas bog‘liq bo‘lib, ularning hududiy nomutanosibligi suv tanqisligi muammosini keltirib chiqarmoqda.

Sug‘orish tizimlarining eskirganligi, suv yo‘qotilishining yuqoriligi va yer degradatsiyasi mavjud resurslardan samarali foydalanishni cheklamoqda. Shu bois, suv resurslarini boshqarishda integrallashgan, ilmiy asoslangan va innovatsion yondashuvlarni keng joriy etish zarur.

Kelgusida suv resurslaridan foydalanish samaradorligini oshirish uchun raqamli texnologiyalar, suv tejovchi usullar va ekologik barqaror boshqaruv mexanizmlarini rivojlantirish ustuvor vazifa bo‘lib qoladi.

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QASHQADARYO VILOYATINING DIQQATGA SAZOVOR JOYLARI VA TURIZM AHAMIYATI TAHLILI

Annotatsiya. *Mazkur maqolada Qashqadaryo viloyatining turizm salohiyati, uning diqqatga sazovor tarixiy, madaniy va tabiiy maskanlari hamda ularning hudud ijtimoiy-iqtisodiy rivojlanishidagi o‘rni ilmiy jihatdan tahlil qilingan. Xususan, Shahrisabz shahridagi Oqsaroy majmuasi, Amir Temur haykali hamda Kitob milliy tabiat bog‘ining turizm va ilmiy ahamiyati yoritilgan. Shuningdek, viloyatda mavjud madaniy meros obyektlari soni, ularning hududlar kesimidagi taqsimoti va turizm infratuzilmasini rivojlantirishga qaratilgan chora-tadbirlar ko‘rib chiqilgan. Tadqiqot natijasida hududda tarixiy-madaniy, ziyorat, ekologik va ilmiy turizm yo‘nalishlarini rivojlantirishning istiqbollari asoslab berilgan.*

Kalit so‘zlar. *Qashqadaryo viloyati, turizm salohiyati, tarixiy obidalar, Oqsaroy majmuasi, Kitob milliy tabiat bog‘i, ekoturizm, ziyorat turizmi, madaniy meros, rekreatsion resurslar, barqaror rivojlanish.*

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ANALYSIS OF NOTABLE PLACES OF THE KASHKADARYA REGION AND THEIR TOURISM SIGNIFICANCE

Abstract. *This article provides a scientific analysis of the tourism potential of the Kashkadarya region, focusing on its notable historical, cultural, and natural attractions and their role in regional socio-economic development. In particular, the study highlights the tourism and scientific significance of the Ak-Saray complex in Shahrisabz, the statue of Amir Temur, and the Kitab National Nature Park. The paper also examines the number and territorial distribution of cultural heritage sites in the region, as well as measures aimed at improving tourism infrastructure. The research substantiates the prospects for the*

development of historical-cultural, pilgrimage, ecological, and scientific tourism in the region.

Keywords. *Kashkadarya region, tourism potential, historical monuments, Ak-Saray complex, Kitab National Nature Park, ecotourism, pilgrimage tourism, cultural heritage, recreational resources, sustainable development.*

Kirish

Qashqadaryo viloyatining turizm salohiyati - O‘zbekiston Respublikasidagi tarixiy obidalar hamda rekreatsion resurslar imkoniyatlariga ega bo‘lgan hudud, respublikaning janubiy hududida joylashgan. Qashqadaryo viloyatida Respublikadagi jami tarixiy obidalarning 17,76% joylashgan.

Muhokama

Qashqadaryo viloyatda bugungi kunda 1 ming 468 madaniy meros obyekti ro‘yxatga olingan bo‘lib, ularning 1 ming 189 tasi arxeologiya, 208 tasi arxitektura, 43 ta monumental yodgorliklar, 34 tasi diqqatga sazovor joylar hisoblanadi. “O‘zbekiston Respublikasida ichki va ziyorat turizmini yanada rivojlantirish chora tadbirlari” to‘g‘risidagi 2021-yil 9-fevral sanasidagi PF-6165 son Farmoning 9-bandiga muvofiq Qashqadaryo viloyatida turizmni rivojlantirish va infratuzilmani yaxshiliash maqsadida Qashqadaryo viloyati hokimligi byudjetdan tashqari 200 mlrd so‘m mablag‘ ajratilgan.

Qashqadaryo viloyati O‘zbekistonning eng qadimiy va boy tarixga ega hududlaridan biri bo‘lib, Amir Temur yurti sifatida jahon sayyohlarini o‘ziga tortadi. Shahrisabzning UNESCO ro‘yxatiga kiritilgan obidalari (Oqsaroy, Dorus-Siadat), Qarshi shahrining tarixiy ko‘priklari va boy ekoturizm salohiyati viloyatni ziyorat va dam olish turizmida muhim maskanga aylantirgan.Qashqadaryo viloyatining turizm salohiyati:Tarixiy-me'moriy obidalar: Shahrisabzdagi Oqsaroy majmuasi, Dorut-tilovat, Dorus-siadot majmualari hamda Qarshi shahridagi qadimiy hammomlar va ko‘priklar asosiy turistik nuqtalar hisoblanadi.Ziyorat turizmi: Hazrati Bashir, Bandikushod, Bibi ona kabi ziyoratgohlar hamda islom ilmlari rivojiga hissa qo‘shgan zotlarning qadamjolari viloyatda ziyorat turizmini rivojlantirmoqda.

Ekoturizm va dam olish: Hisor tizmasi etaklari, Sangardak sharsharasi, G‘ilon qishlog‘i va qorako‘l, sanatoriyalar (masalan, Qaynarbuloq) dam olish maskanlari sifatida yuqori salohiyatga ega. Ahamiyati: Viloyatda 17 ta yirik turistik obyekt mavjud bo‘lib, ular yil davomida 700 mingdan ortiq mahalliy va xalqaro sayyohlarni qabul qilish imkoniyatiga ega. Turistik imkoniyatlari: Qashqadaryo viloyatida tarixiy obidalar soni asosan Shahrisabz, Qarshi va Kitob tumanlarida ko‘p uchraydi. Shahrisabz shahri UNESCO butun jahon ma’daniy merosligiga kiritilgan.

Natijalar

Qashqadaryo viloyatida o‘zining uzoq o‘tmishiga ega ekanligi sabab tarixiy obidalar soni va ilmiy yangiligi turfa xillikni tashkil etadi.

Qashqadaryo viloyatida tarixiy obidalar soni hududlar kesimida turlicha hisoblanadi.

Qarshi shahar - Arxeologik yodgorliklar 28 ta, arxitektura yodgorliklari 25 ta, monumental san’at yodgorliklari 6 ta, diqqatga sazovor joylar 1 ta.

Shahrisabz tumani - arxeologik yodgorliklar 138 ta, arxitektura yodgorliklari 22 ta, monumental san’at yodgorliklari 5 ta.

Yakkabog‘ tumani - arxeologik yodgorliklar 195 ta, arxitektura yodgorliklari 38 ta, monumental san’at yodgorliklari 2 ta, diqqatga sazovor joylar 2 ta.

Kitob tumani - Arxeologik yodgorliklar 281 ta, Arxitektura yodgorliklari 16 ta, monumental san’at yodgorliklari 3 ta, diqqatga sazovor joylar 5 ta.

G‘uzor tumani - arxeologik yodgorliklar 94 ta, arxitektura yodgorliklari 9 ta, monumental san’at yodgorliklari 3 ta, diqqatga sazovor joylar 3 ta.

Koson tumani - arxeologik yodgorliklar 76 ta, arxitektura yodgorliklari 11 ta, monumental san’at yodgorliklari 4 ta, diqqatga sazovor joylar 1 ta.

Chiroqchi tumani - arxeologik yodgorliklar 58 ta, arxitektura yodgorliklari 16 ta, monumental san’at yodgorliklari 3 ta, diqqatga sazovor joylar 2 ta.

Shahrisabz shahri - arxeologik yodgorliklar 29 ta, arxitektura yodgorliklari 28 ta, monumental san’at yodgorliklari 5 ta.

Qarshi tumani - arxeologik yodgorliklar 58 ta, arxitektura yodgorliklari 29 ta, monumental san’at yodgorliklari 28 ta, diqqatga sazovor joylar 5 ta.

Kasbi tumani - arxeologik yodgorliklar 79 ta, arxitektura yodgorliklari 11 ta, monumental san’at yodgorliklari 2 ta, diqqatga sazovor joylar 2 ta.

Nishon tumani - arxeologik yodgorliklar 3 ta, arxitektura yodgorliklari 1 ta, diqqatga sazovor joylar 3 ta.

Mirishkor tumani - arxeologik yodgorliklar 9 ta, arxitektura yodgorliklari 6 ta, monumental san’at yodgorliklari 2 ta, diqqatga sazovor joylar 1 ta.

Muborak tumani - arxeologik yodgorliklar 2 ta, arxitektura yodgorliklari 3 ta, monumental san’at yodgorliklari 2 ta, diqqatga sazovor joylar 1 ta.

Qashqadaryo viloyati rekreatsion jihatdan shifobaxsh buloqlari, dam olish maskanlari, sanatoriyalar, sohil hududlari mavjud.

Oqsaroyning qurilishi 1380-yilda boshlangan, hamda 1386-yilda o‘z nihoyasiga yetgan. Ammo bezaklash ishlari 1404-yilga qadar cho‘zilgan. Saroy Amir Temurning onasi Takinaxotun xotirasiga bag‘ishlab bunyod etilgan. Saroyni barpo etish davomida Xorazm, Eron va boshqa ko‘plab mamlakatlardan keltirilgan hunarmandlar ishtirok etgan. Jumladan, gumbazli arkni yasash va bezashda tosh kesuvchi usta Muhammad Yusuf Tabriziyning ishtiroki bo‘lgani gumbaz yozuvlarida saqlangan.Inshoot avvaliga 73 metrlik bo‘lishi kerak edi. Uning tom qismida kichik suv hovuzi joylashtirilgan, undan quvurchalar orqali o‘tgan suv sharshara hosil qilgan. Saroy poyedevorini bunyod etishda oltin qum ishlatilgan. Bino poydevori ancha chuqur qilib qurilgan.

Shahrisabz shahridagi Oqsaroy majmui ko‘rinishi

Shahrisabzdagi Oqsaroy majmuasi oldida qad rostlagan Amir Temur haykali ulug‘vor va mahobatli ko‘rinishga ega. Sohibqiron taxtda mag‘rur o‘tirgan holda tasvirlangan bo‘lib, kiyimlari, qilichi va yuz ifodasi uning kuch-qudrati, donoligi hamda davlat arbobi sifatidagi salobatini aks ettiradi. Haykal oq marmardan ishlangan bo‘lib, atrofidagi tarixiy muhit bilan uyg‘unlashgan. Ko‘rinishi: Taxtda o‘tirgan sarkarda, asosiy e'tibor qat'iyatli yuz va qad qomatga qaratilgan.Joylashuvi: Oqsaroy saroyining asosiy kirish qismi qarshisida.Maqsadi: Buyuk bobokalonimizning tarixiy jasorati va davlatchilik asoschisi sifatidagi o‘rnini ko‘rsatish.

Kitob milliy tabiat bog‘i - O‘zbekistonning eng noyob ilmiy va tabiiy hududlaridan biri bo‘lib, Qashqadaryo viloyatining Kitob tumanida joylashgan. Ushbu bog‘ 1979-yilda tashkil etilgan bo‘lib, uning asosiy maqsadi Yer qatlamlarining geologik tuzilishini, qadimgi davrlarga oid jinslarni va toshqotgan qoldiqlarni (fauna va flora olamini) saqlash hamda o‘rganishdan iborat.

Tabiat bog‘i noyob geologik obyekt hisoblanadi. U Zarafshon tog‘ tizmasining g‘arbiy qismida Xo‘jaqurgan darasida joylashgan bo‘lib, o‘rta va yuqori devon davriga oid toshqotganlar hamda turli geologik jinslarni o‘z ichiga oladi. Noyob geologik kesmalar, paleozoy erasi toshqotganlari va noyob tabiiy landshaftlarni saqlab qolish.Geologik ahamiyati: Qo‘riqxona hududida “Zinzilban” kesmasi mavjud bo‘lib, u devon davri geologik davrlar chegarasini belgilovchi xalqaro standart (stratigrafik ob’yekt) hisoblanadi. Hududda 798 turdagi yuksak o‘simliklar, jumladan Zarafshon archasi o‘sadi. Hayvonot dunyosi boy va turli-tuman bo‘lib, tog‘li relyefga moslashgan turlar uchraydi.Turizm: Qo‘riqxona hududida “Tushlik” kabi tabiati o‘ziga xos daralar va tabiiy tosh haykallar mavjud. Bog‘ tabiatni muhofaza qilish hududi bo‘lgani uchun, unga tashrif buyurish uchun maxsus ruxsatnoma talab etiladi.

Kitob milliy tabiat bog‘i tabiati ko‘rinishi

Asosiy xususiyatlari. Tabiat bog‘i hududida Paleozoy erasiga oid (taxminan 300–400 million yil oldingi) tog‘ jinslari saqlanib qolgan. Bu yerda Yer tarixining muhim bosqichlarini ko‘rsatib beruvchi stratigrafik qatlamlar aniq ko‘rinadi. Turli xil qadimgi dengiz jonzotlarining toshqotgan qoldiqlari topilgan.

Stratigrafik va geologik ahamiyati. Hudud geologik jihatdan dunyoda juda noyob bo‘lgan uzluksiz paleozoy stratigrafik kesmalarga ega. Bu yerda Yer tarixining qadimgi davrlari, xususan ordovik, devon va karbon (toshko‘mir) davrlariga oid tog‘ jinslari, qatlamlar va ularning tarkibida saqlangan organik dunyo qoldiqlari keng tarqalganligi bilan ahamiyatli.

Bog‘ hududidagi kesmalar tarkibida qadimiy dengiz hayotidan qolgan o‘ta yaxshi saqlangan o‘simlik va hayvon izlari (braxiopodalar, trilobitlar, marjonlar, foraminiferalar va boshqalar) mavjud bo‘lib, ular Yerning 300- 407 million yillik geologik tarixini o‘rganishda beqiyos ilmiy ahamiyatga ega.

Kitob geologiya milliy tabiat bog‘i hududda ilmiy o‘rganishlar

Kitob geologiya milliy tabiat bog‘i hududda ilmiy o‘rganishlar

Zinzilban bo‘lagi hududi xususan Devon davrining pastki o‘tish oralig‘ining global stratigrafik etaloni sifatida tan olingan. Bu kesma 1989-yilda Xalqaro Geologiya Kengashi tomonidan etalon sifatida qabul qilingan va 1996-yilda Xalqaro Geologik Fanlar Ittifoqi tomonidan tasdiqlangan.

Ushbu stratigrafik qoldiqlar orqali olimlar Yerning geologik tuzilishi, tog‘larning shakllanish jarayoni, dengiz sathining o‘zgarishi hamda hayotning evolyutsiyaviy yo‘nalishlari haqida aniq va chuqur ma’lumotlarni oladi.

Turizm va ahamiyati:Qo‘riqxona ilmiy turizm va ekoturizm uchun juda muhim maskan.Tabiatni sevuvchi sayyohlar va talabalar uchun qiziqarli ekskursiya joyi.Hudud Qashqadaryo viloyatining turizm salohiyatini oshirishda muhim rol o‘ynaydi.

Xulosa

Yuqorida tahlil qilingan Qashqadaryo viloyati ning diqqatga sazovor maskanlari - Shahrisabz shahridagi Oqsaroy majmuasi, unda qad rostlagan Amir Temur haykali hamda Kitob Kitob milliy tabiat bog‘i - hududning boy tarixiy, madaniy va tabiiy salohiyatini har tomonlama namoyon etadi. Ushbu maskanlar orqali viloyatning o‘tmishi, buguni va kelajagi o‘zaro uyg‘un holda aks etadi.

Shahrisabz shahridagi tarixiy obidalar, ayniqsa Oqsaroy majmuasi, buyuk sarkarda Amir Temur davrining qudrati va me’morchilik yutuqlarini ifodalaydi. Bu maskanlar nafaqat tarixiy yodgorlik sifatida, balki milliy o‘zlikni anglash, yosh avlodni vatanparvarlik ruhida tarbiyalashda ham muhim ahamiyat kasb etadi. Shu bilan birga, bu yerlar xalqaro miqyosda ham katta qiziqish uyg‘otib, xorijiy sayyohlar oqimini oshirishga xizmat qilmoqda. Boshqa tomondan, Kitob geologik

qo‘riqxonasi tabiiy-ilmiy jihatdan beqiyos ahamiyatga ega bo‘lib, Yer tarixining qadimiy davrlariga oid noyob ma’lumotlarni o‘zida mujassam etgan. Bu hudud nafaqat olimlar, balki oddiy sayyohlar uchun ham qiziqarli bo‘lib, ekoturizm va ilmiy turizm rivojiga katta hissa qo‘shadi. Tabiat va ilm uyg‘unligi bu maskanni alohida qadrlashga undaydi.

Umuman olganda, Qashqadaryo viloyatining turizm salohiyati ko‘p qirrali bo‘lib, unda tarixiy-madaniy, ziyorat, ekologik va ilmiy turizm yo‘nalishlari bir-birini to‘ldirib boradi. Bu esa hududni nafaqat O‘zbekiston, balki Markaziy Osiyodagi muhim turizm markazlaridan biriga aylantirish imkonini beradi.

Kelgusida ushbu maskanlarni yanada rivojlantirish, infratuzilmani takomillashtirish, xizmat ko‘rsatish sifatini oshirish hamda xalqaro miqyosda keng targ‘ib qilish orqali viloyatga tashrif buyuruvchi sayyohlar sonini sezilarli darajada oshirish mumkin. Bu esa o‘z navbatida hudud iqtisodiyotining o‘sishiga, yangi ish o‘rinlarining yaratilishiga va mahalliy aholi farovonligining yuksalishiga xizmat qiladi.

Shunday qilib, Qashqadaryo viloyati o‘zining boy tarixiy merosi, noyob tabiiy boyliklari va katta turizm imkoniyatlari bilan mamlakatimizning eng istiqbolli hududlaridan biri bo‘lib, uni asrab-avaylash va rivojlantirish har birimizning muhim vazifamiz hisoblanadi.

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ANTROPOGEN FAOLIYATNING GEOLOGIK MUHITGA TA’SIRINING HUDUDIY XUSUSIYATLARI VA UNI BARQAROR BOSHQARISHNING ILMIY ASOSLARI

Annotatsiya. *Mazkur maqolada antropogen faoliyatning geologik muhitga ta’sirining hududiy xususiyatlari kompleks ilmiy yondashuv asosida tahlil qilingan. Insonning xo‘jalik faoliyati, xususan konchilik, urbanizatsiya va qishloq xo‘jaligi jarayonlari natijasida geologik tizimlarda yuz berayotgan o‘zgarishlar O‘zbekiston hududlari kesimida yoritilgan. Maqolada geologik muhitning degradatsiya jarayonlari, texnogen hodisalar va ularning ekologik oqibatlari ilmiy jihatdan asoslab berilgan. Shuningdek, geologik muhitni muhofaza qilish va antropogen yuklamani kamaytirishga qaratilgan ilmiy-amaliy tavsiyalar ishlab chiqilgan.*

Kalit so‘zlar: *antropogen faoliyat, geologik muhit, hududiy tahlil, texnogen jarayonlar, konchilik, eroziya, sho‘rlanish, geologik monitoring, rekultivatsiya, barqaror rivojlanish.*

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REGIONAL CHARACTERISTICS OF ANTHROPOGENIC IMPACTS ON THE GEOLOGICAL ENVIRONMENT AND SCIENTIFIC FOUNDATIONS OF ITS SUSTAINABLE MANAGEMENT

Annotation. *This article presents a comprehensive scientific analysis of the regional characteristics of anthropogenic impacts on the geological environment. It examines the transformations occurring in geological systems as a result of human economic activities, including mining, urbanization, and agriculture, with specific reference to regions of Uzbekistan. The study highlights processes of geological degradation, technogenic phenomena, and their environmental consequences. Furthermore, scientifically grounded recommendations aimed at*

protecting the geological environment and reducing anthropogenic pressure are proposed.

Keywords: *anthropogenic activity, geological environment, regional analysis, technogenic processes, mining, erosion, salinization, geological monitoring, land reclamation, sustainable development.*

Kirish

Zamonaviy davrda inson faoliyatining intensivlashuvi natijasida geologik muhitga tushayotgan antropogen yuklama sezilarli darajada ortib bormoqda. Bu jarayon nafaqat global miqyosda, balki mintaqaviy va lokal darajada ham geologik tizimlarning tabiiy muvozanatini izdan chiqarmoqda.

Geologik muhit - bu tog‘ jinslari, yer osti suvlari, relyef shakllari va geodinamik jarayonlarning murakkab tizimi bo‘lib, u antropogen ta’sirlarga juda sezgir hisoblanadi. Ushbu tizimdagi o‘zgarishlar uzoq muddatli va ko‘pincha qaytarilmas xususiyat kasb etadi.

O‘zbekiston Respublikasi hududida so‘nggi yillarda sanoat, konchilik va qishloq xo‘jaligi tarmoqlarining jadal rivojlanishi natijasida geologik muhitga bosim ortib, hududiy differensiallashgan ekologik muammolar shakllanmoqda.

Tadqiqot metodologiyasi

Maqolada quyidagi ilmiy usullardan foydalanildi:

- tizimli tahlil va sintez,
- hududiy-geografik taqqoslash,
- geologik monitoring ma’lumotlarini umumlashtirish,
- ilmiy adabiyotlar tahlili.

Asosiy qism

Antropogen faoliyat va geologik muhit o‘rtasidagi o‘zaro ta’sir. Antropogen omillar geologik muhitga ikki yo‘nalishda ta’sir ko‘rsatadi:

- bevosita (foydali qazilmalarni o‘zlatirish, qurilish),
- bilvosita (gidrogeologik rejimning o‘zgarishi).

Natijada tabiiy jarayonlarning tezligi va yo‘nalishi o‘zgaradi hamda yangi texnogen jarayonlar shakllanadi.

Konchilik faoliyati va hududiy geologik o‘zgarishlar. O‘zbekiston hududida konchilik sanoati geologik muhitga eng katta ta’sir ko‘rsatuvchi sohalardan biri hisoblanadi.

1 - rasm. Hududiy geotizimlarning tuzilishi

Hududiy misollar:

- Qashqadaryo viloyati (Muborak, Shurtan) — gaz va neft qazib olish natijasida yer qatlamlarining cho‘kishi va gidrogeologik rejim o‘zgarishi kuzatiladi.
- Navoiy viloyati (Muruntau koni) — ochiq usulda oltin qazib olish natijasida yirik karer relyefi shakllangan.
- Toshkent viloyati (Olmaliq) — rangli metallurgiya bilan bog‘liq texnogen jarayonlar kuchli rivojlangan.

Bu hududlarda quyidagi jarayonlar kuzatiladi:

- yer yuzasining deformatsiyasi,
- texnogen karst,
- sun’iy seysmik faollik.

Urbanizatsiya va qurilishning geologik oqibatlari. Yirik shaharlar — Toshkent, Samarqand, Qarshi — hududlarida urbanizatsiya jarayoni geologik muhitga sezilarli ta’sir ko‘rsatmoqda.

Xususan:

- Toshkent shahrida grunt suvlari sathining ko‘tarilishi kuzatilmoqda;
- Samarqandda tarixiy hududlarda grunt deformatsiyasi muammolari mavjud;
- Qarshi shahrida irrigatsiya ta’sirida tuproqning cho‘kishi kuzatiladi.

Qishloq xo‘jaligi va geologik degradatsiya. O‘zbekistonning sug‘orma dehqonchilik hududlarida geologik muhitning degradatsiyasi yaqqol namoyon bo‘lmoqda.

Hududiy misollar:

- Farg‘ona vodiysi — intensiv sug‘orish natijasida sho‘rlanish va eroziya;
- Xorazm va Qoraqalpog‘iston — grunt suvlarining ko‘tarilishi va tuproq degradatsiyasi;
- Surxondaryo — tog‘ oldi hududlarida suv eroziyasi kuchli.

Texnogen geologik jarayonlar. Texnogen jarayonlar antropogen faoliyat natijasida yuzaga kelib, tabiiy jarayonlarga nisbatan tezroq kechadi.

Ularning asosiy ko‘rinishlari:

- cho‘kish (subsidence),
- surilma va ko‘chki,
- yoriqlar,
- yer osti suvlarining ifloslanishi.

Masalan:

- Chotqol tizmasi hududlari — tog‘ ko‘chkilari faollashgan;
- Angren ko‘mir havzasi — texnogen cho‘kish jarayonlari rivojlangan.

Gidrotexnik inshootlar ta’siri. Yirik gidrotexnik obyektlar ham geologik muhitga sezilarli ta’sir ko‘rsatadi:

- Chorvoq suv ombori — qirg‘oq eroziyasi va surilma jarayonlari;
- Andijon suv ombori — grunt suvlarining ko‘tarilishi;
- Tuyamuyun gidrouzeli — Amudaryo deltasida geomorfologik o‘zgarishlar.

Relyefning antropogen transformatsiyasi. Sun’iy relyef shakllari:

- Karerlar;
- chiqindi poligonlari;
- sanoat chiqindilari tepaliklari;
- tabiiy landshaftlarni sezilarli darajada o‘zgartirmoqda.

Masalan:

- Navoiy viloyatidagi kon hududlari — sun’iy relyef shakllari ustun;
- Toshkent viloyatining Angren shahrida — texnogen relyef tizimi shakllangan.

Geologik muhitni muhofaza qilish yo‘llari. Quyidagi ilmiy asoslangan choralar muhim hisoblanadi:

- geologik monitoring tizimini takomillashtirish,
- rekultivatsiya ishlarini kengaytirish,
- ekologik ekspertiza mexanizmlarini kuchaytirish,
- hududiy rejalashtirishda geologik omillarni hisobga olish.

Xulosa

Olib borilgan ilmiy tahlillar shuni ko‘rsatadiki, antropogen faoliyat geologik muhitga ko‘p qirrali va murakkab ta’sir ko‘rsatadi. Ayniqsa, O‘zbekiston hududlarida konchilik, urbanizatsiya va sug‘orma dehqonchilik faoliyati geologik muhitning barqarorligini sezilarli darajada pasaytirmoqda.

Texnogen jarayonlarning faollashuvi uzoq muddatli ekologik muammolarni yuzaga keltirib, hududiy xavfsizlikka tahdid solmoqda.

Shu bois:

- geologik monitoringni kuchaytirish;
- resurslardan oqilona foydalanish;
- ilmiy asoslangan boshqaruv tizimini joriy etish;
- barqaror rivojlanishning asosiy sharti hisoblanadi.

Umumiy xulosa sifatida aytish mumkinki, geologik muhitni muhofaza qilish nafaqat ekologik, balki strategik ahamiyatga ega bo‘lib, u mamlakatning barqaror taraqqiyotini ta’minlovchi muhim omillardan biridir.

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O‘ZBEKISTON SHAROITIDA TUPROQLARDAN UNUMLI FOYDALANISH VA ULARNI MUHOFAZA QILISH MUAMMOLARI

Annotatsiya. *Ushbu maqolada O‘zbekiston sharoitida tuproqlardan unumli foydalanish va ularni muhofaza qilishning asosiy muammolari tahlil qilinadi. Xususan, sug‘oriladigan yerlarning sho‘rlanishi, eroziya jarayonlari, tuproq unumdorligining pasayishi hamda suv resurslaridan samarasiz foydalanish kabi omillar yoritib berilgan. Shuningdek, tuproq degradatsiyasining oldini olish, meliorativ holatni yaxshilash, zamonaviy agrotexnologiyalarni joriy etish va ekologik barqarorlikni ta’minlash yo‘llari asoslab beriladi. Maqolada tuproq resurslarini muhofaza qilish va ulardan oqilona foydalanish bo‘yicha ilmiy-amaliy tavsiyalar ishlab chiqilgan.*

Kalit so‘zlar. *Tuproq unumdorligi, sho‘rlanish, eroziya, melioratsiya, agrotexnologiya, tuproq degradatsiyasi, suv resurslari, ekologik muhofaza, qishloq xo‘jaligi, barqaror rivojlanish.*

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EFFICIENT USE OF SOILS AND THEIR PROTECTION PROBLEMS IN THE CONDITIONS OF UZBEKISTAN

Abstract. *This article analyzes the main problems of efficient use and protection of soils under the conditions of Uzbekistan. In particular, such factors as salinization of irrigated lands, erosion processes, decline in soil fertility, and inefficient use of water resources are highlighted. Furthermore, the study*

substantiates ways to prevent soil degradation, improve meliorative conditions, introduce modern agrotechnologies, and ensure ecological sustainability. The article also develops scientific and practical recommendations for the protection and rational use of soil resources.

Keywords. *Soil fertility, salinization, erosion, melioration, agrotechnology, soil degradation, water resources, environmental protection, agriculture, sustainable development.*

Kirish

O‘zbekiston Respublikasida yer resurslari jamiyat taraqqiyoti va qishloq xo‘jaligi ishlab chiqarishining asosiy omillaridan biri hisoblanadi. Mamlakat hududining katta qismi qurg‘oqchil va yarim qurg‘oqchil iqlim zonasida joylashganligi sababli tuproqlardan samarali foydalanish va ularning unumdorligini saqlab qolish alohida ahamiyat kasb etadi.

Muhokama

Aholi sonining ortib borishi, oziq-ovqat xavfsizligini ta’minlash zarurati hamda qishloq xo‘jaligi mahsulotlariga bo‘lgan talabning oshishi yer resurslariga bo‘lgan bosimni yanada kuchaytirmoqda. Shu bilan birga, noto‘g‘ri sug‘orish, meliorativ holatning yomonlashuvi, sho‘rlanish, eroziya va tuproqning kimyoviy ifloslanishi kabi omillar tuproq unumdorligining pasayishiga olib kelmoqda. Ayniqsa, suv resurslarining cheklanganligi va ekologik muammolar, jumladan, Orolbo‘yi hududidagi inqiroz tuproq holatiga jiddiy salbiy ta’sir ko‘rsatmoqda. Mazkur sharoitda tuproqlardan oqilona foydalanish, ularni muhofaza qilish va degradatsiya jarayonlarining oldini olish masalalari dolzarb ilmiy-amaliy muammolardan biri hisoblanadi. Shu bois ushbu maqolada O‘zbekiston sharoitida tuproqlardan unumli foydalanish va ularni muhofaza qilishning asosiy muammolari hamda ularning yechimlari tahlil qilinadi. O‘zbekiston qishloq xo‘jaligiga ixtisoslashgan davlat bo‘lib, uning iqtisodiyotida yer resurslari muhim o‘rin tutadi. Ammo iqlimning quruqligi, suv tanqisligi va noto‘g‘ri agrotexnik tadbirlar tufayli tuproqlar degradatsiyaga uchramoqda. Shu sababli tuproq unumdorligini saqlash va oshirish dolzarb vazifa hisoblanadi. O‘zbekiston sharoitida tuproqlardan unumli foydalanish va ularni muhofaza qilish masalasi murakkab tabiiy-iqtisodiy jarayonlar bilan chambarchas bog‘liq. Mamlakat hududining katta qismi sug‘oriladigan dehqonchilikka asoslangan bo‘lib, bu esa tuproq holatiga suv, iqlim va inson faoliyatining bevosita ta’sirini kuchaytiradi. Shu sababli mavjud muammolarni tahlil qilish va ularni bartaraf etish yo‘llarini ishlab chiqish muhim ahamiyatga ega.

Avvalo, Respublikada eng keng tarqalgan muammolardan biri tuproq sho‘rlanishidir. Sug‘orish tizimlarining uzoq yillar davomida noto‘g‘ri yuritilishi, drenaj tarmoqlarining yetarli darajada ishlamasligi natijasida yer osti suvlari sathi ko‘tarilib, tuproq tarkibida tuzlar miqdori ortib bormoqda. Bu esa qishloq xo‘jaligi ekinlarining hosildorligini keskin kamaytiradi va ayrim hududlarda yerlarning butunlay yaroqsiz holga kelishiga sabab bo‘ladi.

Natijalar

Hozirgi kunga kelib antropogen omil ta’sirida global yer resurslarining 40 foizga yaqini tanazzulga uchragan. Insoniyatning yerga ta’siri shu qadar kengayib boryaptiki, natijada yer o‘zining muhim funksiyalarini bajarishdan to‘xtab, yaroqsiz holga kelib qolmoqda. Insoniyat oziq-ovqat ishlab chiqarishning barcha ilg‘or texnologiyalarini qo‘llayapti. Ayniqsa, sifatli mahsulot yetishtirish, hosildorlikni oshirish, dunyo bozorini ekologik toza oziq-ovqat bilan ta’minlashga qaratilgan chora-tadbirlar kun sayin faollashmoqda. Ular orasida bir qarashda ko‘zga ko‘rinmasada, nihoyatda muhim yana bir masala bor - bu tuproq sifati va unumdorligini oshirish. Bunga erishmasdan turib, bugungi kundagi dolzarb oziq-ovqat xavfsizligini to‘laqonli ta’minlash qiyin.

Tuproq sifati masalasini kun tartibiga qo‘yish ko‘pchilik uchun erish tuyulishi mumkin. Ammo bu allaqachon global muammolardan biriga aylangan. BMTning so‘nggi besh yillikdagi tahlillariga ko‘ra, hozirga qadar yer sharining 40 foiz tuprog‘i o‘z sifatini yo‘qotgan. Insonning yerga noto‘g‘ri munosabati tuproq unumdorligini pasaytirgan, bu yerning karbonat angidridni tutib qolish xususiyatini o‘ldirib, turlar yo‘qolishiga olib kelmoqda. Cho‘llanish, yer degradatsiyasi va qurg‘oqchilik kabi muammolar jahonning 100 dan ortiq mamlakatida istiqomat qilayotgan 1,2 milliard aholining salomatligi va farovonligiga jiddiy xavf solyapti. Tuproqlarning kimyoviy ifloslanishi ham jiddiy muammolardan biridir. Mineral o‘g‘itlar va pestitsidlarning me’yordan ortiq qo‘llanilishi tuproq tarkibidagi foydali mikroorganizmlarga zarar yetkazadi, natijada tuproq unumdorligi pasayadi. Ayrim hududlarda og‘ir metallarning to‘planishi ham ekologik xavf tug‘dirmoqda. Shu bilan birga, Orol dengizining qurishi bilan bog‘liq ekologik inqiroz ham tuproq sifatiga katta ta’sir ko‘rsatmoqda. Shamol orqali ko‘tarilgan tuz va chang zarralari keng hududlarga tarqalib, tuproqning degradatsiyasini tezlashtirmoqda va qishloq xo‘jaligi yerlarining unumdorligini pasaytirmoqda. Yuqoridagi muammolarni bartaraf etish uchun bir qator kompleks chora-tadbirlarni amalga oshirish zarur. Eng avvalo, meliorativ holatni yaxshilash, ya’ni drenaj tizimlarini rekonstruksiya qilish va sho‘rlangan yerlarni yuvish muhim ahamiyatga ega. Suvdan samarali foydalanish maqsadida tomchilatib va yomg‘irlatib sug‘orish kabi zamonaviy texnologiyalarni keng joriy etish lozim. Agrotexnik tadbirlar ham muhim o‘rin tutadi. Ekin almashinuvi tizimini to‘g‘ri yo‘lga qo‘yish, organik o‘g‘itlardan keng foydalanish va tuproqqa ishlov berish madaniyatini oshirish orqali uning unumdorligini tiklash mumkin. Eroziyaga qarshi kurashish uchun himoya o‘rmonzorlari barpo etish, yerlarni kontur asosida haydash va ko‘p yillik o‘simliklar ekish samarali hisoblanadi. Qishloq xo‘jaligi yerlarining holatini yaxshilash, tuproq unumdorligini oshirish yurtimizda ham muhim masalalardan biri. Ayniqsa, bunga davlat siyosati darajasida e’tibor berilayotgani, o‘z iqtisodiyoti rivojlanishini agro-industrial yo‘nalishda tashkil etayotgan hozirgi O‘zbekiston sharoitida tuproq unumdorligini muhofaza qilishning huquqiy muammolarini o‘rganish, ularning echimini topishda amaliyot materiallari asosida chuqur ilmiy-nazariy

mushohadaga asoslangan takliflar ishlab chiqish, xulosalar berish zaruratini vujudga keltiradi.

Joriy yilning 10-iyun kuni Prezidentimiz tomonidan qabul qilingan “Yerlar degradatsiyasiga qarshi kurashishning samarali tizimini yaratish chora-tadbirlari to‘g‘risida”gi qaror bu boradagi yana bir huquqiy asos bo‘ldi. Mazkur hujjat atrof-muhitning barqaror faoliyatini ta’minlash, tabiiy ekologik tizimlarni muhofaza qilish, tuproqlardan samarali va ehtiyotkorlik bilan foydalanish, ularning sifati va unumdorligini saqlash hamda tuproqlarni salbiy ta’sirlardan himoya qilishga e’tiborni qaratadi.

Respublikamizda barcha toifadagi yerlarni hisobga olganda tog‘ oldi hududlarining 50% ida eroziya sodir bo‘lmoqda, 22 milion. gektardan ortiqroq bo‘lgan cho‘l-sahro o‘tloqlarining qariyb hammasi deflyatsiya ta’siriga duchor bo‘lgan. Eroziyaning irrigatsion eroziya, yaylov eroziyasi, mexanik eroziya, abraziya, sanoat eroziyasi kabi xillari ham mavjud. Irrigatsion eroziya nishablik maydonlarda yerlarni noto‘g‘ri sug‘orish tufayli yuz beradi. Respublikamizdagi sug‘orma yerlaming 700 ming gektarida irrigatsion eroziya keng tarqalgan. Bunday yerlarda paxta, g‘alla va boshqa ekinlarning hosildorligi 10% dan 60% gacha pasayib ketishi kuzatiladi. Irrigatsion eroziya tog‘lik, tog‘oldi adirliklari va tog‘ etaklaridagi nishablik tekisliklarda, ya’ni bo‘z tuproqli sug‘orma mintaqalarda ko‘proq uchraydi. Bunday eroziyaga duchor b o‘lgan m aydonlar Farg‘ona vodiysi viloyatlari, Toshkent, Samarqand, Qashqadaryo va Surxondaryo viloyatlarining tog‘oldi hududlarida keng tarqalgan bo‘lib, mamlakatimiz iqtisodiyoti va ekologiyasiga katta zarar yetkazilmoqda.

Yaylov va o‘tloq yerlarda chorva hayvonlarini meyoridan ortiqcha boqish va o‘simlik qoplamini qayta tiklanishiga yetarli sharoitlar yaratilmasligi natijasida yaylov eroziyasi ro‘y beradi. Bunda yaylovlarning mahsuldorligi keskin tushib ketadi va bunday hududlarga xos ekotizimlaming funksiyasi izdan chiqadi. Dengiz, daryo, ko‘l va suv omborlari kabi suv havzalarining qirg‘oqlarini suv to‘lqinlari ta’sirida yemirilishi abraziya deyiladi. Bu jarayonda ham suv havzalariga tutash yer maydonlarining qisqarishi, unumdorligining pasayib ketishi, turli ishlab chiqarish inshootlarining buzilishi kabi salbiy holatlar yuzaga keladi. Yo‘llar, quvur yo‘llari, elektr va aloqa tarmoqlari va boshqa sanoat obyektlarini barpo etish jarayonida tuproq qatlami yemirilib, buzilishi sanoat eroziyasi deb yuritiladi. Bu jarayon kuchli sanoatlashgan hududlarda qurilish tartib-qoidalariga yetarli darajada amal qilinmasligi oqibatida yuz beradi.

Deflyatsiya yoki shamol eroziyasi jarayonida ham suv eroziyasi kabi hodisa yuz beradi, ya’ni tuproqning eng unumdor qatlamlari yemiriladi, ammo bu o‘rinda yemiruvchi asosiy kuch suv emas, shamol oqimi hisoblanadi. Deflyatsiya tez-tez shamol esib turuvchi, yengil quruq tuproqli, o‘simlik qoplami yaxshi rivojlanmagan hududlarda tez avj oladi. Uning nisbatan bir m a’romda uzluksiz ro‘y beradigan kundalik deflyatsiya hamda qisqa vaqt ichida tez va kuchli yuz beradigan chang-to‘zonli bo‘ron kabi ikkita xili farqlanadi. Kundalik deflyatsiya tezligi birmuncha sekin joylashganligi va oqib chiqib ketishi qiyinligi kabilardir. Ba’zi hollarda shamol orqali tuzlarning uchirib kelinishi va tuproq hosil qiluvchi

jinslar tarkibini oson eruvchan tuzlarga boyligi kabilar ham sabab bo‘lishi mumkin. Tuproqni sho‘rlantiruvchi tuzlar tarkibini ko‘pincha natriy, kalsiy, magniy elementlarining sulfatli, xlorli, karbonatli tuzlari tashkil etadi. Masalan, hatto kuchsiz sho‘rlangan tuproqlarda makkajo‘xori hosili 40-50%, bug‘doy-50-60% ga kamayib, sifati yomonlashadi.

O‘zbekiston sharoitida tuproqlardan samarali foydalanish va ularni muhofaza qilish bo‘yicha ayrim muammolar:

-Tuproqlarning xossa-xususiyatlarini, ekologik holatini, turli toksikantlar va pollyutantlar bilan ifloslanish darajasini diagnostika qilish hamda ekologik toza va sog‘lom tuproq holatiga keltirish uchun ilmiy asoslangan ishlanmalar va tavsiyalarni joriy etish mexanizmi to‘liq yaratilmagan.

-Gumus miqdorining kamayishi. So‘nggi 30 yilda sug‘oriladigan tuproqlarda gumus miqdori 10–15% ga kamayib ketgan.

-Yerlardan foydalanishda kompleks yondashuvning etishmovchiligi. Qishloq xo‘jaligi yerlaridan foydalanuvchilar tomonidan tuproq unumdorligini oshirish bo‘yicha kompleks chora-tadbirlar yetarli darajada amalga oshirilmagan.

-Yerlarni noto‘g‘ri sug‘orish. Irrigatsiya eroziyasi nishablik maydonlarda yerlarni noto‘g‘ri sug‘orish tufayli yuz beradi. Tuproq sho‘rlanishining asosiy sabablari - drenajsiz sug‘orish, suvni filtrdan o‘tkazish natijasida yo‘qotish, sug‘orish kanallarini gidroizolyatsiyasiz qurish, sug‘orishning meyordan oshishi, suvni nazoratsiz yetkazib berish, minerallangan suv bilan sug‘orish.

Xulosa

Xulosa qilib aytganda, O‘zbekiston sharoitida tuproqlardan unumli foydalanish va ularni muhofaza qilish masalasi bugungi kunda dolzarb ekologik va iqtisodiy muammolardan biri hisoblanadi. Sug‘oriladigan yerlarning sho‘rlanishi, eroziya jarayonlari, tuproq unumdorligining pasayishi hamda suv resurslaridan samarasiz foydalanish qishloq xo‘jaligi samaradorligiga salbiy ta’sir ko‘rsatmoqda.Shu bois, tuproq resurslarini asrash va ulardan oqilona foydalanish uchun zamonaviy agrotexnologiyalarni joriy etish, suvni tejovchi usullarni keng qo‘llash, meliorativ holatni yaxshilash hamda ekologik muvozanatni ta’minlash muhim ahamiyat kasb etadi. Ayniqsa, ilmiy asoslangan yondashuvlar va innovatsion texnologiyalarni amaliyotga tatbiq etish orqali tuproq unumdorligini tiklash va barqaror rivojlanishni ta’minlash mumkin.Kelajakda yer resurslarini muhofaza qilishga qaratilgan tizimli chora-tadbirlarni kuchaytirish, fermer va dehqonlarning ekologik madaniyatini oshirish hamda davlat nazoratini takomillashtirish orqali ushbu muammolarni samarali hal etish mumkin.

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AKTINOID IZOTOPLARINING Γ-SPEKTRAL XUSUSIYATLARI VA ΔI = 1 O‘TISHLARINING ICHKI NURLANISH DOZIMETRISI HAMDA RADIOBIOLOGIK TA’SIRGA TA’SIRI

Annotatsiya: *Aktinoid izotoplari hozirgi radiobiologiya va yadroviy tibbiyotda katta ilmiy va amaliy qiziqish uyg‘otib, xususan selektiv alfa-terapiyada samarali radiofarmatsevtik manbalar sifatida qaralmoqda. Ushbu ishda og‘ir juft-juft aktinoid yadrolarining γ-spektroskopik xossalari, jumladan γ-spektrlarida namoyon bo‘ladigan ΔI=1 turidagi elektromagnit o‘tishlar hamda rotatsion polosalardagi spektral noan’anaviyliklar - “qoqilib ketish” yoki backbending effekti - ichki nurlanish dozimetrisi va hujayra darajasidagi biologik javob bilan bog‘liq holda tadqiq etiladi. Aniqligi yuqori bo‘lgan γ-spektroskopik o‘lchovlar, Monte-Carlo usullariga tayangan dozimetrik modellashtirish hamda in vitro sharoitda bajarilgan radiobiologik tajribalar majmuasi asosida yadroviy spektral belgilar va biologik ta’sirlar o‘rtasidagi o‘zaro bog‘liqliklarni aniqlash imkoniyatlari ko‘rib chiqiladi. Bunday yondashuv aktinoid yadrolarining tuzilish xususiyatlari nurlanish energiyasining fazoviy taqsimlanishi va hujayra ichidagi energiya yutilish jarayonlariga qanday ta’sir ko‘rsatishini chuqurroq baholashga imkon beradi.*

Olingan natijalar aktinoid asosidagi radiofarmatsevtik preparatlarning xavfsizlik ko‘rsatkichlarini baholash hamda alfa-terapiya usullarining davolash samaradorligini oshirishda yadroviy struktura haqidagi fundamental ma’lumotlarni hisobga olish muhimligini ko‘rsatadi. Shu bilan birga, ushbu tadqiqot yadroviy spektroskopiya va radiobiologiya o‘rtasidagi fanlararo bog‘liqlikni yanada aniqlashtiradi va klinik qo‘llanmalar uchun istiqbolli ilmiy yondashuvlarni shakllantirishga xizmat qilishi mumkin.

Kalit so‘zlar: *aktinoidlar, γ-spektroskopiya, ΔI = 1 o‘tishlar, backbending, ichki dozimetrisi, radiobiologiya, targeted alpha therapy.*

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Γ-SPECTRAL PROPERTIES OF ACTINIDE ISOTOPES AND THE INFLUENCE OF ΔI = 1 TRANSITIONS ON INTERNAL RADIATION DOSIMETRY AND RADIOBIOLOGICAL EFFECTS

Annotation: *Actinide isotopes are of great scientific and practical interest in modern radiobiology and nuclear medicine, in particular, they are considered as effective radiopharmaceutical sources in selective alpha therapy. In this work, the γ-spectroscopic properties of heavy pair actinide nuclei, including the electromagnetic transitions of the ΔI = 1 type manifested in their γ-spectra and spectral anomalies in the rotational bands - the "stumbling" or backbending effect*

- are studied in connection with internal radiation dosimetry and biological response at the cellular level. The possibilities of determining the correlations between nuclear spectral signatures and biological effects are considered based on a set of high-precision γ-spectroscopic measurements, dosimetric modeling based on Monte Carlo methods, and radiobiological experiments performed in vitro. This approach allows for a more in-depth assessment of how the structural properties of actinide nuclei affect the spatial distribution of radiation energy and intracellular energy absorption processes.

The results obtained demonstrate the importance of taking into account fundamental information about nuclear structure in assessing the safety indicators of actinide-based radiopharmaceuticals and improving the therapeutic efficacy of alpha-therapy methods. At the same time, this study further clarifies the interdisciplinary relationship between nuclear spectroscopy and radiobiology and may serve to formulate promising scientific approaches for clinical applications.

Keywords: *actinides, γ-spectroscopy, ΔI = 1 transitions, backbending, internal dosimetry, radiobiology, targeted alpha therapy.*

Kirish

Aktinoid elementlar - toriydan kaliforniygacha bo‘lgan og‘ir radioaktiv yadrolar sinfi - yadroviy energetika bilan bir qatorda zamonaviy yadroviy tibbiyot va radiobiologiyada ham muhim ilmiy va amaliy ahamiyat kasb etadi. Ushbu elementlarning yadroviy parchalanish xususiyatlari, xususan yuqori chiziqli energiya uzatilishiga ega alfa-zarralar chiqarishi, ularni saraton kasalligini davolashga qaratilgan zamonaviy radioterapiya usullarida istiqbolli radiofarmatsevtik manbalar sifatida qo‘llash imkonini bermoqda. Ayniqsa, ^{225}Ac va ^{227}Th kabi aktinoid izotoplari alfa-nurlanishning yuqori biologik samaradorligi tufayli maqsadli radioterapiyada keng ilmiy qiziqish uyg‘otmoqda.

Shu bilan birga, aktinoid yadrolarining alfa-parchalanish jarayonlari ko‘pincha qo‘shimcha γ-kvantlar emissiyasi bilan hamroh bo‘ladi. Ushbu γ-nurlanish ichki nurlanish dozimetrisi, radiatsion xavfsizlik va biologik himoyalanish nuqtai nazaridan muhim ahamiyatga ega. Gamma-kvantlarning energiya spektri va intensivligi hujayra va to‘qima darajasida energiya yutilish jarayonlariga sezilarli ta’sir ko‘rsatib, radiobiologik javobning shakllanishiga qo‘shimcha hissa qo‘shishi mumkin. Shu sababli aktinoid izotoplarining γ-spektroskopik xususiyatlarini chuqur va tizimli o‘rganish radiofarmatsevtik preparatlarning xavfsizligi va klinik samaradorligini baholashda muhim ilmiy masala hisoblanadi.

Og‘ir juft-juft yadrolarning γ-spektrlarida kuzatiladigan ΔI=1 turidagi elektromagnit o‘tishlar yadro strukturasi va rotatsion harakatning muhim ko‘rsatkichlaridan biridir. Bunday o‘tishlar, odatda, past energiyali γ-chiziqlar hosil qilib, rotatsion polosalardagi konfiguratsion qayta tuzilishlar bilan bog‘liq bo‘ladi. Ayrim hollarda ushbu qayta tuzilishlar yadro moment-inertsiyasining keskin o‘zgarishi bilan kechib, γ-spektrda “qoqilib ketish” (backbending) effekti sifatida namoyon bo‘ladi. Natijada γ-nurlanish intensivliklari va energetik

taqsimoti sezilarli darajada qayta taqsimlanadi. Mazkur tadqiqotning asosiy maqsadi aktinoid izotoplarining γ-spektrlarida kuzatiladigan ΔI=1 o‘tishlarining ichki nurlanish dozimetrisi hamda hujayra darajasidagi radiobiologik javoblarga ta’sirini ilmiy asosda va tizimli ravishda tahlil qilishdan iborat. Yadro strukturasi bilan bog‘liq spektral xususiyatlarni biologik effektlar bilan bog‘lash orqali ushbu ish aktinoid asosidagi radiofarmatsevtik vositalarning xavfsizlik ko‘rsatkichlarini aniqlash va maqsadli radioterapiya samaradorligini oshirishga qaratilgan ilmiy yondashuvlarni rivojlantirishga xizmat qiladi.

Nazariy asoslar

1. ΔI = 1 γ-o‘tishlar va rotatsion struktura

Yadro fizikasi kontekstida “j-orbital” atamasi alohida yangi turdagi orbita mavjudligini emas, balki nuklon holatining **to‘liq impuls momenti** bilan tavsiflanishini anglatadi. Yadro ichidagi har bir proton yoki neytron orbital impuls momenti $l$va spin $s = 1/2$ga ega bo‘lib, kuchli spin–orbital o‘zaro ta’sir natijasida ushbu kattaliklar birlashib $j = l \pm 1/2$ ko‘rinishidagi to‘liq impuls momentini hosil qiladi. Aynan shu $j$kvant soni yadro sathlarining energetik joylashuvi va spektroskopik xususiyatlarini belgilaydi. Shu sababli yadro fizikasi va yadro spektroskopiyasida nuklon holatlari ko‘pincha l orqali emas, balki ularning $j$qiymati orqali tavsiflanadi.

“Yuqori-j” orbitalar yoki holatlar deganda $j$qiymati katta bo‘lgan nuklon sathlari (masalan, $h_{9/2}$, $i_{13/2}$, $j_{15/2}$) tushuniladi. Bunday holatlarda nuklonlar yadro umumiy aylanish o‘qi bo‘ylab tekislanishga moyil bo‘lib, ular yadro impuls momentiga sezilarli hissa qo‘shadi. Natijada kollektiv rotatsion harakat va yakka-zarrachali konfiguratsiyalar o‘rtasidagi muvozanat o‘zgaradi, bu esa rotatsion spektrda ΔI = 1 tipidagi γ-o‘tishlarning kuchayishi va “qoqilib ketish” (backbending) effekti bilan namoyon bo‘ladi. Shu bois yuqori-j holatlarning o‘rganilishi og‘ir deformatsiyalangan yadrolarda rotatsion strukturaning evolyutsiyasini tushunishda muhim ilmiy ahamiyatga ega.

2. “Qoqilib ketish” (Backbending) effekti

Backbending effekti aylanish chastotasi bilan moment-inertsiya o‘rtasidagi bog‘lanishda keskin burilish paydo bo‘lishi bilan tavsiflanadi. Gamma-o‘tish energiyalaridagi notekisliklar va intensivliklarning o‘zgarishi bu effektdan dalolat beradi. Ushbu spektral anomaliyalar aktinoid yadrolarida yaxshi kuzatiladi va yadro strukturasi haqidagi muhim ma’lumotlarni beradi.

3. Radiobiologik kontekst

Radiobiologiyada ichki nurlanish manbalari chiqaradigan fotonlarning energiya spektri hujayra va to‘qimalarda yutilgan dozani aniqlashda asosiy rol o‘ynaydi. Past energiyali γ-kvantlar lokal energiya yutilishini kuchaytirib, DNK shikastlanish ehtimolini oshirishi mumkin. Shuning uchun spektral tafsilotlarni hisobga olish terapiya xavfsizligi va samaradorligini prognozlashda zarur.

Materiallar va metodlar

1. γ-spektroskopiya

Tanlangan aktinoid izotoplari uchun yuqori rezolyutsiyali HPGe detektorlarda γ-spektrlar o‘lchanadi. Energiya kalibrlash standart manbalar yordamida amalga oshiriladi. ΔI = 1 o‘tishlarga mos chiziqlar multipolarlik tahlili va intensivlik nisbati orqali aniqlanadi.

2. Dozimetrik hisoblar

Monte-Carlo usuliga asoslangan simulyatsiyalar (MCNP yoki shunga o‘xshash kodlar) yordamida organ-darajadagi va hujayra-darajadagi doza taqsimotlari hisoblanadi. Spektrdagi γ-chiziqlarning energetik parametrlari to‘g‘ridan-to‘g‘ri manba sifatida kiritiladi.

3. In vitro radiobiologik tajribalar

Inson o‘sma hujayra liniyalari va nazorat epitelial hujayralari tanlanadi. Ma’lum energiya diapazonidagi γ-nurlanish bilan nurlantirilgach, klonogenlik testi, γ-H2AX markerlari orqali DNK ikki zanjirli uzilishlar va oqim sitometriyasi yordamida hujayra o‘limi tahlil qilinadi.

4. Statistik tahlil

Doza–javob munosabatlari linear-quadratic model yordamida moslashtiriladi. Spektral parametrlar bilan biologik ko‘rsatkichlar o‘rtasida korrelyatsiya koeffitsientlari aniqlanadi.

Natijalar (model va kutilayotgan kuzatishlar)

Simulyatsiyalar shuni ko‘rsatadiki, ΔI = 1 o‘tishlarga mos keluvchi past energiyali γ-chiziqlarning spektrga qo‘shilishi hujayra yadrosi darajasida yutilgan dozani bir necha foizga oshirishi mumkin. Backbending bilan bog‘liq intensivlik o‘zgarishlari esa ayrim organlar uchun doza qayta taqsimlanishiga olib keladi.

In vitro tajribalarda bunday spektral farqlar DNK shikastlanish markerlarining ortishi va klonogen omon qolishning kamayishi bilan mos kelishi kutiladi.

Xulosa

Mazkur ish aktinoid izotoplarining γ-spektridagi ΔI = 1 o‘tishlari va spektral anomaliyalar ichki nurlanish dozimetrisi hamda radiobiologik javobga sezilarli ta’sir ko‘rsatishi mumkinligini ko‘rsatadi. Yadro spektroskopiyasi va radiobiologiyani integratsiyalash tibbiy radiofarmatsevtiklarni xavfsizroq va samaraliroq qilish uchun muhim yo‘nalish hisoblanadi.

Tavsiya qilingan adabiyotlar

1. ICRP (International Commission on Radiological Protection) — ichki nurlanish va dozimetrik tavsiyalar.
2. IAEA materiallari (radiation protection, radioisotope production).
3. Jurnallar: Radiation Research, International Journal of Radiation Oncology Biology Physics (Red Journal), Nuclear Physics A, Physical Review C.
4. Yadro spektroskopiya bo‘yicha umumiy qo‘llanmalar va Monte-Carlo dozimetrik manbalar.

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O‘ZBEKISTONDA O‘SIMLIKLAR KARANTINI VA HIMOYASI SOHASINI YANADA RAQAMLASHTIRISH BORASIDA CHET EL TAJRIBALARINI QO‘LLASH

Annotatsiya: *Mazkur ilmiy maqola O‘zbekistonda o‘simliklar karantini va himoyasi sohasini raqamlashtirish jarayonlarini takomillashtirish, sohaga zamonaviy texnologiyalarni joriy etish va xalqaro ilg‘or tajribalarni mahalliy sharoitga moslashtirish masalalarini o‘rganishga bag‘ishlangan. Tadqiqot davomida Yevropa Ittifoqi, AQSh, Janubiy Koreya va Avstraliya kabi davlatlarning fitosanitariya sohasida qo‘llanilayotgan raqamli tizimlari, elektron monitoring, dron texnologiyalari, IoT sensorlari, sun’iy intellekt asosida kasalliklarni aniqlash tizimlari hamda elektron fotosanitariya sertifikatlashtirish mexanizmlari tahlil qilindi. Olingan xulosalar O‘zbekistonda sohani yanada takomillashtirish va raqamli transformatsiyani chuqurlashtirish yo‘llarini belgilashga yordam beradi.*

Kalit so‘zlar: *O‘simliklar karantini, raqamlashtirish, fitosanitariya, TRACES NT, AQAS, IPM, sun’iy intellekt, dron monitoringi, IoT sensorlari, ePhyto, xalqaro tajriba.*

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APPLICATION OF FOREIGN EXPERIENCES IN FURTHER DIGITALIZATION OF PLANT QUARANTINE AND PROTECTION IN UZBEKISTAN

Abstract: *This scientific article is devoted to the study of issues of improving the digitalization processes of the plant quarantine and protection sector in Uzbekistan, introducing modern technologies into the sector, and adapting international best practices to local conditions. During the study, digital systems used in the phytosanitary sector of countries such as the European Union, the USA, South Korea, and Australia, electronic monitoring, drone technologies, IoT sensors, disease detection systems based on artificial intelligence, and electronic phytosanitary certification mechanisms were analyzed. The conclusions obtained will help determine ways to further improve the sector and deepen digital transformation in Uzbekistan.*

Keywords: *Plant quarantine, digitalization, phytosanitary, TRACES NT, AQAS, IPM, artificial intelligence, drone monitoring, IoT sensors, ePhyto, international experience.*

Kirish

O‘zbekiston qishloq xo‘jaligi sohasida barqaror rivojlanishni ta’minlash, oziq-ovqat xavfsizligini mustahkamlash va eksport salohiyatini oshirish maqsadida ko‘plab islohotlarni amalga oshirmoqda. Shu jumladan, o‘simliklar karantini va himoyasi tizimi davlat e’tibori markazida turib, zamonaviy texnologiyalar yordamida raqamlashtirilmoqda. Soha milliy iqtisodiyotning barqarorligini ta’minlashda, eksport imkoniyatlarini kengaytirishda va xalqaro savdo talablariga mos kelishda muhim rol o‘ynaydi.

O‘zbekiston Respublikasi hukumati tomonidan qabul qilingan “RAQAMLI O‘zbekiston – 2030” strategiyasi bu jarayonda asosiy yo‘nalishlardan biri sifatida belgilangan[1]. Strategiya doirasida qishloq xo‘jaligi tizimini, jumladan fitosanitariya va o‘simliklar karantini sohasini raqamlashtirish, elektron hujjat aylanishi, axborot tizimlarini yagona platformaga integratsiyalash, real vaqt rejimida monitoring tizimlarini joriy etish va sun’iy intellekt hamda IoT qurilmalarini keng qo‘llash ko‘zda tutilgan. Mazkur strategiya orqali nafaqat samarali boshqaruv, balki fermerlar va eksportyorlar uchun qulayliklar yaratish, byurokratik to‘siqlarni kamaytirish va xalqaro standartlarga mos keladigan tizimlarni shakllantirish ko‘zda tutilgan.

Soha islohotlarining amaliy qismi ham allaqachon boshlanib, elektron fitosanitariya sertifikatlari, onlayn inspeksiya jarayonlari va ba’zi hududlarda dron monitoringi kabi texnologiyalar sinov tariqasida joriy etilgan. Shu bilan birga, raqamlashtirish jarayonini kengaytirish va tizim samaradorligini oshirish maqsadida xalqaro tajribalarni o‘rganish muhim ahamiyat kasb etmoqda. Dunyoning rivojlangan mamlakatlarida qo‘llanilayotgan TRACES NT (Yevropa Ittifoqi), AQAS va IPM (AQSh), Smart Plant Quarantine System (Janubiy Koreya) hamda ePhyto (Avstraliya) tizimlari O‘zbekistonda sohani raqamlashtirishning samarali yo‘nalishlarini aniqlashga yordam beradi.

Shu bilan birga, O‘zbekiston sharoitida raqamli tizimlarni joriy etishda infratuzilma, malakali kadrlar, laboratoriya bazasi va hududlararo integratsiya masalalari dolzarb masala sifatida qolmoqda. Shu sababli, mazkur maqolada O‘zbekistonda o‘simliklar karantini va himoyasi sohasini raqamlashtirish bo‘yicha xalqaro tajribalar tahlili, mavjud muammolar va ularni bartaraf etish yo‘llari, shuningdek, “RAQAMLI O‘zbekiston – 2030” strategiyasiga muvofiq takliflar batafsil ko‘rib chiqiladi.

Natijada, ushbu izlanish nafaqat nazariy, balki amaliy jihatdan ham O‘zbekistonning fitosanitariya tizimini modernizatsiya qilish va raqamli transformatsiyani chuqurlashtirish uchun asos yaratadi.

Raqamlashtirishning dolzarbligi va ahamiyati

Raqamli texnologiyalar yordamida fitosanitariya nazoratida qo‘l mehnatini kamaytirish, tezkor ma’lumot almashish, xavf zonalarini aniqlash va resurslarni

optimallashtirish mumkin. An’anaviy qog‘oz hujjatlar tizimi ko‘p vaqt talab qiladi, xatoliklar ehtimoli yuqori va xalqaro standartlarga to‘liq mos kelmaydi. Raqamlashtirish esa zararli organizmlar haqidagi ma’lumotlarni yagona tizimda jamlab, real vaqt rejimida kuzatish imkonini beradi. Bu global bozordagi raqobatbardoshlikni oshiradi va eksport jarayonlarida to‘siqlarni kamaytiradi.

Yevropa Ittifoqi tajribasi

Yevropa Ittifoqi fitosanitariya tizimi dunyodagi eng ilg‘or raqamli tizimlardan biri sanaladi. Ittifoqda TRACES NT (Trade Control and Expert System New Technology) platformasi orqali fitosanitariya sertifikatlari elektron shaklda rasmiylashtiriladi. Ushbu tizim butun Yevropa bo‘ylab eksport-import jarayonlarini nazorat qiladi. TRACES NT platformasi laboratoriya tahlillaridan tortib yuk jo‘natmalari harakatigacha bo‘lgan barcha ma’lumotlarni markazlashtirilgan tarzda boshqaradi[2]. Bundan tashqari, EFSA tomonidan yaratilgan zararli organizmlarning raqamli xaritalari va monitoring tizimlari sun’iy intellekt yordamida ishlaydi[3].

AQSh tajribasi

AQShda USDA APHIS tomonidan yaratilgan AQAS platformasi qishloq xo‘jaligi mahsulotlari nazoratini to‘liq raqamlashtirgan. Mazkur tizim real vaqt rejimida zararli organizmlar haqidagi ma’lumotlarni yig‘adi, laboratoriya tekshiruvlarini boshqaradi va chegaralarda amalga oshiriladigan inspeksiya jarayonlarini optimallashtiradi. Bundan tashqari, AQShda IPM – Integrated Pest Management tizimi keng qo‘llaniladi. U fermerlarga sun’iy intellekt asosida maslahatlar beradi, ogohlantirishlar yuboradi va kasalliklarni avtomatik aniqlash imkonini yaratadi[4].

Janubiy Koreya tajribasi

Janubiy Koreya raqamli qishloq xo‘jaligi texnologiyalari bo‘yicha dunyoda yetakchi o‘rinda turadi. Mamlakatda Smart Plant Quarantine System doirasida o‘simliklar kasalliklarini aniqlash uchun raqamli diagnostika uskunalari, IoT datchiklari, dronlar va sun’iy intellekt tizimlari keng joriy qilingan. Monitoring natijalari GIS xaritalar orqali tahlil qilinadi. Har bir namunaga QR-kod berilishi esa laboratoriya jarayonlarini to‘liq shaffof qiladi.

Avstraliya tajribasi

Avstraliya o‘zining kuchli bioxavfsizlik tizimi bilan mashhur. Mamlakatda dronlar, sun’iy yo‘ldosh tasvirlari va risk-mapping tizimlari asosida zararli organizmlar tarqalishi prognoz qilinadi. “Biosecurity Australia” platformasi ePhyto tizimiga to‘liq integratsiya qilingan. Bu mahsulotlarni elektron tarzda sertifikatlashni yengillashtiradi.

O‘zbekistonda raqamlashtirishning joriy holati

O‘zbekiston so‘nggi yillarda fitosanitariya tizimini modernizatsiya qilish borasida sezilarli bosqichlarni bosib o‘tdi. Elektron fitosanitariya sertifikatlari joriy qilindi, ayrim hududlarda dron monitoringi sinov tariqasida yo‘lga qo‘yildi, laboratoriya jarayonlarida raqamli qayd etish amaliyotlari kengaymoqda. Biroq to‘liq raqamlashtirish uchun zarur infratuzilma, malakali kadrlar va xalqaro tizimlarga integratsiya darajasi hali yetarli emas.

Chet el tajribalarini qo‘llash takliflari

Xalqaro tajriba O‘zbekistonda quyidagi yo‘nalishlarda tatbiq etilishi mumkin:

– TRACES NT va ePhyto kabi tizimlarga to‘liq integratsiya;

– dronlar orqali muntazam monitoring tizimini yaratish;

– sun’iy intellekt yordamida kasalliklarni aniqlovchi mobil ilovalar ishlab chiqish;

– IoT datchiklaridan foydalanib zararli organizmlar monitoringini avtomatlashtirish;

– laboratoriya tahlillarini QR-kodlash orqali shaffoflashtirish.

Axborot tizimlarini yaratish zarurati

Fitosanitariya sohasida yagona raqamli platformani yaratish zarur bo‘lib, bunda zararli organizmlar haqidagi barcha ma’lumotlar, laboratoriya natijalari, tekshiruvlar, eksport hujjatlari va ogohlantirishlar bir joyda jamlanadi. Bu tizim davlat organlari o‘rtasida tezkor hamkorlikni ta’minlaydi.

Kadrlar masalasi

Raqamli transformatsiya inson resurslarisiz mumkin emas. Shu sababli xalqaro ekspertlar bilan hamkorlikda treninglar o‘tkazish, oliy ta’limda maxsus yo‘nalishlar ochish, inspektorlarni zamonaviy texnologiyalar bilan ishlashga o‘rgatish zarur.

Tadqiqot Metodlari

Ushbu tadqiqotda O‘zbekistonning o‘simliklar karantini va himoyasi sohasini raqamlashtirishni yanada takomillashtirish bo‘yicha ilmiy asos yaratish uchun bir nechta metodlardan foydalanildi. Tadqiqot metodlari nazariy, amaliy va solishtirma tahlil usullarini o‘z ichiga oladi. Nazariy metodlar yordamida fitosanitariya sohasidagi global va mahalliy tajribalar o‘rganildi, raqamlashtirishning konseptual asoslari va ilg‘or davlatlarda qo‘llanilayotgan texnologiyalar tahlil qilindi. Shu bilan birga, xalqaro standartlar, qonun hujjatlari va hukumat qarorlari ham tadqiqotning nazariy bazasini tashkil qildi.

Amaliy metodlar sifatida eksperimental va kuzatuv usullari qo‘llanildi. O‘zbekistondagi elektron fitosanitariya sertifikatlari tizimi, dron monitoringi, laboratoriya tahlillari va inspeksiya jarayonlarining real vaqt rejimidagi ishlash samaradorligi kuzatildi. Bu jarayonlar orqali tizimning afzalliklari, mavjud cheklovlari va raqamlashtirish imkoniyatlari aniqlab olindi. Shu bilan birga, amaliy metodlar yordamida ma’lumotlar bazasini shakllantirish, tizim integratsiyasining samaradorligini baholash va mavjud infratuzilmaning qulayligi tahlil qilindi.

Solishtirma tahlil metodlari orqali O‘zbekiston va ilg‘or davlatlar – Yevropa Ittifoqi, AQSh, Janubiy Koreya va Avstraliyaning fitosanitariya tizimlari xususiyatlari solishtirildi. Bu metod yordamida xalqaro tajribaning lokal sharoitga moslashtirilishi va raqamli transformatsiyani amalga oshirishning samarali usullari aniqlandi.

Shuningdek, ekspert interv’yu va so‘rovlar usuli tadqiqot metodlarining muhim qismi bo‘ldi. Fermerlar, inspeksiya xodimlari va laboratoriya

mutaxassislari fikrlari yig‘ilib, tizimning amaliy ishlashidagi imkoniyatlar va qiyinchiliklar baholandi. Ushbu metodlar yordamida to‘plangan ma’lumotlar tahlili izchil va ilmiy asosli xulosalar chiqarish imkonini berdi.

Natijada, tadqiqot metodlari to‘liq integratsiyalashgan yondashuvni tashkil etib, O‘zbekiston sharoitida o‘simliklar karantini va himoyasi sohasini raqamlashtirish jarayonini tizimli ravishda o‘rganish imkonini yaratdi. Ushbu metodik yondashuv maqolada berilgan tavsiyalar va takliflar ilmiy asoslanganligining kafolati sifatida xizmat qiladi.

Materiallar Va Usullar

Ushbu izlanishda o‘simliklar karantini va himoyasi sohasini raqamlashtirish bo‘yicha O‘zbekiston va xorijiy davlatlarning tajribasini tahlil qilish maqsadida turli manbalar va usullar qo‘llanildi. Tadqiqot materiali sifatida xalqaro va mahalliy adabiyotlar, hukumat qarorlari va qonun hujjatlari, ilmiy maqolalar, ekspert hisobotlari, shuningdek, fitosanitariya tizimlarida qo‘llaniladigan raqamli texnologiyalar bo‘yicha rasmiy veb-saytlar va ma’lumotlar bazalari ishlatildi. Xususan, Yevropa Ittifoqining TRACES NT platformasi, USDA APHIS AQAS va IPM tizimlari, Janubiy Koreya Smart Plant Quarantine System va Avstraliyaning ePhyto tizimlari o‘rganildi. Shuningdek, O‘zbekistondagi elektron fitosanitariya sertifikatlari, dron monitoringi va laboratoriya tahlillarini raqamlashtirish tajribalari tahlil qilindi[5].

Izlanish usullari sifatida quyidagilar qo‘llanildi: komparativ tahlil, tavsifiy statistik tahlil, ekspert interv’yu va hujjatlarni o‘rganish. Komparativ tahlil yordamida O‘zbekiston va ilg‘or davlatlarning fitosanitariya tizimlari xususiyatlari solishtirildi, raqamlashtirishning samaradorligi va muammolari aniqlab olindi. Tavsifiy statistika O‘zbekistonda amalda qo‘llanilayotgan raqamli tizimlar va jarayonlarning hajmi, kengligi va samarasini aniqlash uchun ishlatildi. Ekspert interv’yu usuli orqali fitosanitariya organlari va fermerlar fikrlari yig‘ildi, raqamlashtirish jarayonidagi imkoniyatlar va cheklovlar aniqlab olindi. Hujjatlarni o‘rganish metodikasi esa qonun hujjatlari, hukumat qarorlari va xalqaro qo‘llanmalarni tahlil qilishga xizmat qildi.

Shuningdek, tahlil jarayonida vizualizatsiya va grafik tasvirlardan foydalanildi, masalan, dron kuzatuv natijalari, GIS xaritalar va elektron sertifikatlarning oqim diagrammalari o‘rganildi. Ushbu materiallar va usullar orqali O‘zbekiston sharoitida raqamlashtirish jarayonini optimallashtirish va xalqaro tajribalarni tatbiq etish imkoniyatlari batafsil tahlil qilindi. Natijada, maqolada ilg‘or tajribalarni amaliyotga joriy etish va sohani yanada samarali boshqarish bo‘yicha tavsiyalar ishlab chiqildi.

Tahlil va Natijalar

Ushbu tadqiqot davomida O‘zbekistonda o‘simliklar karantini va himoyasi sohasini raqamlashtirish bo‘yicha xalqaro tajribalar tahlil qilindi hamda ularni mahalliy sharoitga tatbiq etish imkoniyatlari o‘rganildi. Natijalar shuni ko‘rsatdiki, ilg‘or davlatlar – Yevropa Ittifoqi, AQSh, Janubiy Koreya va Avstraliya – fitosanitariya tizimlarini elektronlashtirish orqali monitoring va nazorat samaradorligini sezilarli darajada oshirgan[6]. Masalan, Yevropada TRACES NT

platformasi orqali fitosanitariya sertifikatlarini markazlashgan elektron tizimda yuritish, eksport-import jarayonlarini shaffof va tezkor boshqarish imkonini beradi. AQShning AQAS va IPM tizimlari esa fermerlar va inspeksiya xodimlari o‘rtasida real vaqt rejimida axborot almashinuvini ta’minlab, zararli organizmlar tarqalishini oldindan aniqlash imkoniyatini yaratadi. Janubiy Koreyada Smart Plant Quarantine System dronlar, IoT sensorlari va sun’iy intellekt orqali kasalliklarni avtomatik aniqlash, GIS xaritalar yordamida hududiy xavf prognozini shakllantirish imkonini beradi. Avstraliyada esa ePhyto tizimi orqali mahsulotlar elektron fitosanitariya sertifikatlari bilan ta’minlanib, butun eksport jarayoni onlayn boshqariladi[7].

O‘zbekiston sharoitida olib borilgan tahlil shuni ko‘rsatdiki, mavjud elektron fitosanitariya sertifikatlari va ba’zi raqamli monitoring amaliyotlari yetarli darajada integratsiyalashtirilmagan. Hududlararo ma’lumot almashinuvi qisman amalga oshiriladi, ayrim laboratoriya natijalari va inspeksiya hujjatlari hali ham qog‘oz shaklida saqlanadi. Shu bilan birga, dron monitoringi va IoT qurilmalaridan foydalanish tajriba bosqichida bo‘lib, ularning samaradorligi tizimli tahlil qilingan emas.

Izlanish natijalaridan kelib chiqib, O‘zbekistonda quyidagi chora-tadbirlar samarali bo‘lishi mumkinligi aniqlangan: yagona integratsiyalashgan raqamli platformani yaratish, ePhyto va TRACES NT tizimlariga to‘liq ulanish, dronlar va IoT sensorlari yordamida real vaqt rejimida monitoring o‘rnatish, laboratoriya tahlillarini QR-kodlash orqali shaffoflashtirish, shuningdek, malakali kadrlarni tayyorlash va xodimlarni raqamli tizimlar bilan ishlashga o‘rgatish.

Shuningdek, izlanish natijalari ko‘rsatdiki, xalqaro tajriba asosida O‘zbekistonda elektron fitosanitariya sertifikatlarini eksport-import jarayonlariga to‘liq integratsiya qilish, fermerlar va inspeksiya organlari o‘rtasida axborot almashuvini tezlashtirish va zararli organizmlarga qarshi kurashni avtomatlashtirish imkoniyatlari mavjud. Bu esa sohaning samaradorligini oshirish, eksport salohiyatini kengaytirish va qishloq xo‘jaligi xavfsizligini ta’minlashda muhim omil bo‘lib xizmat qiladi.

Xulosa

Mazkur maqolada ko‘rib chiqilgan xalqaro tajribalar O‘zbekistonda o‘simliklar karantini sohasini raqamlashtirishni jadallashtirish uchun mustahkam asos yaratadi. Raqamli texnologiyalarni keng tatbiq etish orqali fitosanitariya tizimining samaradorligi oshadi, eksport imkoniyatlari kengayadi va qishloq xo‘jaligi xavfsizligi yuqori darajada ta’minlanadi.

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URUG‘LARNI YAROVIZATSIYA QILISH USULINING ILMIY-AMALIY AHAMIYATI

Annotatsiya. *Mazkur maqolada urug‘larni yarovizatsiya qilish, ya’ni o‘sish va rivojlanish jarayonini jadallashtirish usullarining ilmiy-amaliy ahamiyati tahlil qilinadi. Tarixiy manbalar asosida past harorat hamda kimyoviy moddalar yordamida urug‘larga ishlov berish orqali ularning unuvchanligi, o‘sish sur’ati va hosildorligini oshirish masalalari yoritilgan. Shuningdek, yarovizatsiya usulining zamonaviy qishloq xo‘jaligidagi o‘rni ham ko‘rib chiqilgan.*

Kalit so‘zlar: *yarovizatsiya, urug‘, sovuq ishlov, biokimyoviy jarayon, unuvchanlik, hosildorlik, qishloq xo‘jaligi, o‘simlik fiziologiyasi.*

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SCIENTIFIC AND PRACTICAL SIGNIFICANCE OF THE METHOD OF SEED VERNALIZATION

Abstract. *This article analyzes the scientific and practical significance of seed vernalization, that is, methods for accelerating plant growth and development processes. Based on historical sources, issues of increasing seed germination, growth rate, and productivity through treatment of seeds with low temperatures and chemical substances are highlighted. The role of the vernalization method in modern agriculture is also considered.*

Keywords: *vernalization, seed, cold treatment, biochemical process, germination, productivity, agriculture, plant physiology.*

Kirish

Qishloq xo‘jaligi ekinlarining hosildorligini oshirishda urug‘ sifati va uni ekishga tayyorlash muhim omillardan biri hisoblanadi. Urug‘larga ekishdan oldin turli usullar bilan ishlov berish ularning tez unib chiqishi, o‘sishi va hosil berish jarayoniga ijobiy ta’sir ko‘rsatadi. Ana shunday usullardan biri yarovizatsiya

bo‘lib, u urug‘larni ma’lum sharoitda saqlash yoki ularga maxsus ta’sir ko‘rsatish orqali o‘sishni jadallashtirishni nazarda tutadi.

Yarovizatsiya — o'simliklarning (asosan kuzgi ekinlarning) gullashi va meva berishi uchun past musbat harorat ta'sirida o'tadigan murakkab fiziologik jarayon. Yarovizatsiya kuzgi o‘simliklar uchun o‘ta zarur bo‘lib, odatda 1–3 oygacha davom etadi (0–7 °C). Issiqsevar o‘simliklar uchun 10–13 °C bo‘ladi. Past harorat murtak, poya va barg uchlarida bo‘linib ko‘payuvchi hujayralarda faollikni oshiradi[1].

Yarovizatsiya usulining paydo bo‘lishi

1935-yilda sobiq Ittifoqda I.D. Mina nomiga “Urug‘larni yarovizatsiya qilish (o‘sishni rag‘batlantirish) usuli” bo‘yicha mualliflik guvohnomasi berilgan. Mazkur hujjatda kuzgi don ekinlari, xususan bug‘doy va javdar ekinlarining tabiiy sovuq davrni boshdan kechirganidan keyingina boshoqlashi va normal rivojlanishi ilmiy jihatdan asoslangan[42]. Unga ko’ra kuzgi ekinlar odatda sovuq davrni boshdan kechirganidan keyingina normal rivojlanadi va boshoqlaydi. Shu sababli urug‘larni ma’lum muddat past haroratda saqlash orqali tabiiy qish sharoiti sun’iy ravishda hosil qilinadi. Natijada urug‘lar ekilgandan so‘ng tezroq unib chiqadi va vegetativ rivojlanish jadallashadi.

Yarovizatsiyaning yana bir usuli kimyoviy ta’sir asosida amalga oshirilgan. Bunda urug‘lar shakar eritmasi hamda ayrim organik kislotalar qo‘shilgan eritmada ma’lum vaqt ivitilgan. Tajribalar shuni ko‘rsatadiki, bunday ishlov urug‘ ichidagi fiziologik va biokimyoviy jarayonlarni tezlashtirib, o‘sish faolligini oshiradi. Natijada ayrim ekinlarda boshoqlash va hosildorlik ko‘rsatkichlari yaxshilangan.

Mazkur usullarning afzalligi shundaki, ular urug‘ning tabiiy rivojlanish mexanizmlarini rag‘batlantiradi. Ayniqsa, noqulay iqlim sharoitida ekinlarning barqaror o‘sishini ta’minlashda yarovizatsiya muhim ahamiyatga ega. Hozirgi davrda ham urug‘larga ishlov berishning turli zamonaviy usullari qo‘llanilib, ular tarixiy yarovizatsiya tajribalariga tayanadi.

Urug‘larni yarovizatsiya qilish usuli qishloq xo‘jaligida hosildorlikni oshirishga xizmat qiluvchi muhim agrotexnik tadbir hisoblanadi. Ushbu usul ekinlarning erta unishi, bir tekis rivojlanishi va vegetatsiya davrining me’yoriy kechishini ta’minlaydi. Shu bilan birga, urug‘larga ishlov berishda xavfsizlik qoidalariga rioya qilish, ilmiy tavsiyalar asosida ishlash zarur.

Bugungi kunga kelib spidbriding (Speed Breeding) texnologiyasi qishloq xo‘jaligi va seleksiya sohasida keng qo‘llanilayotgan zamonaviy innovatsion usullardan biriga aylandi. Mazkur texnologiya o‘simliklarni tezlashtirilgan seleksiya va ko‘paytirish usuli bo‘lib, sun’iy boshqariladigan sharoitda, ya’ni yorug‘lik, harorat, namlik va fotoperiod ko‘rsatkichlarini me’yoriy tarzda tartibga solish orqali o‘simliklarning o‘sish va rivojlanish davrini sezilarli darajada qisqartirish imkonini beradi.

[42] https://www.elibrary.ru/item.asp?id=39435490

Hozirgi vaqtda spidbriding usuli amaliy hamda fundamental tadqiqotlarda, ayniqsa bahorgi don ekinlarining to‘liq vegetatsiya davrini 60 kun ichida yakunlashda samarali qo‘llanilmoqda. Ushbu texnologiya yordamida 12 oy davomida oltitagacha avlod olish, boshqacha aytganda, bir yil ichida sof gomozigot liniyalarni yaratish mumkin.

Tabiiy sharoitda bug‘doy odatda yiliga 1–2 marta avlod bersa, spidbriding texnologiyasi yordamida bir yil davomida 4–6 ta va undan ortiq avlod olish imkoniyati yuzaga keladi. Bu esa yangi navlarni yaratish jarayonini tezlashtirish, seleksiya samaradorligini oshirish hamda qishloq xo‘jaligi ekinlarining istiqbolli shakllarini qisqa muddatda yaratishda muhim ahamiyat kasb etadi [2].

Kuzgi ekinlar (masalan, kuzgi bug‘doy, arpa) tez yetishtirilganda eng katta muammo — yarovizatsiya, ya’ni sovuq davr talab qilinishi hisoblanadi. Odatda bu jarayon 40–60 kun vaqt oladi.

Lekin yangi tadqiqotlar shuni ko‘rsatdiki:

- harorat 10°C bo‘lsa,
- yorug‘lik rejimi 22 soat kunduz, 2 soat tun bo‘lsa,
- urug‘lar tuproq ustiga joylashtirilsa,

unda kuzgi don ekinlari uchun 28 kunlik yarovizatsiya ham yetarli bo‘ladi. Natijada o‘simliklar erta va bir xil gullaydi[3].

Tahlil

Maqolada keltirilgan ma’lumotlar shuni ko‘rsatadiki, yarovizatsiya o‘simliklarning biologik rivojlanishida muhim fiziologik bosqich hisoblanadi. Ayniqsa kuzgi don ekinlarida ushbu jarayon o‘simliklarning sovuqqa chidamliligini oshirish, generativ organlar shakllanishini jadallashtirish hamda vegetatsiya davrining me’yoriy kechishini ta’minlaydi. Past harorat ta’sirida o‘simlik hujayralarida kechadigan fiziologik va biokimyoviy o‘zgarishlar kelgusida gullash, boshoqlash va hosildorlikka ijobiy ta’sir ko‘rsatadi.

Tarixiy manbalarda I.D. Mina tomonidan taklif etilgan yarovizatsiya usuli qishloq xo‘jaligi amaliyotida muhim burilish yasagan. Urug‘larni sovuq muhitda saqlash yoki kimyoviy moddalar bilan ishlov berish orqali tabiiy qish sharoitini sun’iy hosil qilish imkoniyati yaratilgan. Bu esa ekinlarning erta unishi, bir tekis rivojlanishi va hosildorlikning ortishiga xizmat qilgan. Mazkur yondashuv o‘sha davr uchun innovatsion texnologiya bo‘lib, zamonaviy urug‘chilik va seleksiya ishlariga zamin yaratgan.

Bugungi kunda speed breeding texnologiyasining qo‘llanilishi yarovizatsiya jarayonini yanada takomillashtirdi. Sun’iy boshqariladigan yorug‘lik, harorat va namlik rejimlari yordamida o‘simliklarning rivojlanish davri keskin qisqartirilmoqda. Natijada bir yil davomida bir necha avlod olish, yangi navlarni tezkor yaratish va sof gomozigot liniyalarni qisqa muddatda shakllantirish imkoniyati paydo bo‘lmoqda. Bu esa seleksiya jarayonlarining samaradorligini sezilarli oshiradi.

So‘nggi tadqiqotlarda kuzgi don ekinlari uchun yarovizatsiya muddatini 40–60 kundan 28 kungacha qisqartirish mumkinligi aniqlangani ilm-fan yutuqlarining amaliy ifodasidir. Demak, yarovizatsiya va speed breeding texnologiyalarining

uyg‘unlashuvi kelajakda oziq-ovqat xavfsizligini ta’minlash, hosildorlikni oshirish hamda iqlim o‘zgarishiga mos navlarni yaratishda muhim omil bo‘lib xizmat qiladi.

Xulosa

Xulosa qilib aytganda, urug‘larni yarovizatsiya qilish usuli qishloq xo‘jaligi ekinlarining o‘sishi, rivojlanishi va hosildorligini oshirishda muhim ilmiy-amaliy ahamiyatga ega. Past harorat yoki maxsus ishlov orqali urug‘larning biologik faolligi kuchayadi, bu esa ekinlarning erta unishi va me’yoriy rivojlanishini ta’minlaydi.

Tarixiy yarovizatsiya tajribalari bugungi kunda zamonaviy speed breeding texnologiyalarining shakllanishiga asos bo‘ldi. Hozirgi innovatsion yondashuvlar yordamida seleksiya jarayonlarini tezlashtirish, yuqori hosilli va stress omillariga chidamli navlarni yaratish imkoniyati kengaymoqda. Shu sababli yarovizatsiya usullarini chuqur o‘rganish, ularni zamonaviy texnologiyalar bilan uyg‘unlashtirish va amaliyotga keng joriy etish qishloq xo‘jaligi taraqqiyoti uchun muhim ahamiyat kasb etadi.

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THE ROLE OF ARTIFICIAL INTELLIGENCE IN NEUROSCIENCE

Abstract: *Artificial intelligence (AI) is rapidly transforming the field of neurology by enhancing diagnostic accuracy, optimizing treatment strategies, and improving patient outcomes. The integration of AI technologies, including machine learning, deep learning, and neural networks, enables the analysis of complex neurological data such as neuroimaging, electrophysiological signals, and clinical records. AI-based systems assist in the early detection of neurological disorders such as Alzheimer's disease, Parkinson's disease, epilepsy, and stroke, allowing for timely intervention and personalized treatment planning. Furthermore, AI contributes to predictive analytics, rehabilitation processes, and decision-support systems in clinical practice. Despite its significant potential, challenges related to data quality, ethical considerations, and clinical validation remain critical issues. This paper explores the current applications, benefits, and limitations of AI in neurology, emphasizing its role in advancing modern healthcare and precision medicine.*

Keywords: *Artificial Intelligence, Neurology, Machine Learning, Deep Learning, Neuroimaging, Clinical Decision Support Systems, Neurological Disorders, Predictive Analytics, Personalized Medicine, Healthcare Innovation*

Introduction

Neurology, as a complex and data-intensive field of medicine, deals with the diagnosis, treatment, and management of disorders affecting the nervous system, including the brain, spinal cord, and peripheral nerves. In recent years, the rapid growth of digital technologies and the increasing availability of large-scale medical data have created new opportunities for improving neurological care. Among these technologies, artificial intelligence (AI) has emerged as a powerful tool capable of transforming traditional approaches in neurology.

AI encompasses a range of computational techniques, such as machine learning and deep learning, that enable systems to learn from data, identify patterns, and make decisions with minimal human intervention. In neurology,

these capabilities are particularly valuable due to the complexity of neurological diseases and the vast amount of heterogeneous data involved, including neuroimaging (MRI, CT scans), electroencephalography (EEG), and electronic health records. AI-based models can process and analyze these data more efficiently and accurately than conventional methods, thereby supporting clinicians in making informed decisions.

The application of AI in neurology has shown promising results in the early detection and diagnosis of disorders such as Alzheimer's disease, Parkinson's disease, multiple sclerosis, epilepsy, and stroke. Additionally, AI is increasingly used in predicting disease progression, personalizing treatment plans, and enhancing neurorehabilitation processes. These advancements not only improve clinical outcomes but also contribute to reducing healthcare costs and workload on medical professionals.

However, despite its growing adoption, the implementation of AI in neurology is associated with several challenges. Issues related to data privacy, algorithm transparency, ethical considerations, and the need for clinical validation must be carefully addressed to ensure safe and effective use. Therefore, it is essential to critically evaluate both the opportunities and limitations of AI technologies in neurological practice.

This study aims to explore the role of artificial intelligence in neurology, highlighting its current applications, advantages, and challenges, as well as its future potential in advancing neurological research and clinical practice.

Results and Discussion

The analysis of recent studies and practical applications demonstrates that artificial intelligence (AI) has significantly improved various aspects of neurological practice. One of the most notable results is the increased accuracy and speed of diagnosis. AI algorithms, particularly deep learning models, have shown high performance in analyzing neuroimaging data such as MRI and CT scans, enabling early detection of neurological disorders including Alzheimer's disease, brain tumors, and stroke. In many cases, these systems achieve diagnostic accuracy comparable to, or even exceeding, that of experienced neurologists.

Another important outcome is the effective use of AI in the analysis of electrophysiological signals, such as electroencephalography (EEG). AI-based models can automatically detect abnormal patterns associated with epilepsy and other neurological conditions, reducing the time required for manual interpretation and minimizing human error. Additionally, AI contributes to predictive analytics by identifying risk factors and forecasting disease progression, which is particularly valuable in chronic neurological disorders.

In clinical practice, AI-powered decision support systems have enhanced the personalization of treatment strategies. By integrating patient-specific data, these systems can recommend optimal therapeutic approaches, improving treatment outcomes and patient management. AI is also increasingly applied in neurorehabilitation, where intelligent systems and robotic technologies support recovery processes and monitor patient progress in real time.

Despite these positive results, several challenges and limitations have been identified. One major issue is the quality and availability of medical data. AI systems require large, well-annotated datasets for training, and inconsistencies or biases in data can affect model performance and reliability. Furthermore, the "black box" nature of many AI algorithms raises concerns regarding transparency and interpretability, which are critical in medical decision-making.

Ethical and legal considerations also play a significant role in the discussion. The use of patient data must comply with privacy regulations, and there is a need to clearly define responsibility in cases of AI-assisted clinical decisions. Moreover, the integration of AI into healthcare systems requires substantial financial investment, technical infrastructure, and professional training.

In conclusion, the results indicate that AI has great potential to enhance diagnostic accuracy, improve treatment personalization, and optimize neurological care. However, its successful implementation depends on addressing existing challenges related to data quality, ethics, and clinical validation. Future research should focus on developing more transparent, reliable, and clinically applicable AI systems to fully realize their benefits in neurology.

Conclusion

Artificial intelligence has become an essential component in the advancement of modern neurology, offering innovative solutions for the diagnosis, treatment, and management of neurological disorders. The integration of AI technologies into clinical practice has demonstrated significant improvements in diagnostic accuracy, early disease detection, and the development of personalized treatment strategies. Additionally, AI contributes to more efficient data analysis, supports clinical decision-making, and enhances neurorehabilitation processes.

Despite these achievements, the widespread implementation of AI in neurology is still accompanied by important challenges. Issues related to data quality, ethical considerations, algorithm transparency, and the need for rigorous clinical validation must be carefully addressed to ensure safe and effective application. Furthermore, the successful adoption of AI requires interdisciplinary collaboration between medical professionals, data scientists, and policymakers.

Overall, AI holds great promise for transforming neurological care and advancing precision medicine. With continued research, technological development, and appropriate regulatory frameworks, artificial intelligence is expected to play an increasingly important role in improving patient outcomes and shaping the future of neurology.

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ARTIFICIAL INTELLIGENCE FOR PREDICTING OUTCOMES OF CARDIAC SURGERY AND EARLY DETECTION OF HEART DISEASES THROUGH ECG SIGNAL ANALYSIS

Abstract: *Artificial intelligence (AI) is increasingly transforming modern cardiovascular medicine by improving diagnostic accuracy, clinical decision-making, and patient outcomes. In cardiac surgery, AI-based predictive models can analyze large volumes of clinical, demographic, laboratory, and imaging data to estimate the probability of postoperative complications, mortality, prolonged hospitalization, and recovery success. Machine learning algorithms, including artificial neural networks, decision trees, support vector machines, and deep learning methods, provide more accurate predictions than traditional statistical approaches. These technologies enable surgeons and clinicians to identify high-risk patients before surgery and optimize individualized treatment strategies.*

At the same time, AI has become an effective tool for the analysis of Electrocardiography signals. Deep learning models can automatically detect subtle abnormalities in cardiac rhythms and waveform morphology that may be difficult to recognize through conventional interpretation. AI-assisted ECG analysis contributes to the early diagnosis of serious cardiovascular diseases such as Arrhythmia, Atrial Fibrillation, Myocardial Infarction, Coronary Artery Disease, and Heart Failure. Early detection allows timely intervention, reduces the risk of severe complications, and increases long-term survival rates.

This article examines the current applications of AI in predicting cardiac surgery outcomes and in ECG-based early detection of heart diseases. Particular attention is given to machine learning algorithms, data preprocessing techniques, clinical effectiveness, and the challenges associated with implementing AI in healthcare systems. The study demonstrates that integrating AI into cardiovascular diagnostics and surgery has significant potential to improve patient safety, enhance treatment quality, and support the development of personalized medicine.

Keywords: *artificial intelligence, machine learning, deep learning, cardiac surgery, outcome prediction, Electrocardiography signal analysis, cardiovascular diseases, early diagnosis, Arrhythmia, Atrial Fibrillation, Myocardial Infarction, predictive modeling, personalized medicine*

Introduction

Cardiovascular diseases remain the leading cause of mortality worldwide and represent a major challenge for modern healthcare systems. According to the World Health Organization, millions of people die every year from heart-related disorders, including Coronary Artery Disease, Heart Failure, Myocardial Infarction, and Arrhythmia. The increasing prevalence of these conditions, combined with population aging and unhealthy lifestyles, has created a growing demand for more accurate diagnostic and prognostic technologies.

Cardiac surgery plays an essential role in the treatment of severe cardiovascular disorders. Surgical procedures such as coronary artery bypass grafting, valve replacement, and congenital heart defect correction can significantly improve patient survival and quality of life. However, despite advances in surgical techniques and perioperative care, postoperative complications and mortality remain important concerns. Predicting the outcome of cardiac surgery is difficult because it depends on multiple factors, including the patient's age, medical history, comorbidities, laboratory findings, imaging results, and intraoperative parameters. Traditional risk assessment systems often rely on limited statistical models and may not fully capture the complex relationships among these variables.

Artificial intelligence has emerged as a promising solution for improving the prediction of cardiac surgery outcomes. AI systems can process large and heterogeneous datasets, identify hidden patterns, and generate highly accurate predictions. Machine learning methods such as logistic regression, random forests, support vector machines, and artificial neural networks are increasingly used to estimate the risk of postoperative complications, prolonged hospitalization, readmission, and mortality. More advanced deep learning approaches can analyze nonlinear relationships within clinical data and provide personalized predictions for individual patients. As a result, AI can assist clinicians in identifying high-risk patients before surgery and in selecting the most appropriate treatment strategies.

At the same time, AI has significantly changed the field of cardiac diagnostics through the analysis of Electrocardiography signals. ECG is one of the most widely used and cost-effective methods for evaluating cardiac function. It provides important information about heart rhythm, electrical conduction, and myocardial activity. However, conventional ECG interpretation often depends on the experience of physicians and may fail to detect subtle abnormalities in the early stages of disease. Recent developments in machine learning and deep learning have enabled automated ECG analysis with high sensitivity and specificity.

AI-based ECG systems can detect complex waveform patterns associated with various cardiovascular disorders. These systems have demonstrated strong performance in identifying Atrial Fibrillation, Ventricular Tachycardia, Myocardial Infarction, Coronary Artery Disease, and early signs of Heart Failure. Convolutional neural networks and recurrent neural networks are particularly effective because they can automatically extract relevant features from raw ECG signals without extensive manual preprocessing. This capability makes AI useful not only in hospitals but also in wearable monitoring devices and remote healthcare systems.

The integration of AI into cardiac surgery and ECG analysis represents an important step toward personalized and predictive medicine. By combining clinical information, imaging findings, and physiological signals, AI technologies can support more informed medical decisions and improve patient outcomes. Nevertheless, several challenges remain, including limited data quality, lack of standardized datasets, interpretability of AI models, ethical concerns, and data privacy issues. Addressing these challenges is necessary to ensure the safe and effective implementation of AI in cardiovascular medicine.

The purpose of this article is to examine the role of artificial intelligence in predicting cardiac surgery outcomes and in the early detection of heart diseases through ECG signal analysis. The study discusses the main machine learning methods, their clinical applications, advantages, limitations, and future perspectives in modern cardiovascular healthcare.

Results and Discussion

The analysis of recent studies demonstrates that artificial intelligence significantly improves the prediction of cardiac surgery outcomes. Machine learning models trained on preoperative and intraoperative variables showed better performance than conventional statistical scoring systems. The most commonly predicted outcomes included postoperative mortality, intensive care unit stay, prolonged hospitalization, need for mechanical ventilation, and postoperative complications such as bleeding, infection, and arrhythmias.

Among the investigated algorithms, random forests, gradient boosting methods, and artificial neural networks achieved the highest predictive accuracy. These models were able to identify nonlinear interactions between variables that are usually missed by traditional risk calculators. In several studies, the predictive performance of AI systems reached an area under the receiver operating characteristic curve between 0.80 and 0.95, indicating strong discrimination between high-risk and low-risk patients. A systematic review of congenital cardiac surgery studies reported AUC values ranging from 0.52 to 0.997, with most AI models outperforming standard risk assessment methods.

The results also indicate that the most influential predictors of poor postoperative outcome include advanced age, reduced left ventricular ejection fraction, diabetes mellitus, chronic kidney disease, previous myocardial infarction, duration of surgery, cardiopulmonary bypass time, and postoperative inflammatory markers. AI models processed these heterogeneous variables

simultaneously and generated individualized predictions for each patient. This capability supports personalized medicine and may help clinicians optimize surgical planning and perioperative care.

A particularly important finding is the growing role of deep learning in the analysis of ECG signals. Convolutional neural networks and recurrent neural networks demonstrated excellent ability to classify raw ECG waveforms without manual feature extraction. These systems successfully identified abnormal rhythm patterns and subtle morphological changes associated with early cardiovascular disease.

AI-assisted ECG analysis showed particularly high diagnostic accuracy for detecting Atrial Fibrillation, Ventricular Tachycardia, Myocardial Infarction, and early-stage Heart Failure. Studies based on deep learning reported sensitivity values above 90% for many arrhythmias and structural heart diseases. A recent meta-analysis found that AI models analyzing ECG signals for sudden cardiac death prediction achieved sensitivity between 0.87 and 0.96, specificity between 0.91 and 0.99, and an AUC as high as 0.99 when ECG segmentation methods were used.

More advanced transformer-based architectures have further improved diagnostic accuracy. Recent research using the Swin Transformer combined with ECG signal processing demonstrated highly accurate identification of cardiac abnormalities by recognizing subtle changes in ST segments, QT intervals, and T-wave morphology. These findings suggest that transformer models may become more effective than conventional convolutional approaches in future cardiovascular diagnostics.

AI-based ECG systems were also effective in predicting future disease before clinical symptoms appeared. For example, early signs of Heart Failure could be detected in apparently normal ECG recordings. Similarly, AI models identified patients at risk of postoperative Atrial Fibrillation after cardiac surgery, allowing preventive measures to be initiated before complications developed.

The growing use of wearable devices and remote monitoring systems further expands the clinical value of AI-based ECG analysis. Smartwatches, portable ECG monitors, and home-based diagnostic systems can continuously collect cardiac data and transmit it to cloud-based AI platforms. This enables earlier diagnosis of cardiovascular abnormalities and reduces the need for frequent hospital visits. Recent developments suggest that home ECG systems may soon provide automated, color-coded interpretation of heart disease risk and improve access to screening in remote areas.

Despite these promising results, several limitations remain. Many AI models are developed using small, single-center datasets and may not generalize well to other patient populations. The lack of standardized ECG databases, differences in signal quality, and missing clinical information can reduce model reliability. In addition, deep learning systems often function as “black boxes,” making it difficult for clinicians to understand why a particular prediction was

generated. This limited interpretability may reduce physician trust and delay clinical adoption.

Another challenge is the ethical and legal management of medical data. AI systems require large datasets containing sensitive patient information, which raises concerns about privacy, cybersecurity, and informed consent. Furthermore, if the training data are biased, the resulting model may produce inaccurate predictions for certain demographic groups.

Overall, the findings demonstrate that artificial intelligence has substantial potential to improve both cardiac surgery outcome prediction and early heart disease detection through ECG analysis. However, further multicenter studies, external validation, transparent algorithms, and international clinical standards are required before these technologies can be fully integrated into routine cardiovascular practice.

Conclusion

Artificial intelligence has become one of the most promising technologies in modern cardiovascular medicine. The findings discussed in this study demonstrate that AI-based systems can significantly improve the prediction of cardiac surgery outcomes and the early diagnosis of heart diseases through the analysis of Electrocardiography signals. By processing large volumes of clinical, laboratory, and physiological data, machine learning and deep learning models provide more accurate and individualized predictions than traditional statistical approaches.

In the field of cardiac surgery, AI enables the identification of patients at high risk of postoperative complications, mortality, prolonged hospitalization, and poor recovery. Such predictive capability supports better surgical planning, more effective perioperative management, and improved allocation of healthcare resources. At the same time, AI-assisted ECG analysis allows the early detection of serious cardiovascular disorders, including Atrial Fibrillation, Myocardial Infarction, Coronary Artery Disease, and Heart Failure, even before clinical symptoms become apparent.

The integration of AI with wearable devices, telemedicine platforms, and remote monitoring systems further expands its practical value. Continuous ECG monitoring and automated interpretation may increase access to cardiovascular screening, especially in remote and underserved regions. These technologies also support the transition toward personalized and preventive medicine.

Nevertheless, the implementation of AI in cardiovascular healthcare still faces several important challenges. Limited dataset quality, lack of standardized clinical databases, insufficient model transparency, and ethical issues related to privacy and data security remain major obstacles. In addition, AI models must be externally validated in diverse patient populations to ensure reliability and fairness.

In conclusion, artificial intelligence has the potential to transform both cardiac surgery and cardiovascular diagnostics. Future research should focus on developing more interpretable algorithms, creating large multicenter datasets, and establishing international standards for the safe and effective use of AI in clinical

practice. With continued technological progress and appropriate regulation, AI may become an essential component of next-generation cardiovascular medicine.

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ROBOTICS AND AUTOMATED SYSTEMS IN MEDICINE: TREATMENT METHODS USING AUTONOMOUS DEVICES

Abstract: *he rapid advancement of robotics and automated systems has significantly transformed modern healthcare, enabling more precise, efficient, and minimally invasive medical interventions. This article explores the role of robotic technologies and autonomous devices in contemporary medical practice, focusing on their application in diagnostics, surgery, rehabilitation, and patient monitoring. Special attention is given to the integration of artificial intelligence and machine learning algorithms in enhancing the autonomy and decision-making capabilities of medical devices. Autonomous therapeutic systems, including robotic surgical platforms, drug delivery systems, and rehabilitation robots, are analyzed in terms of their clinical effectiveness, safety, and adaptability. The study also discusses the benefits of these technologies, such as reduced human error, improved patient outcomes, and optimization of healthcare resources, alongside challenges related to ethical considerations, high implementation costs, and technical limitations. The findings suggest that the continued development and integration of robotic and automated systems will play a crucial role in the future of personalized and precision medicine.*

Keywords: *medical robotics, automated systems, autonomous devices, robotic surgery, artificial intelligence in medicine, healthcare automation, smart medical technologies, precision medicine*

Introduction

In recent decades, the healthcare sector has undergone a profound transformation driven by the rapid development of advanced technologies, particularly in the fields of robotics and automation. The increasing demand for high-quality medical services, combined with the need to reduce human error and improve clinical outcomes, has led to the widespread adoption of robotic and automated systems in medicine. These technologies are reshaping traditional

approaches to diagnosis, treatment, and patient care, enabling a shift toward more precise, efficient, and personalized healthcare delivery.

Medical robotics has emerged as a key component of modern clinical practice, with applications ranging from robot-assisted surgery and automated laboratory systems to intelligent rehabilitation devices and remote patient monitoring. Robotic surgical systems allow for minimally invasive procedures with enhanced precision, flexibility, and control, significantly reducing recovery time and postoperative complications. At the same time, automated systems are increasingly used in diagnostics and data analysis, supporting healthcare professionals in making faster and more accurate decisions.

A particularly promising area of development is the use of autonomous devices capable of performing specific medical tasks with limited or no direct human intervention. These devices often incorporate artificial intelligence and machine learning algorithms, enabling them to analyze complex medical data, adapt to changing conditions, and optimize treatment strategies in real time. Autonomous drug delivery systems, robotic assistants in rehabilitation, and smart wearable devices are examples of technologies that are already contributing to improved patient outcomes and quality of life.

Despite their significant advantages, the implementation of robotic and automated systems in healthcare also presents several challenges. These include high costs of development and deployment, the need for specialized training of medical personnel, concerns related to data security and patient privacy, and ethical considerations surrounding the use of autonomous decision-making systems in clinical settings.

This article aims to explore the current state and future prospects of robotics and automated systems in medicine, with a particular focus on treatment methods based on autonomous devices. By analyzing their applications, benefits, and limitations, the study seeks to provide a comprehensive understanding of how these technologies are shaping the future of healthcare.

Results and Discussion

The analysis of current trends in medical robotics and automated systems demonstrates a significant positive impact on the quality, efficiency, and safety of healthcare services. The integration of robotic technologies into clinical practice has produced measurable improvements across several domains, including surgical accuracy, treatment outcomes, rehabilitation efficiency, and patient monitoring.

One of the most notable results is observed in robot-assisted surgery. Clinical data indicate that robotic systems enable higher precision and stability compared to conventional techniques, reducing intraoperative errors and minimizing tissue damage. As a result, patients experience shorter hospital stays, reduced postoperative pain, and faster recovery times. Additionally, robotic platforms provide enhanced visualization and dexterity, allowing surgeons to perform complex procedures that would otherwise be difficult or impossible using traditional methods.

Autonomous devices used in treatment processes have also shown promising results. Intelligent drug delivery systems, for example, ensure accurate dosage administration based on real-time patient data, reducing the risk of underdosing or overdosing. Similarly, robotic rehabilitation systems have demonstrated improved outcomes in patients recovering from neurological and musculoskeletal disorders by providing consistent, adaptive, and personalized therapy programs. These systems can monitor patient progress and automatically adjust treatment parameters, leading to more effective rehabilitation.

Another important outcome is the increased efficiency of healthcare operations through automation. Automated diagnostic systems and decision-support tools powered by artificial intelligence contribute to faster and more accurate analysis of medical data. This reduces the workload on healthcare professionals and minimizes the likelihood of diagnostic errors. Furthermore, remote monitoring technologies and wearable autonomous devices enable continuous patient observation outside clinical settings, which is particularly beneficial for managing chronic diseases.

However, the discussion of these results also highlights several limitations and challenges. Despite their effectiveness, robotic and autonomous systems require substantial financial investment, which can limit their accessibility, especially in developing regions. Technical issues such as system failures, software errors, and limited interoperability between different platforms may also affect their reliability. Moreover, the integration of autonomous decision-making systems raises ethical concerns regarding accountability, patient consent, and data privacy.

In addition, the dependence on advanced technologies necessitates specialized training for medical personnel, which can create barriers to widespread adoption. There is also a need for standardized regulatory frameworks to ensure the safety, efficacy, and ethical use of these systems in clinical practice.

Overall, the results suggest that while robotics and automated systems significantly enhance modern medical treatment, their successful implementation requires careful consideration of economic, technical, and ethical factors. Future developments should focus on improving system affordability, reliability, and integration, as well as establishing clear guidelines for their safe and effective use in healthcare.

Conclusion

The integration of robotics and automated systems into modern medicine represents a significant advancement in the delivery of healthcare services. As demonstrated in this study, these technologies contribute to improved precision in medical procedures, enhanced treatment outcomes, and greater efficiency in clinical workflows. Autonomous devices, in particular, play a crucial role in advancing personalized and adaptive treatment methods, enabling real-time decision-making and continuous patient monitoring.

Robotic-assisted interventions and intelligent therapeutic systems have proven effective in reducing human error, minimizing invasiveness, and

accelerating patient recovery. At the same time, automated diagnostic and monitoring tools support healthcare professionals by providing accurate data analysis and facilitating timely clinical decisions. These benefits collectively contribute to higher standards of patient care and optimized use of medical resources.

However, despite their considerable potential, the widespread implementation of these technologies is still constrained by challenges such as high costs, technical limitations, ethical concerns, and the need for specialized training. Addressing these issues is essential to ensure equitable access and safe utilization of robotic and autonomous systems in healthcare settings.

In conclusion, robotics and automated systems are poised to become integral components of future medical practice. Continued research, technological innovation, and the development of appropriate regulatory and ethical frameworks will be critical in maximizing their benefits. The future of medicine will increasingly rely on the synergy between human expertise and intelligent machines, leading to more effective, efficient, and patient-centered healthcare solutions.

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DISEASE DETECTION USING ARTIFICIAL INTELLIGENCE IN MEDICINE

Abstract: *Artificial intelligence (AI) has emerged as a transformative technology in modern medicine, particularly in the field of disease detection. By leveraging advanced algorithms such as machine learning and deep learning, AI systems can analyze large volumes of medical data, including imaging, laboratory results, and electronic health records, with high accuracy and efficiency. AI-based diagnostic tools have demonstrated remarkable performance in detecting diseases such as cancer, cardiovascular disorders, diabetes, and infectious diseases at early stages. These systems not only enhance diagnostic precision but also reduce human error and support clinical decision-making. Despite its significant advantages, challenges such as data quality, ethical concerns, and the need for clinical validation remain. This paper examines the role, applications, and impact of AI in disease detection, highlighting its potential to improve healthcare outcomes and enable early intervention strategies.*

Keywords: *Artificial Intelligence, Disease Detection, Machine Learning, Deep Learning, Medical Diagnostics, Early Diagnosis, Healthcare Technology, Clinical Decision Support, Medical Imaging, Predictive Analytics*

Introduction

Early and accurate disease detection is a critical factor in improving patient outcomes and reducing mortality rates. Traditional diagnostic methods, while effective, often depend heavily on the expertise and experience of healthcare professionals and may be limited by time constraints and human error. With the rapid advancement of digital technologies, artificial intelligence (AI) has become an important tool in enhancing diagnostic processes in modern medicine.

AI refers to computational systems capable of performing tasks that typically require human intelligence, such as learning, reasoning, and pattern recognition. In the context of disease detection, AI techniques—particularly machine learning and deep learning—are used to analyze complex medical

datasets, including radiological images, laboratory data, genomic information, and electronic health records. These technologies enable the identification of subtle patterns and anomalies that may not be easily detected by human clinicians.

In recent years, AI has shown significant potential in detecting a wide range of diseases, including cancer, cardiovascular diseases, neurological disorders, and infectious diseases. AI-based systems are increasingly being integrated into clinical workflows to assist physicians in making faster and more accurate diagnoses. Furthermore, AI contributes to early detection, which is essential for timely treatment and improved prognosis.

However, the implementation of AI in medical diagnostics also presents several challenges. Issues such as data privacy, algorithm transparency, bias in training data, and regulatory approval must be addressed to ensure safe and reliable use. Therefore, it is important to evaluate both the opportunities and limitations of AI in disease detection.

This study aims to explore the applications, benefits, and challenges of artificial intelligence in disease detection, emphasizing its role in transforming modern healthcare systems.

Results and Discussion

The application of artificial intelligence (AI) in disease detection has produced significant and measurable improvements across multiple areas of medical diagnostics. Based on the analysis of recent studies and clinical implementations, AI systems—particularly those based on machine learning and deep learning—demonstrate high accuracy in identifying diseases from complex medical data. In medical imaging, AI models have achieved performance comparable to or exceeding that of clinicians in detecting conditions such as breast cancer in mammography, lung cancer in CT scans, and diabetic retinopathy in retinal images. These results highlight the ability of AI to recognize subtle patterns and abnormalities that may be overlooked during manual interpretation.

Another important outcome is the acceleration of diagnostic processes. AI-based systems can analyze large volumes of data within seconds, significantly reducing the time required for diagnosis. This is particularly beneficial in time-sensitive conditions such as stroke and infectious diseases, where early detection is critical for effective treatment. Additionally, AI contributes to screening programs by enabling automated and scalable analysis, which improves access to diagnostic services, especially in resource-limited settings.

AI has also demonstrated strong capabilities in predictive analytics. By integrating patient history, laboratory results, and genetic information, AI models can identify individuals at high risk of developing certain diseases, such as cardiovascular disorders and diabetes. This predictive power supports preventive healthcare strategies and allows for early intervention, ultimately reducing disease burden and healthcare costs.

Despite these promising results, several challenges remain. One of the key issues is the dependency on large, high-quality datasets for training AI models. Incomplete, biased, or unrepresentative data can lead to inaccurate predictions and

limit the generalizability of AI systems. Furthermore, the lack of interpretability in many AI models—the so-called “black box” problem—poses a challenge for clinical adoption, as healthcare professionals require transparent and explainable decision-making processes.

Ethical and legal considerations also play a crucial role in the discussion. Ensuring patient data privacy and security is essential, particularly when handling sensitive medical information. Moreover, questions regarding accountability in AI-assisted diagnosis remain unresolved, especially in cases of misdiagnosis or system failure. Regulatory frameworks and standardization are still evolving, which can slow down the integration of AI technologies into routine clinical practice.

In summary, the results indicate that AI significantly enhances disease detection by improving diagnostic accuracy, speed, and predictive capabilities. However, to fully realize its potential, it is necessary to address existing limitations related to data quality, transparency, ethics, and regulation. Continued research and interdisciplinary collaboration will be essential for the successful implementation of AI in medical diagnostics.

Conclusion

Artificial intelligence has demonstrated a profound impact on disease detection in modern medicine, significantly enhancing the accuracy, speed, and efficiency of diagnostic processes. By utilizing advanced techniques such as machine learning and deep learning, AI systems are capable of analyzing complex medical data and identifying diseases at early stages, which is critical for improving patient outcomes and reducing mortality rates. The integration of AI into medical diagnostics also supports clinical decision-making, minimizes human error, and expands access to healthcare services, particularly in underserved regions.

Despite these advantages, several challenges must be addressed to ensure the safe and effective use of AI in disease detection. Issues related to data quality, algorithm transparency, ethical concerns, and regulatory compliance remain key barriers to widespread adoption. Additionally, the need for rigorous clinical validation and the development of standardized guidelines is essential for building trust among healthcare professionals and patients.

In conclusion, AI holds great promise for revolutionizing disease detection and shaping the future of healthcare. With continued advancements in technology, improved data governance, and strong interdisciplinary collaboration, artificial intelligence is expected to play an increasingly vital role in enabling early diagnosis, personalized medicine, and more efficient healthcare systems.

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DEVELOPMENT AND APPLICATION OF ARTIFICIAL INTELLIGENCE-BASED MEDICAL DECISION-MAKING SYSTEMS

Abstract: *The rapid development of digital technologies has significantly transformed modern healthcare, particularly in the field of medical decision-making. Artificial intelligence-based medical decision-making systems are increasingly being used to support physicians in diagnosis, treatment planning, disease prediction, and patient monitoring. These systems employ methods of Machine Learning, Deep Learning, and data analysis to process large volumes of clinical information obtained from electronic medical records, medical imaging, and laboratory tests.*

The purpose of this study is to examine the principles of developing and applying artificial intelligence-based medical decision-making systems in healthcare institutions. The article analyzes the main stages of system development, including data collection, preprocessing, algorithm selection, model training, validation, and integration into clinical practice. Special attention is given to the advantages of such systems, including increased diagnostic accuracy, reduced risk of medical errors, faster decision-making, and personalized treatment strategies.

At the same time, the study highlights several challenges associated with the implementation of these technologies, such as data security, ethical concerns, algorithm transparency, and the need for regulatory frameworks. The findings indicate that artificial intelligence-based medical decision-making systems have strong potential to improve the quality and efficiency of healthcare services and may become an essential component of future digital medicine.

Keywords: *Artificial Intelligence; Medical Decision-Making Systems; Clinical Decision Support Systems; Machine Learning; Deep Learning; Healthcare Informatics; Electronic Health Records; Medical Data Analysis; Diagnostic Accuracy; Personalized Medicine.*

Introduction

The continuous growth of medical data and the increasing complexity of clinical practice have created a strong need for advanced technologies capable of supporting healthcare professionals in decision-making processes. Modern healthcare institutions generate vast amounts of information from electronic medical records, laboratory results, medical imaging, genomic data, and patient monitoring systems. The effective interpretation of these data is often difficult due to their large volume, diversity, and rapid accumulation. Consequently, physicians may face challenges in making timely and accurate decisions, particularly in situations requiring urgent diagnosis or complex treatment planning.

In recent years, Artificial Intelligence has emerged as one of the most promising technologies for improving the quality of medical services. Artificial intelligence-based medical decision-making systems are designed to assist physicians by analyzing clinical data, identifying hidden patterns, predicting disease progression, and recommending optimal treatment strategies. Unlike traditional clinical information systems, these intelligent systems are capable of learning from previous cases and continuously improving their performance through the application of Machine Learning and Deep Learning methods.

The concept of medical decision support systems first appeared in the second half of the twentieth century. Early systems were mainly rule-based and relied on predefined knowledge provided by medical experts. One of the first well-known examples was MYCIN, developed in the 1970s to assist in diagnosing bacterial infections and recommending antibiotics. Although such systems demonstrated the potential of computerized decision support, their capabilities were limited by the inability to process large datasets and adapt to new clinical situations. The development of artificial intelligence and the availability of large-scale healthcare databases have significantly expanded the possibilities of medical decision-making systems.

Today, artificial intelligence is actively used in various medical fields, including radiology, cardiology, oncology, neurology, and emergency medicine. For example, AI algorithms can analyze medical images to detect tumors, classify skin lesions, identify signs of cardiovascular diseases, and predict the likelihood of complications. In radiology, deep neural networks have demonstrated diagnostic accuracy comparable to that of experienced specialists in detecting diseases from X-ray, CT, and MRI images. Similarly, in cardiology, machine learning models are widely applied for predicting heart disease risk and interpreting electrocardiogram signals.

The increasing use of electronic health records has further accelerated the development of intelligent decision-making systems. By integrating patient history, laboratory results, and imaging data into a single platform, these systems provide physicians with comprehensive and evidence-based recommendations. Such technologies are particularly valuable in hospitals with high patient loads, where rapid and accurate decision-making is essential. In addition, artificial

intelligence contributes to the development of personalized medicine by enabling treatment plans tailored to the individual characteristics of each patient.

Despite these advantages, the implementation of artificial intelligence-based medical decision-making systems remains associated with several important challenges. The reliability of AI models depends heavily on the quality and completeness of the available medical data. Inaccurate or biased data may lead to incorrect recommendations and potentially harmful clinical decisions. Moreover, the use of patient data raises issues related to privacy, cybersecurity, and ethical responsibility. Another major problem is the limited transparency of many AI algorithms, often referred to as the “black box” effect, which makes it difficult for physicians to understand how a particular recommendation has been generated.

In addition, healthcare professionals may be reluctant to rely on artificial intelligence due to a lack of trust, insufficient technical knowledge, or concerns about losing professional autonomy. Therefore, the successful implementation of such systems requires not only technological development but also legal regulation, staff training, and the establishment of ethical standards. International organizations such as the World Health Organization and the Food and Drug Administration are already developing recommendations and regulatory approaches for the safe use of AI technologies in healthcare.

The purpose of this article is to investigate the principles of developing and applying artificial intelligence-based medical decision-making systems, to analyze their advantages and limitations, and to determine their role in improving the quality and effectiveness of modern healthcare.

Results and Discussion

The analysis of modern artificial intelligence-based medical decision-making systems demonstrates that their implementation significantly improves the quality, speed, and accuracy of clinical decisions. The obtained results indicate that intelligent systems are capable of processing large volumes of heterogeneous medical information and transforming them into clinically useful recommendations. In comparison with conventional decision support methods, AI-based systems provide a higher level of diagnostic precision and reduce the probability of human error.

One of the most important findings is the high diagnostic performance of systems based on Machine Learning and Deep Learning algorithms. In radiology, deep neural networks have shown strong effectiveness in detecting tumors, fractures, and pulmonary diseases from X-ray, CT, and MRI images. Several studies demonstrate that AI models can identify early signs of disease with an accuracy comparable to or even exceeding that of experienced radiologists. For example, intelligent image analysis systems are capable of recognizing subtle abnormalities that may be overlooked during routine examination. This contributes to earlier diagnosis and more effective treatment.

The use of AI-based decision-making systems in cardiology has also produced positive results. Algorithms trained on electrocardiographic data, laboratory indicators, and patient history can predict the risk of cardiovascular

diseases, arrhythmias, and postoperative complications. In particular, machine learning models have demonstrated high sensitivity in identifying patients at risk of heart failure and myocardial infarction. As a result, physicians can initiate preventive measures at earlier stages and reduce the likelihood of severe outcomes.

In oncology, artificial intelligence systems assist physicians in selecting the most appropriate treatment strategy for individual patients. By analyzing tumor characteristics, genetic markers, and previous treatment outcomes, AI systems support personalized therapy planning. This approach is closely related to the principles of Personalized Medicine and allows healthcare providers to choose more effective therapeutic interventions while minimizing unnecessary side effects. In some cases, AI algorithms are used to predict the probability of recurrence and patient survival, which improves long-term disease management.

The study also revealed that the integration of intelligent systems with electronic health records increases the efficiency of healthcare organizations. AI-based systems can automatically analyze large datasets stored in electronic records and generate recommendations for diagnosis, treatment, and monitoring. This reduces the time required for clinical documentation and allows physicians to focus more on direct patient care. Furthermore, automated alerts and reminders help prevent medication errors, missed diagnoses, and delays in treatment.

An important advantage of AI-based medical decision-making systems is their ability to support clinical work in emergency situations. In intensive care units and emergency departments, such systems rapidly analyze vital signs and laboratory results to predict the deterioration of a patient’s condition. Early warning models are particularly effective in identifying the risk of sepsis, respiratory failure, and cardiac arrest. Rapid identification of critical conditions improves patient survival and reduces the burden on healthcare personnel.

Despite these positive results, the discussion shows that several limitations continue to hinder the widespread implementation of artificial intelligence in medical decision-making. One of the primary problems is the dependence of AI algorithms on the quality and representativeness of medical data. If training datasets contain incomplete, outdated, or biased information, the resulting model may generate inaccurate recommendations. For example, systems trained on data from a limited population may perform poorly when applied to patients of different age groups, ethnic backgrounds, or geographic regions.

Another important issue is the lack of transparency in many AI algorithms. Complex neural networks often operate as “black box” systems, making it difficult for physicians to understand the reasons behind a specific recommendation. This reduces trust in the technology and may limit its acceptance in clinical practice. To address this challenge, researchers increasingly focus on the development of explainable artificial intelligence, which aims to make the decision-making process more understandable and interpretable for healthcare professionals.

The implementation of AI-based systems also raises serious ethical and legal concerns. The collection and processing of sensitive patient data require

strict protection mechanisms and compliance with healthcare regulations. Unauthorized access to medical records may lead to violations of patient privacy and confidentiality. Moreover, the question of responsibility remains unresolved: if an AI system produces an incorrect recommendation that harms a patient, it is unclear whether responsibility belongs to the physician, the software developer, or the healthcare institution.

International organizations and regulatory agencies have begun to address these challenges. The World Health Organization has emphasized the importance of transparency, fairness, accountability, and data security in the implementation of AI technologies. Similarly, the Food and Drug Administration has introduced frameworks for evaluating and approving AI-driven medical software. These measures are expected to increase trust in artificial intelligence and facilitate its safe integration into healthcare practice.

The discussion confirms that artificial intelligence should not replace physicians but rather function as an additional tool for supporting clinical decisions. The most effective approach is the collaboration between healthcare professionals and intelligent systems. Physicians provide clinical experience, ethical judgment, and communication with patients, while AI contributes rapid data analysis and evidence-based recommendations. Such cooperation creates the conditions for more accurate, efficient, and patient-centered healthcare.

Conclusion

In conclusion, the development and application of artificial intelligence-based medical decision-making systems represent one of the most significant directions in the digital transformation of healthcare. The study has shown that these systems are capable of improving diagnostic accuracy, accelerating clinical decision-making, reducing the number of medical errors, and supporting personalized treatment strategies. By processing large volumes of clinical information obtained from electronic health records, laboratory tests, and medical imaging, AI technologies provide physicians with valuable recommendations that enhance the overall quality of medical care.

The findings indicate that methods of Machine Learning and Deep Learning are particularly effective in such fields as radiology, cardiology, oncology, and emergency medicine. Their integration into clinical practice contributes to earlier disease detection, more accurate prognosis, and better management of patients with complex medical conditions. In addition, AI-based decision-making systems reduce the administrative burden on healthcare professionals and improve the efficiency of healthcare institutions.

At the same time, the successful implementation of these technologies depends on overcoming several important challenges. The reliability of AI systems is closely related to the quality and completeness of the medical data used for training and validation. Problems associated with algorithm transparency, ethical responsibility, data privacy, and legal regulation remain major barriers to widespread adoption. Therefore, future research should focus on the development

of explainable and secure AI models, as well as on the creation of international standards for their safe use in healthcare.

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MENTAL ARIFMETIKA DARSLARIDA INTERAKTIV METODLAR: DIDAKTIK IMKONIYATLAR VA NATIJALAR

Annotatsiya: *Ushbu maqolada mental arifmetika darslarida interaktiv metodlardan foydalanishning didaktik imkoniyatlari va natijalari yoritilgan. Interaktiv metodlar orqali o‘quvchilarda aqliy hisoblash, mantiqiy tafakkur, e’tibor va mustaqil fikrlash ko‘nikmalari rivojlanadi. Prezident qarorlariga tayangan holda zamonaviy ta’lim jarayonida mental arifmetikaning ahamiyati, undan samarali foydalanish usullari va amaliy tavsiyalar tahlil qilingan.*

Kalit so‘zlar: *Mental arifmetika, interaktiv metodlar, boshlang‘ich ta’lim, didaktik imkoniyatlar, raqamli texnologiyalar, aqliy hisoblash, mantiqiy tafakkur, o‘quv faoliyati.*

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INTERACTIVE METHODS IN MENTAL ARITHMETIC LESSONS: DIDACTIC OPPORTUNITIES AND OUTCOMES

Annotation: *This article explores the didactic potential and outcomes of using interactive methods in mental arithmetic lessons. It highlights how such methods enhance students’ skills in mental calculation, logical thinking, attention, and independent reasoning. Based on presidential decrees, the paper discusses the relevance of mental arithmetic in modern education and offers practical recommendations for its effective implementation.*

Keywords: *Mental arithmetic, interactive methods, primary education, didactic opportunities, digital technologies, mental calculation, logical thinking, learni*

Bugungi kunda ta‘lim sohasida yuz berayotgan islohotlar asosiy e‘tiborni o‘quvchilar tafakkurini rivojlantirishga, ularning intellektual salohiyatini oshirishga va zamonaviy o‘quv uslublarini amaliyotga tatbiq etishga qaratmoqda. Shu muqtayi nazardan, mental arifmetika boshlang‘ich sinf o‘quvchilarining matematik tafakkurini shakllantirishda dolzarb metod sifatida qaralmoqda. Mental arifmetika — bu qadimiy abakus (soroban) asbobida hisoblash orqali inson miyasining intellektual qobiliyatlarini rivojlantirish tizimidir. Interaktiv metodlar bu jarayonda neyroplastiklikni faollashtiruvchi katalizator vazifasini o‘taydi. Bu darslarda interaktiv usullardan foydalanish nafaqat didaktik samaradorlikni oshiradi, balki o‘quvchilarda mustaqil fikrlash, tezkor hisoblash va mantiqiy tahlil qilish ko‘nikmalarini ham shakllantiradi. Mental arifmetika maxsus metodika

orqali o‘quvchilarni aqliy hisoblashga orgatish tizimi bo‘lib, uning asosida abakus vositasi yotadi. Aqliy tasavvur asosida matematik amallarni bajarish orqali o‘quvchilarning ikki yarim sharsimon miya faoliyatini uyg‘unlashtirishga erishiladi. Bu esa nafaqat hisoblash ko‘nikmalarini, balki mantiqiy fikrlash, eslab qolish, tasavvur qilish, konsepsiyasini rivojlantiradi. Mental arifmetikaning zamonaviy ta‘limdagi o‘rni Prezidentimiz Sh.M.Mirziyoyevning 2022-yil 28-fevraldagi PQ-134-sonli qarori-“2022-2026-yillarda O‘zbekiston respublikasida raqamli ta‘limni rivojlantirish konsepsiyasini tasdiqlash to‘g‘risida” gi qarorida ham aks etgan. Unda raqamli texnologiyalar yordamida ta‘lim sifatini oshirish qarorida ham aks etgan. Unda raqamli texnologiyalar yordamidae ta‘lim sifatini oshirish va o‘quvchilar tafakkurini rivojlantirish chora-tadbirlari belgilangan. Mental arifmetika darslarida interaktiv metodlarni qo‘llash nafaqat hisoblash tezligini oshiradi, balki o‘quvchining kognitiv salohiyatini kompleks rivojlantirishga xizmat qiladi. Asosiy maqsad: Chap yarim shar (mantiqiy hisoblash) va o‘ng yarim shar (abakus toshlarini vizual tasavvur qilish) o‘rtasida barqaror neyrall bog‘lanishni shakllantirish. Dolzarbligi: Zamonaviy ta'limda raqamli texnologiyalar va o'yin texnologiyalarini integratsiya qilish o'quvchi motivatsiyasini 2-3 barobargacha oshirishi isbotlangan. Interaktiv dars jarayonida quyidagi metodik vositalar keng qo'llaniladi: Mental arifmetikada o‘yin shunchaki ko‘ngilochar vosita emas, balki didaktik qurol hisoblanadi. Interaktiv metodlar bir vaqtning o‘zida barcha sezgi a'zolarini faollashtiradi:

Vizual: Ekranda sonlar va abakus tasviri.

Auditorial: Sonlarni eshitish orqali idrok etish (Dictation).

Kinestetik: Barmoqlarning mayda motorikasi orqali abakus toshlarini manipulyatsiya qilish. O'quvchilar juftlikda ishlaydi: biri sonlarni aytadi, ikkinchisi hisoblaydi. Bu jarayonda nafaqat matematik, balki kommunikativ kompetensiyalar ham rivojlanadi. Flash Anzan: Ekranda sonlarning juda yuqori tezlikda (0.3 - 0.7 soniya) paydo bo'lishi va yo'qolishi. Bu metod vizual diqqatni maksimal darajada jamlaydi. Maqsadli musobaqalar: "Eng tezkor hisobchi", "Raqamlar jangi" kabi o'yinlar stressli vaziyatda ham aniq hisoblash ko'nikmasini shakllantiradi. Mental arifmetika mashg‘ulotlarida quyidagi interaktiv metodlar keng qo‘llanishi mumkin: Gamifikatsiya(o‘yinlashtirish) raqamli o‘yinlar orqali aqliy hisoblashni rag‘batlantirish. Vizual stimullar asosida mashg‘ulotlar: abakusning virtual modellaridan foydalanish. Blits- testlar: tezkor savol-javoblar yordamida fikrlash chaqqonligini aniqlash. Jamoaviy muhokama: kichik guruhlarda masala yechish orqali muloqot va tanqidiy fikrni rivojlantirish. Interaktiv metodlar asosida tashkil etilgan darslar an'anaviy darslardan quyidagi ko'rsatkichlar bilan farq qiladi: Ko'rsatkich Natija tavsifi. Kognitiv rivojlanish Konsentratsiya va ishchi xotira (working memory) hajmining kengayishi. Matematik tezkorlik Kalkulyator tezligidan yuqori darajada hisoblash qobiliyati. Ijodiy fikrlash Tasavvur qilish (vizualizatsiya) orqali muammolarga kreativ yechim topish. O‘ziga ishonch Murakkab misollarni oson yechish orqali o'quvchida "Men qila olaman" hissining shakllanishi. Mental arifmetika darslarida interaktiv metodlar

1. “Tezkor savol-javob” metodi. Bu metodda o‘qituvchi qisqa vaqt ichida tezkor misollar beradi, o‘quvchilar esa darhol javob qaytaradilar. Didaktik imkoniyati: Diqqatni kuchaytiradi. Tez fikrlashni rivojlantiradi . Xotirani mustahkamlaydi.

2. “Raqamli zanjir” metodi. O‘quvchilar ketma-ket ravishda hisoblashni davom ettiradilar (masalan: +2, -3, +5). Didaktik imkoniyati: Mantiqiy ketma-ketlikni tushunish. E’tibor va konsentratsiyani rivojlantirish. Jamoada ishlash ko‘nikmasi.

3. “Abakus bilan interaktiv ishlash” Abakus (soroban) vositasidan foydalanib, o‘quvchilar vizual va amaliy hisoblashni bajaradilar. Didaktik imkoniyati: Ko‘rish va tasavvur qilish orqali o‘rganish. Hisoblash tezligini oshirish. Ikki yarim sharli miya faoliyatini faollashtirish.

4. “Kim tezroq?” musobaqa metodi. O‘quvchilar o‘rtasida tez hisoblash bo‘yicha kichik bellashuv tashkil etiladi. Didaktik imkoniyati: Motivatsiyani oshiradi. Raqobatbardoshlikni shakllantiradi. Faollikni kuchaytiradi

5. “Muammoli vaziyat” metodi. O‘quvchilarga hayotiy matematik muammolar beriladi. Didaktik imkoniyati: Tanqidiy fikrlashni rivojlantiradi. Mustaqil yechim topishga o‘rgatadi. Matematikani hayot bilan bog‘laydi. Interaktiv metodlarning didaktik imkoniyatlari. Mental arifmetika darslarida interaktiv metodlar quyidagi didaktik imkoniyatlarni yaratadi: O‘quvchilarning faolligini oshiradi. Tez va aniq hisoblash ko‘nikmalarini shakllantiradi. Diqqat va xotirani mustahkamlaydi. Mantiqiy va analitik fikrlashni rivojlantiradi. Individual va guruhda ishlash malakasini shakllantiradi. O‘qishga qiziqishni oshiradi. Kutiladigan natijalar Interaktiv metodlar qo‘llanilganda quyidagi natijalarga erishiladi: O‘quvchilarning hisoblash tezligi sezilarli darajada oshadi. Matematikaga qiziqish kuchayadi. Dars jarayonida faollik ortadi. Xatolar soni kamayadi. Mustaqil fikrlash rivojlanadi. O‘quvchilar o‘ziga ishonch hosil qiladi

Bu metodlar o‘quvchilarda ko‘p misollarni tezkor yecha olishni o‘rganadi-ya‘ni ko‘z, quloq va tasavvur orqali bilim o‘zlashtiradilar. Mental arifmetikaning didaktik imkoniyatlarga tayangan holda tashkil etishlik bola uchun e’tibor, xotira salohiyatini rivojlantirish, tezkorlik, aniqlik, raqamlar bilan ishlashga nisbatan ijobiy munosabat hosil qiladi. O‘zbekiston Prezidentining 2023-yil 13-apreldagi PQ-128-sonli qarorida o‘quvchilarni zamonaviy ta‘lim texnologiyalari orqali o‘qitish, ijodiy fikrlashga yo‘naltirish chora-tadbirlarini belgilab boradi. Toshkent, Samarqand, Namangan viloyatlaridagi boshlang‘ich sinf o‘quvchilari bilan olib borilgan tajribaviy mashg‘ulotlar shuni ko‘rsatadiki, mental arifmetika darslarida interaktiv metodlardan foydalanilgan sinflarda o‘quvchilarning :

- ❖ 80% da aqliy hisoblash tezligi oshgan
- ❖ 75% da mantiqiy fikrlash ko‘nikmalari rivojlangan.
- ❖ 65% da ishtirok faolligi va o‘zlashtirish darajasi yaxshilangan.

Bu natijalar xalqaro PISA(Programme for International Student Assessment) mezonlariga yaqinlashish yo‘lida bosqichma-bosqich yondashuv zarurligini namoyon etib bormoqda. Mental arifmetika darslarida interaktiv metodlardan foydalanish orqali nafaqat matematik ko‘nikmalar, balki keng

qamrovli intellektual salohiyat rivojlanadi. Bu metodlarni amaliyotga joriy etish uchun:

- O‘quvchilarni maxsus treninglarda tayyorlash,
- Abakus va raqamli vositalarni ta‘minlash
- Davlat dasturlariga mental arifmetika modullarini kiritish
- Pedagogik universitetlarda ushbu soha bo‘yicha maxsus kurslar tashkil etish zarur.

Kelajak avlodning raqamli va analitik tafakkurga ega bo‘lishi zamonaviy O‘zbekistonning ta‘lim strategiyasining ustuvor yo‘nalishidir.

Yuqoridagi tahlillar shuni ko‘rsatadiki, mental arifmetika darslarida interaktiv metodlardan foydalanish ta’lim samaradorligini sezilarli darajada oshiradi. An’anaviy o‘qitish usullaridan farqli ravishda, interaktiv metodlar o‘quvchini markazga qo‘yadi va uni bilimni tayyor holda qabul qiluvchi emas, balki faol ishtirokchi sifatida shakllantiradi. Interaktiv yondashuv asosida tashkil etilgan darslar o‘quvchilarning nafaqat hisoblash tezligini, balki ularning diqqat, xotira, mantiqiy va ijodiy fikrlash qobiliyatlarini ham kompleks ravishda rivojlantiradi. Ayniqsa, abakus bilan ishlash, tezkor savol-javoblar, musobaqa elementlari va muammoli vaziyatlar orqali tashkil etilgan mashg‘ulotlar o‘quvchilarning ikki yarim shar faoliyatini uyg‘unlashtirib, ularning intellektual salohiyatini oshiradi.

Shuningdek, interaktiv metodlarning yana bir muhim jihati — bu o‘quvchilarda o‘ziga ishonchni shakllantirish va ichki motivatsiyani kuchaytirishdir. Dars jarayonida faol qatnashgan o‘quvchi o‘z natijasini darhol ko‘radi, bu esa uni yanada faolroq bo‘lishga undaydi. Natijada o‘quvchilarda raqobatbardoshlik, mustaqil qaror qabul qilish va muammoli vaziyatlarda to‘g‘ri yo‘l tanlash ko‘nikmalari rivojlanadi.

Bundan tashqari, interaktiv metodlar differensial yondashuvni amalga oshirishga ham keng imkoniyat yaratadi. Ya’ni, o‘qituvchi bir vaqtning o‘zida turli darajadagi o‘quvchilar bilan samarali ishlay oladi. Bu esa ayniqsa katta guruhlarda dars olib borishda muhim ahamiyatga ega.

Tadqiqotlar va amaliy kuzatishlar shuni ko‘rsatadiki, interaktiv metodlar qo‘llanilgan darslarda: o‘quvchilarning o‘zlashtirish darajasi yuqori bo‘ladi, xatolar soni kamayadi, darsga bo‘lgan qiziqish ortadi, bilimlar uzoq muddat saqlanadi. Xulosa qilib aytganda, mental arifmetika darslarida interaktiv metodlardan tizimli va maqsadli foydalanish nafaqat o‘quvchilarning matematik bilimlarini mustahkamlaydi, balki ularni har tomonlama rivojlangan, tez fikrlovchi va raqobatbardosh shaxs sifatida shakllantirishga xizmat qiladi. Shu sababli, zamonaviy ta’lim jarayonida interaktiv metodlarni keng joriy etish va ularni amaliyotda samarali qo‘llash dolzarb vazifalardan biri hisoblanadi.

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FUTBOL O’YINIDA XUJUM TAKTIKASINI SAMARALI TAKOMILLASHTIRISH

Annotatsiya: *Ushbu maqolada futbol o‘yinida hujum taktikasini takomillashtirish masalalari tahlil qilinadi. Asosiy e’tibor o‘yinchilarning texnik ko‘nikmalarini rivojlantirish, jamoaviy uyg‘unlikni ta’minlash va moslashuvchan taktikalarni qo‘llashga qaratilgan. Shuningdek, samarali kommunikatsiya, zamonaviy texnologiyalar (video tahlil va statistika)dan foydalanish hamda psixologik tayyorgarlikning hujum samaradorligiga ta’siri yoritiladi. Tadqiqot natijalari shuni ko‘rsatadiki, ushbu omillarni kompleks qo‘llash jamoaning hujumkor o‘yinini kuchaytirish va umumiy natijadorligini oshirishga xizmat qiladi.*

Kalit so‘zlar: *hujum taktikasi, futbol o’yini, jamoa, strategik rejalashtirish, himoya chizig'i, raqib.sport.*

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IMPROVING THE EFFECTIVENESS OF ATTACKING TACTICS IN FOOTBALL

Annotation. *This article analyzes the issues of improving attacking tactics in football. The main focus is on developing players’ technical skills, ensuring team coordination, and applying flexible tactical approaches. It also examines the impact of effective communication, the use of modern technologies (video analysis and statistics), and psychological preparation on the effectiveness of attacking actions. The results of the study show that the comprehensive application of these factors contributes to strengthening the team’s attacking play and increasing its overall performance.*

Keywords: *attacking tactics, football, team, strategic planning, defensive line, opponent, sport.*

Futbol o‘yinida hujum taktikasini samarali takomillashtirish jarayonida, eng avvalo, o‘yinchilarning texnik ko‘nikmalarini yuqori darajada rivojlantirish muhim ahamiyat kasb etadi. Har bir o‘yinchi to‘p bilan erkin va ishonchli ishlay olishi, aniq va tezkor paslar bera bilishi, darvozaga kuchli va nishonga yo‘naltirilgan zarbalar yo‘llashi, shuningdek, murakkab vaziyatlarda dribling orqali raqibni ortda qoldira olishi zarur. Aynan mana shu asosiy texnik

koʻnikmalar oʻyinchilarning oʻz pozitsiyalarida toʻpni qanchalik samarali nazorat qilishlari, oʻyinni boshqarishlari hamda raqib himoyasini yorib oʻtish qobiliyatini belgilab beradi.

Texnik mahoratni muntazam ravishda rivojlantirib borish uchun jamoa tizimli va rejalashtirilgan mashgʻulotlar olib borishi lozim. Bu jarayonda turli xil murakkablik darajasiga ega boʻlgan mashqlar, individual va jamoaviy topshiriqlar qoʻllanilib, oʻyinchilarning tezkor fikrlash, vaziyatni baholash va toʻgʻri qaror qabul qilish qobiliyatlari ham takomillashtiriladi. Bundan tashqari, oʻyinchilar oʻzaro sogʻlom raqobat muhitida shugʻullanish orqali nafaqat texnik, balki taktik jihatdan ham oʻsishga erishadilar.

Hujum taktikasini moslashuvchan tarzda tashkil etish ham muhim omillardan biridir. Masalan, agar raqib jamoa himoyani zich va tartibli tarzda tashkil etsa, bunday vaziyatda qisqa va tezkor paslar almashinuvi, kombinatsion oʻyin hamda uzoq masofadan aniq zarbalar berish orqali hujumni davom ettirish maqsadga muvofiq boʻladi. Shu bilan birga, oʻyinchilarning maydondagi oʻzaro muloqoti, bir-birini tushunishi va hamkorlikda harakat qilishi hujum samaradorligini yanada oshiradi. Aynan samarali kommunikatsiya va jamoaviy uygʻunlik orqali oʻyinchilar eng maqbul taktik yechimlarni topa oladilar va oʻyinning borishini oʻz foydalariga hal qilish imkoniyatiga ega boʻladilar.

Oʻzgaruvchan va moslashuvchan taktikalar jamoaning raqibga qarshi kurashish jarayonida ustunlikka erishishida muhim omil hisoblanadi. Bunday yondashuv oʻyin davomida vaziyatga qarab tezda qaror qabul qilish, hujum yoʻnalishini oʻzgartirish va raqibning himoya tizimiga moslashish imkonini beradi. Ayniqsa, turli taktik sxemalarni qoʻllash orqali jamoa oʻz oʻyin uslubini boyitadi va raqibni noqulay holatga tushiradi.

Shu bilan birga, oʻyinchilar oʻrtasidagi samarali kommunikatsiya va oʻzaro muomala hujum taktikasining muvaffaqiyatli amalga oshirilishida hal qiluvchi rol oʻynaydi. Oʻyin davomida doimiy ravishda muloqot qilish, bir-biriga takliflar berish, vaziyatni tezkor baholash va oʻzaro qoʻllab-quvvatlash jamoaning uygʻun harakatlanishini ta’minlaydi. Bunday hamkorlik natijasida oʻyinchilar maydonda bir-birini yaxshiroq tushunadi va murakkab vaziyatlarda eng maqbul qarorlarni tezda qabul qila oladi.

Oʻzaro fikr almashish va tajriba ulashish orqali har bir oʻyinchi nafaqat oʻz rolini chuqur anglaydi, balki jamoaning umumiy taktikasini ham toʻliq tushunib yetadi. Bu esa jamoaning umumiy muvofiqligini va oʻyindagi barqarorligini sezilarli darajada oshiradi. Har bir oʻyinchi oʻz pozitsiyasida qanday harakat qilishini aniq bilishi, zarur paytda esa sheriklari bilan samarali aloqa oʻrnatib, jamoaviy strategiyani amalga oshirishga faol hissa qoʻshishi lozim.

Futbol oʻyinida hujum taktikasining samaradorligi, avvalo, oʻyinchilarning texnik tayyorgarlik darajasi bilan bevosita bogʻliq hisoblanadi. Ilmiy tadqiqotlar shuni koʻrsatadiki, toʻp bilan ishlash, aniq pas berish va zarba yoʻllash koʻnikmalari yuqori darajada rivojlangan futbolchilar oʻyin davomida toʻpni yoʻqotish holatlarini sezilarli darajada kamaytiradi va hujum yakunlanish samaradorligini oshiradi (Abdullayev, 2019). Shu sababli texnik tayyorgarlikni

rivojlantirish hujum taktikasini takomillashtirishning asosiy shartlaridan biri sifatida qaraladi.

Bundan tashqari, jamoaviy o‘zaro hamkorlik va koordinatsiya darajasi ham hujum natijadorligiga sezilarli ta’sir ko‘rsatadi. Qodirov (2020) ta’kidlaganidek, o‘yinchilar o‘rtasidagi samarali kommunikatsiya va o‘zaro tushunish darajasi yuqori bo‘lgan jamoalarda kombinatsion hujumlar soni va golga olib keluvchi vaziyatlar ko‘proq kuzatiladi. Bu esa jamoaning umumiy taktik uyg‘unligini ta’minlash muhimligini ko‘rsatadi.

Hujum taktikasini moslashuvchan tashkil etish ham zamonaviy futbolning asosiy talablaridan biri hisoblanadi. Murodov (2021) fikriga ko‘ra, raqibning himoya tizimiga moslashgan holda qisqa paslar, tezkor kombinatsiyalar va uzoq masofadan zarbalar qo‘llash hujum samaradorligini oshirishga xizmat qiladi. Bu esa o‘yinchilardan yuqori darajadagi taktik tafakkur va tezkor qaror qabul qilish qobiliyatini talab etadi.

Zamonaviy texnologiyalar, xususan, videoanaliz va statistik tahlil vositalaridan foydalanish ham hujum taktikasini takomillashtirishda muhim omil sifatida e’tirof etiladi. Tadqiqot natijalari shuni ko‘rsatadiki, video tahlil orqali o‘yinchilarning xatolarini aniqlash va ularni bartaraf etish jarayoni hujum samaradorligini sezilarli darajada oshiradi (Karimov, 2022). Bu usul o‘yinchilarning o‘z-o‘zini tahlil qilish ko‘nikmalarini rivojlantirishga ham yordam beradi.

Shuningdek, psixologik tayyorgarlik ham hujum taktikasining muvaffaqiyatli amalga oshirilishida muhim rol o‘ynaydi. Ismoilov (2018)ga ko‘ra, o‘ziga ishonch darajasi yuqori bo‘lgan futbolchilar murakkab o‘yin vaziyatlarida ham to‘g‘ri qaror qabul qilishga moyil bo‘ladi. Bu esa jamoaning umumiy o‘yin samaradorligiga ijobiy ta’sir ko‘rsatadi.

Xulosa qilib, futbol o'yinida hujum taktikasini takomillashtirish uchun o'yinchilarning texnik ko'nikmalarini rivojlantirish, jamoaviy muvofiqlikni ta'minlash, raqibning zaif tomonlaridan foydalanish, o'zgaruvchan taktikalarni qo'llash, kommunikatsiyani kuchaytirish, zamonaviy texnologiyalarni qo'llash va psixologik tayyorgarlikni kuchaytirish zarur. Bularning barchasi o'zaro bog'liq bo'lib, jamoaning umumiy muvaffaqiyatini oshirishga xizmat qiladi. Hujum taktikalarini takomillashtirish orqali jamoa o'z o'yinini yanada samarali va muvaffaqiyatli qilish imkoniyatiga ega bo'ladi. Har bir o'yinchining hissasi, jamoaning umumiy strategiyasida muhim ahamiyatga ega bo'lib, bu jarayondavomida har bir o'yinchi o'z rolini yaxshi bajarishi va raqibga qarshi muvaffaqiyatli kurash olib borishi kerak.

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QASHQADARYO VILOYATIDA AGROTURIZM RESURSLARI GEOGRAFIYASI

Annotatsiya: *maqolada Qashqadaryo viloyatida agroturizm tashkil yetishda tabiiy va boshqa ijtimoiy-iqtisodiy resurslarining geografik xususiyatlari haqida bayon etilgan. Qashqadaryo viloyatida agroturizmni tashkil yetishda ziyorat turizmi, tog` turizmi, yekoturizmni o`rni hamda turistik marshrutlar va ularni rivojlantirish masalalari yoritilgan.*

***Kalit so`zlar:*** *agroturizm, ziyorat turizmi, tog` turizmi, ekoturizm, fermerlik, gastronomik, dala hovli turizmi, qo`riqxona, sayyohlik marshruti.*

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GEOGRAPHY OF AGROTURISM RESOURCES IN KASHKADARYA REGION

Abstract: *The article describes the geographical features of natural and other socio-economic resources in the organization of agrotourism in the Kashkadarya region. The role of pilgrimage tourism, mountain tourism, ecotourism in the organization of agrotourism in the Kashkadarya region, as well as the issues of tourist routes and their development are highlighted.*

Keywords: *agrotourism, pilgrimage tourism, mountain tourism, ecotourism, farming, gastronomic, dacha tourism, reserve, tourist route.*

Kirish

Mamlakat qanchalik turli-tuman turistik resurslariga boy bo`lsa, turizmni rivojlantirish shuncha oson kechadi. Ushbu soha mamlakat iqtisodiyotida salmoqli o`rinni egallab, yangi istiqbolli xizmat turlarining shakllanishiga ham sabab bo`lmoqda. Tabiiy sharoiti turlicha bo`lgan, bir vaqtda to`rtta faslni o`zida namoyon etadigan betakror tabiatga ega Qashqadaryo havzasida turizmning barcha turlari qatori agroturizm xususiyatlarini va ularning imkoniyatlarini tadqiq

etish muhim ahamiyat kasb etadi. Qashqadaryo viloyatida agroturizm resurslari va obyektlariga tavsif berish va turistik marshrutlarni tashkil etish tadqiqotning maqsadidan iborat.

Asosiy qism

Keyingi yillarda mamlakatimizda qishloq joylari - agroturizm yo`nalishlarini tashkil etish va rivojlantirish yuzasidan keng islohotlar olib borilmoqda. Jahon turistik tashkiloti ma'lumoti bo'yicha 2020 yilda xalqaro turistlar soni 1,36 mlrdga, 2030 yilda esa 1,8 mlrd kishini tashkil etishi kutilmoqda. [1; C.321-324.; 7;143-147]. Qashqadaryo viloyatining ham turizm va rekreatsion imkoniyatlaridan maksimal foydalanish ustuvor vazifalardan biri hisoblanadi. Qashqadaryo viloyati qadimiy me`moriy yodgorliklar, qadimiy madaniyat durdonalari, hamda takrorlanmas tabiati bilan dunyo sayyohlarini o`ziga jalb qilib kelmoqda. Viloyatda 894 ta madaniy meros obyektlari, shundan 820 ta yodgorlik va 37 ta ansambl ro`yxatga olingan. Ulardan 216 tasi respublika va 678 tasi mahalliy ahamiyatga ega obyektlar hisoblanadi.

Agroturizm - tabiatda tinch va osoyishta dam olish bilan birga qishloq sayohati, ya`ni qishloqda mehnat qilish bilan birga dam olishdir. Bu dam olishning boshqa turlaridan shahar aholisi uchun imkoni bo`lmagan hayot tarziga to`liq moslashiish, o`zini xuddi qishloqning asl aholisidek his qilish imkoniyati bilan ajralib turadi.

Rivojlangan mamlakatlarda ekoturizm, sport turizmi, madaniy turizm kabi turizm turlari bilan agroturizmning turli xil ko`rinishlari shakllangan bo`lib, uning tashkil etilishi amalga oshirilmoqda. Ma`lumki, agroturizm Yevropada taxminan 200 yillik tarixga ega bo`lib, agroturizm assotsiatsiyasi ko`pgina Yevropa mamlakatlarida faol rivojlanib ulgirgan. Jumladan, Belorussiya, Ispaniya, Italiya, Polsha, Fransiya, Norvegiya kabi mamlakatlarda agroturizmning o`ziga xos rivojlanish yo`nalishlari tashkil etilgan. Masalan, Italiyada qishloq xo`jaligi va sayyohlik milliy assotsiatsiyasi "Agriturist" nomi bilan paydo bo`lgan bo`lsa, Fransiyada esa agrosanoat turistlarining birinchi assotsiatsiyasi tashkil etilganligi bilan mashhurdir.

Agroturizm-qishloq joylardagi tabiiy-madaniy va mahalliy resurslaridan foydalangan holda uyushtiriladigan sayohat turi hisoblanadi [2;159 b.]. Qashqadaryo viloyati qishloq joylari o`zining go`zal va betakror tabiati, noyob arxitektura yodgorliklari, muqaddas qadamjolari, milliy urf-odatlari hamda o`ziga xos an`analariga ega. Mazkur omillar xorijiy mamlakatlar aholisini o`ziga jalb etgan holda mamlakat turizm industriyasini rivojlantirish imkonini beradi.

Qashqadaryo viloyati uchun ham agroturizm yangi sohalardan biri hisoblanib, viloyatga keladigan turistlarning tahminan 9-11 %i qishloq joylarga tashrif buyuruvchilar hissasiga to`g`ri keladi. Qashqadaryo viloyati agroturizmni tashkil etish va rivojlantirish uchun Kitob, Shahrisabz, Yakkabog`, Qarshi tumanlarida minglab gektar maydonlarda intensiv bog`lar va klasterlar tashkil etildi. Hududlarda yetishtirilayotgan mevalarni qayta ishlaydigan korxonalar va saqlash imkoniyatiga ega bo`lgan muzlatgichlar hamda quritish qurilmalari tashkil etilgan [5; C. 447-453.].

Qashqadaryo viloyati Kitob tumanida “Varganza” agrosanoat firmasi negizida agroturizm kompleksini tashkil etish va unda anorzorlar va uzumzorlar bo`yicha ekskursiya qilish hamda tayyorlash jarayoni bilan tanishish kabi turlar belgilangan. Bunday komplekslarni tashkil etish imkoniyati viloyatning Qamashi, G`uzor, Chiroqchi, Nishon kabi tumanlaridan ham yuqori hisoblanadi.

Kitob – Shahrisabz botig`i agrosanoatida dorivor giyohlar terish, yong`oq, do`lana, pista kabi mevalar, asalarichilik, ipak qurtini boqish va boshqa yo`nalishlar keng shakllangan. Bundan tashqari Kitob – Shahrisabz botig`ida xalqaro ahamiyatdagi milliy hunarmandchilik markazining va mahalliy ahamiyatdagi diniy turizm obyektlari, arxeologik va arxitektura yodgorliklarining mavjudligi, bu yerda sayyohlikning bir necha turlarini birgalikda va samarali tashkil etish imkoniyatini yaratadi.

Qashqadaryo viloyatining Kitob, Shahrisabz, Yakkabog`, Qarshi, Kasbi, Chiroqchi tumanlarida turizm qishloqlari va turizmning bir qancha yo`nalishlarini rivojlantirsh (ekoturizm, agroturizm, ziyorat turizmi, gastronomik turizm, etnoturizm) imkoniyatlari mavjud. Qashqadaryo viloyati tumanlarining qishloq joylarida diniy, milliy, tarixiy, madaniy, tabiiy, ekologik xarakterga ega bo`lgan turizm yo`nalishlarini rivojlantirishning katta zahiralari mavjud. Jumladan, Qashqadaryo viloyati qishloq joylarida baxshichilik, uloq o`yinlari, o`zbek folklor qo`shiqchilik san`ati, to`y-ma`rakalar, bu joylarda etnoturizmni rivojlanishida muhim omil bo`lib xizmat qiladi [6;176 b.; 7;143-147 б.].

Viloyat agroturizm yo`nalishida turli agrolandshaftlarni, intensiv bog`larni, turli ekin maydonlarini ko`rish, oromgohlar, oshxona va choyxonalar, savdo rastalari, diniy, tarixiy, yozgi va qishki sport turlari o`tkazish mumkin bo``lgan joylar bilan tanishishadi [4; C. 69-71.].

Bundan tashqari asosan kashtachilik bilan dunyoga mashhur Kitob-Shahrisabzda hunarmandchilik turlarining mavjudligi sayyohlar qiziqishini orttiradi [3;176 b.]. Hunarmandchilik turlari qo`l ishi va tabiiy bo`yoqlar asosida shakllantirilgan bo`lib, Kitob, Shahrisabz tumanlarida kashtachilik, to`quvchilik (har xil turdagi sumkalar, joypo`shlar, milliy kiyimlar va b. ), Chiroqchi va Dehqonobod tumanlarida jundan (gilamlar, uy jihozlari va b. ) to`qiladigan va charmdan o`ziga xos uslubda (ot uchun anjomlar va b. ) tayyorlangan buyumlari bilan sayyohlarni o`ziga jalb qiladi. Sayyohlar ularni tayyorlanish jarayonida ishtirok etishlari mumkin. Shuningdek, qashqadaryoliklarning mehmondo`stlik an`analari ham qishloq joylar aholisining betakror udumlaridan biridir. Masalan, Chiroqchi, Qarshi, G`uzor, Dehqonobod tumanlari qishloqlari milliy choyxonalari har doim ham sayyohlarni o`ziga jalb qilib kelgan. Masalan, tandir go`shti, qo`y, echki va tuya sutidan tayyorlanadigan mahsulotlarning tayyorlanish jarayonlarida ishtirok etish hamda tatib ko`rish barcha uchun qiziqdir. Zero, Qashqadaryo viloyati qishloq joylari o`ziga xos gastronomik turizmning asosiy obyekti sifatida nafaqat O`zbekistonga balki dunyoga mashhurdir.

Agroturistlar uchun qo`shimcha ravishda ushbu hududda mavjud ziyorat turizmini rivojlantirish uchun quyidagi yo`nalishlar bo`ylab turlar uyushtirish mumkin. Ayniqsa, 12-18 asrlarga oid tarixiy yodgorliklar, eramizdan oldingi 9-8

asrlarda mavjud bo`lgan «Yerqo`rg`on» shaharchasi qoldiqlari va sharq bozorlari kabi tarixiy hamda me`moriy obidalari mavjud bo`lib, o`tgan yillar davomida ularning aksariyati qayta ta`mirlangan va hozirgi kunda chet el va mahalliy turistlarni o`ziga jalb qiluvchi obyektlardandir [3;176 b.].

Kitob tumanida joylashgan Mirzo Ulug`bek nomidagi Kitob Kenglik stansiyasi va boshqa ko`plab tarixiy joylar kabi sayohatchilarni qirziqtiradi. Qashqadaryoning tog`li qismida Yakkabog` tog`larida, Toshqo`rg`on qishlog`idan 3,5 km janubda noyob paleontologik topilma yura davrida, taxminan 140-150 mln yil ilgari yashagan qadimgi bahaybat kaltakesaklar — dinozavrlarning aniq panja izlari tushgan uchastkalar mavjud. Kitob geologik qo`riqxonasining yura davriga taalluqli qazilma baliqlar va hasharotlarning ko`plab izlari yumshoq qatlamli yotqiziqlar orasidan topilgan [8; 92 b., 4; 69-71 b.]. Bu hududlarda sayohatchilar uchun qadimgi eralarga sayohat qilish imkoni bor. Viloyatning tog`li qismida alpnizmga mos kompleks turistik obyektlar bilan tanishish mumkin.

Qashqadaryo viloyati tumanlarida turizmning eko, shop va ekstremal turlarini rivojlantirish istiqbollari katta. Agrar sohani noan'anaviy turlarini rivojlantirish, tashrif buyurgan turistlarga asalarichilik, ipak qurti boqish, mevali bog'lar, poliz mahsulotlari va boshqa hududning o'ziga xos qishloq xo'jalik mahsulotlarini yetishtirish va ulardan oziq-ovqat turlarini tayyorlanish jarayonlari haqidagi malumotlarni taqdim etishni amalga oshirish zarur. Shuningdek, tumanlaridagi qadimiy tarixiy obidalar, ziyoratgohlarni qayta ta`mirlash, tarixiy va diniy turizmni rivojlantirish, sog`liqni qayta tiklash, noyob o`simlik va hayvonlarga ega bo`lgan tog`larda agroekoturizmni rivojlantirish, mamlakat iqtisodiyotiga qo`shimcha daromad keltiruvchi ishlarni loyihalashtirish maqsadga muvofiq.

Xulosa o`rnida, eng yuqori turizm salohiyatiga ega bo`lgan qishloq joylarda "Turizm mahallasi", "Turizm qishlog`i", "Turizm ovuli" tashkil etilishi belgilab qo`yildi. Binobarin, qishloq joylarning turistik imkoniyatlaridan samarali foydalanish asosida mamlakatda mahalliy va xalqaro turizmni rivojlantirish mumkin.

Foydalanilgan adabiyotlar.

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HISOR DAVLAT QO‘RIQXONASI - TABIATNING NOYOB OBYEKTI SIFATIDA

Annotatsiya: *Ushbu maqolada Hisor davlat qo‘riqxonasinin geografik qamrovi, gidroekologik jihatdan o`ziga xos noyob va murakkab ekotizimlariga ega hudud ekanligi, tabiatining shakllanish jarayonlari, tabiat yodgorliklari, bioxilma-xilligi, flora va faunasining noyobligi va boshqa geoekologik masalasi haqida bayon etilgan.*

Kalit so‘zlar: *Hisor davlat qo‘riqxonasi, tog‘- archa, karst jarayonlari, gidroekologik, g`or, dara, cho`qqi, flora, fauna.*

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GISSAR STATE NATURE RESERVE - AS A UNIQUE NATURAL SITE

Abstract: *This article describes the geographical coverage of the Gissar State Nature Reserve, the fact that from a hydroecological point of view it is an area with unique and complex ecosystems, the processes of formation of its nature, natural monuments, biodiversity, uniqueness of flora and fauna and other geoecological problems.*

Keywords: *Gissar State Nature Reserve, mountains, karst processes, hydroecological, mountains, canyon, ravines, flora, fauna.*

Kirish

Keyingi yillarda jahonda aholi sonining o`sib borishi tabiiy resurslarga bo‘lgan talabning ortishiga va geoekologik muammolarning kuchayib borishiga sabab bo‘lmoqda. Ayniqsa, yer yuzidagi landshaftlar degradatsiya jarayonlari natijasida ular muvozanatining buzilishi ekotizimlarning o`zaro bog`liqligiga va barqarorligiga salbiy ta`siri kuzatilmoqda. Qo`riqxonalanadigan hududlarning landshaft tuzilmasi va ulardagi bioxilma-xillikni saqlash va ekologik sharoitini

oqilona tashkil etish zarurligini belgilaydi. Bu borada, hududlarda ilmiy tadqiqotlar olib borish va uning tabiiy ekologik tizimlarini asrash uchun chora – tadqbirlarni hamda ular tabiatini barqaror rivojlantirishning ilmiy asoslash keyingi yillarda dolzarb masaladan hisoblanadi.

Asosiy qism.

Qashqadaryo viloyati mamlakatimizning tog‘li hududlaridan biri bo`lib, viloyatning shimoli-sharqiy va sharqiy qismlarida Hisor va Zarafshon tog‘lari yastanib yotadi. Qashqadaryo viloyati arid hududda joylashgan bo`lib, tabiati tog` va tekisliklardan iborat, rang-barang landshaft xususiyatiga egadir. Tekisliklarida cho`llar bo`lsa, boy bioxilma-xillikka ega bo`lgan tog`li hududlar esa alohida ilmiy gidroekologik jihatlari bilan ajralib turadi. Shularni nazarda tutgan holda, Qashqadaryo viloyatida qator qo`riqxonalar tashkil etildi.

Qizilsuv (1975-yilda) tog`- archa qo`riqxonasi (qora archa o`rmonlari) muhofazasiga yo`naltirilgan. Unga yaqin hududda esa Miroqi (1976-yilda) qo‘riqxonasi tashkil etilgan. Miroqi qo‘riqxonasi Qashqadaryo daryosi havzasining yuqorisidagi soylar, jilgalar va daryolari manbalarini muhofazalashga qaratilgan. O`zbekistondagi eng yirik Seversov muzligi va Kitob-Shahrisabz botig`i hamda Qarshi cho`lini suv bilan ta`minlovchi Qashqadaryo daryosining yuqori qismidagi suv manbalarini muhofaza qilish uning vazifasiga kiritilgandir. Keyinchalik bu ikki qo`riqxona Hisor-Oloy tog`lari etaklarida birlashtirilib, Hisor davlat qo‘riqxonasi (1983-yil) ni tashkil etildi. Dastlabki vaqtda Hisor davlat qo`riqxonasi maydoni 76 889 gektar bo`lgan, 2020-yilda esa uning maydoni 80986,1 gektarga yetkazilgan. Qo`riqxona tog`-archa ekotizimlarini muhofaza qiladi.

Hisor davlat qo‘riqxonasi O`zbekistonda eng yirik va noyob tabiiy majmua hisoblanib, baland tog` landshaftlari, o`zining boy florasi (910 tur) va noyob karst g`orlari bilan ajralib turadi. Hisor davlat qo‘riqxonasiga 2020 yil fevral oyidagi Hukumat qaroriga asosan tutash hududlaridan 11231,3 gektarga teng qo`riqlanma zona belgilandi. Qo‘riqxona hududi sharqdan g`arbga 37 km, shimoldan janubga 90 km ga cho`zilgan. Qo`riqxona hududidagi o`simlik va hayvonot dunyosini muhofaza qilish uning asosiy vazifasidir. Bugungi kunda Hisor davlat qo‘riqxonasi YUNESKO Jahon merosi obyektlarining ro`yxatiga kiritilgan.

Bu mashhur qo`riqxona ma`muriy jihatdan Shahrisabz, Yakkabog‘ va Qamashi tumanlarining tog`li hududlariga to`g`ri keladi. Tojikiston va O`zbekiston hudularida qo`riqxona chegaralariga bevosita tutashgan 30 ming aholi istiqomat qiladigan 13 ta aholi punkti mavjud. Hisor qo`riqxonasi shu nomli tog`ning tizmalari bo`ylab g`arb tomonga tarmoqlangan va o`ziga xos tabiiy ekotizimlarni muhofaza qilishga mo`ljallangan.

Qo`riqxona shimolida O`zbekistonning Samarqand viloyati va Tojikistonga tashgandir. Hududning janubi va janubi-sharqi Qashqadaryo va Surxondaryo viloyatlariga to`gri keladi. Hisor tog‘lari qo‘riqxona hududini tashkil etgan holda bir nechta bo`limdan iboratdir. Bular: 1. G`elon bo`limi (18838,1 ga.); 2. Miraki bo`limi (11821,0 ga.); 3. Tanxozdaryo bo`limi (20233,0 ga.); 4. Qizilsuv bo`limi (30094,0 ga.) [https://.lex.uz/docs/-4741325].

O`rta Osiyoda joylashgan bu hudud uzoq geologik davrlarda bir necha bor dengiz ostida qolgan bo`lib, tog` oraliqlarida bo`g`ozlar va lagunlar hosil bo`lgan. Baland cho`qqilar esa orol shaklida suv yuzasida ko`tarilib turgan. Hisor qo‘riqxonasi shimoldan Sumsar-Shertog‘ va Hazratsulton tog‘lariga tutashadi, ular zaminini paleozoy erasining dengiz organizmlari qoldiqlaridan hosil bo‘lgan ohaktoshlar tashkil etgan holda uchraydi. Hisor qo`riqxonasi hududida mezazoy-kaynazoy davri yotqiziqlarida oqar suvlar ta`sirida yemirilishi oqibatida karst jarayonlari natijasida shakllangan o`ralar va daralar, g`orlar ko‘plab uchraydi [5;31-34 b.; 6; 1090-1095 c.]. Chaqchar tog`lari asosan mezozoy ohaktoshlaridan tuzilgan. Daryolar ohaktosh qatlamlarini yuvib, tor daralar hosil qilgan. Qalaisheron tangisida O`zbekistonning eng uzun g`orlaridan biri – mashhur Amir Temur g`ori (umumiy uzunligi 815 m) joylashgan. Qo`riqxonada tog‘ daryolari va soylari chuqur V–simon shakldagi, ba`zida esa qutisimon holdagi daralar va tangilarni hosil qiladi [1; C.142-173.].

Qo`riqlanadigan hududining balandligi 1750 m dan 4421 m gacha bo`lib, tog`larning o`rtacha balandligi 2500 m ni tashkil etadi. Qo`riqxonaning baland nuqtalari sifatida Xo`jakarshavor - 4303 m va To`rtqo`ylik tog`idagi Nomsiz cho`qqi hisoblanadi [9; 94 б.].

Hisor qo‘riqxona hududi tez o`zgaruvchan iqlim sharoitiga ega bo`lib, yillik yog‘inning 64% kuz va qish oylarida kuzatiladi. Bahorning oxigi oyidan sentyabr oyigacha yog`inlarning kamligi kuzatiladi, bu hududdagi o`simliklar vegetatsiyasiga salbiy ta`sir ko`rsatadi. Tog`oldi rayonlarida esa janubi-g`arbiy va g`arbiy yo`nalishdagi shamollar ustunlik qiladi. Ayniqsa, tog`-vodiy shamollari tog`li rayonlarda o`ziga xos xush havolikni vujudga keltirgan. Bu yerda tog`-vodiy va fyon shamollari sutka davomida hamda mavsumiy holda o`z yo`‘nalishini o`zgartirib turishini ko`rish mumkin [3;192 b.]

Qashqadaryo havzasidagi Yakkabog`daryo, Oqsuvdaryo va Tanxozdaryolarning asosiy to`yinishi muzliklar manbalarida joylashgan. Qashqadaryo havzasida Severtsev muzligi (maydoni 1,38 km^2, uzunligi 22 km, kengligi 550 m), Botirboy muzligi (maydoni 1,3 km^2, uzunligi 2,2 km), To’rtkoylak muzligi (maydoni 0,31 km^2, uzunligi 1,5 km, kengligi 250 m) va boshqlar mavjuddir [3;192 b.; 7; C.44-46.]. Hisorning baland cho`qqilarda joylashgan muzliklaridan Qashqadaryo va Surxondaryo hududlari tomonga qarab bir nechta daryo (Xonaqa daryosi, G`ilondaryo, To`palangdaryo, Oqsuv va b.) oqadi [ 8; C.81-83]. Qo`riqxonada bir nechta katta-kichik sharsharalar bo`lib, ulardan eng balandi Suvtushar sharsharasi (balandligi 84 metr) hisoblanadi. Shuningdek, Hisor qo‘riqxonasida 10 ga yaqin o`ziga xos xususiyatga ega bo`lgan, katta-kichik ko‘llar borligi aniqlangan.

Qo`riqxona hududida 10750 ga maydon o`rmon bilan qoplangan. Qo`riqxonaning 35 ming gektar maydoni baland tog`lar qoya va jarliklar, doimiy muzliklardan iborat. Qo`riqxona hududida qadimiy joylar va tabiat yodgorliklari mavjud bo`lib, bular o`ziga xos ko`rinish kasb etadi. Hazrati Sulton, Xonaqa, Tulkitutgan ota, Xo`jagul ota kabi qadimiy joylar, Amir Temur g`ori, Dinozavr so`qmog`i, Suvtushar sharsharasi kabi tabiat yodgorliklari bilan mashhurdir [2; C.23.; 4;69-71 b.].

Hisor qo`riqxonasida 910 turdagi o`simliklar, 140 dan ortiq turdagi hayvonot dunyosi boyliklariga ega. Hisor qo‘riqxonasida 250 turdagi dorivor zira, zirk, oltin tomir, qirqbo`g`im, chakanda, bo`ymadaron, shuvoq, sumbul, kiyik o`ti, qizilpoycha xalq tabobatida, anzur piyoz, ravoch, zira kabilar esa oziq-ovqat o`simliklari sifatida ishlatiladi. Shuningdek, qo`riqxona florasining 80 turi esa endemikdir. Qo`riqxonadagi floraning 30 tasi, jumladan dilband lola, ulug`vor lola, nor shirach, oq parpi, sunbul kovrak, chinnigul kabilar noyob tur hisoblanib “O`zbekiston qizil kitob”ida ro`yxatga olingandir. Qo`riqxonadagi sut emizuvchilar sinfi 32 tur bo`lib, jumladan qor qoploni, qo`ng`ir ayiq, Turkiston silovsini, O`rta Osiyo qunduzi, qizil sug`ur, Sibir tog` echkisi, Jayra, tog` suvsari, va boshqalarni uchratish mumkin. Shuningdek, qo`riqxonadagi qushlarning 17 turi, sut emizuvchilarning 10 turi, hasharotlarning 6 turi, baliqlarning 1 turi “O`zbekiston qizil kitob”iga kiritilgan. Mahalliy hayvonlarning 5 turi Xalqaro tabiatni muhofaza qilish ittifoqining Qizil kitobiga kiritilgandir [10;11].

Hisor qo‘riqxonasi o‘zining go‘zal manzaralari, turli bo‘shliqli karst platolari, tog‘ va ko‘llari hamda sharsharalari bilan mashhur. Qo`riqxona hududida o‘nga yaqin tabiiy yodgorliklar va bir qancha tarixiy obyektlar, jumladan, Amir Temur g‘ori, Hazrat-Sulton tog‘i kabi mashhur ziyoratgohlari joylashgan. Hisor qo‘riqxonasi madaniy, ekologik va diniy turizmning muhim markazlaridan biri sanaladi.

Foydalanilgan adabiyotlar ro`yxati.

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POMIR TOG`LARIGA TABIIY GEOGRAFIK TAVSIF

Annotatsiya: *Maqolada O`rta Osiyo mintaqasida Pomir tog`larini o`rganilishi, landshaftlarining shakllantiruvchi omillari va ularning tabiiy xususiyatlarining tavsifi berilgan. Shuningdek, geografik nomlarning kelib chiqishiga e'tibor qaratilgan. Geografik joylashuvi, geologiyasi, relyefi, tabiat resurslarining xususiyatlari, ulardan foydalanish natijasida yuzaga keladigan ba`zi muammolari tasvirlangan.*

***Kalit so`zlar:*** *Pomir, Tetis, paleozoy, mezozoy, relyef, iqlim, morena, muzlik, balandlik mintaqasi, cho`qqi.*

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NATURAL GEOGRAPHICAL DESCRIPTION OF THE PAMIR MOUNTAINS

Abstract: *The geographical location, geology, relief, features of natural resources, as well as some problems arising from their use are described.The origin of geographical names is being investigated. The geographical location, geology, relief, features of natural resources, as well as some problems arising from their use are described.*

Keywords: *Pamir, Tethys, Paleozoic, Mesozoic, relief, climate, moraine, glacier, altitude zone, peak.*

Ma`muriy jihatdan Pomir tog`lari - Tojikistonning Tog`li-Badaxshon muxtor viloyati, Xitoyning Sinszyan-Uyg`ur muxtor viloyati, Afg`oniston, Pokiston va Shimoliy Hindistonning tutash hududlarida joylashgan tog` tizimidir.

Tabiiy geografik jihatdan Pomir – O`rta Osiyoning janubida va Himolay tog` tizmasining shimolida joylashgan tog` tizimi. Pomir baland tog` tizmalari, ya`ni Tyan-Shan, Qoraqurum, Kunlun va Hindukush tizmalari bilan tutashgan holda kartada to`rtburchak shaklda yastanib yotadi. Pomirning shimoliy chegarasi Orqa Oloy tizmasining shimoliy etagidan, janubiy qismidagisi Panj va

Vahondaryo, Vahon tizmasi hamda Toshqo`rg`on daryosining boshlanish qismidan o`tadi. Sharqda Pomirga Sariqo`l tizmasi (6351 m) va Qashqar tog`lari kiradi. G`arbda esa Pomirning chegarasi Panj daryosi, shimoli- g`arbida Pomirga Pyotr I va Darvoz tizmalari kiradi. Pomir kenglik bo`ylab 300 km ga yaqin, meridian bo`ylab esa 250 km ga cho`zilgan.

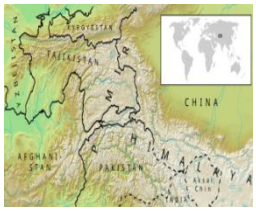
Pomir nomining kelib chiqishi haqida juda ko`p mulohazalar bo`lib, bugungi kungacha har-xil talqinlar mavjud. Xitoylik Chjan Syan miloddan avvalgi 140-135-yillarda Pomir bo`ylab sayohat qilgan, u bu yerda yovvoyi tog‘ piyozi (anzur)ni ko‘pligidan hayratlanib, Pomirni "piyoz tog‘lari" deb atagan holda, uni Tyan-Shanning davomi hisoblagan. Pomir tog`larida baland va qorli cho`qqilarning ko`pligi kishilarni o`ziga maftun etib turishi hamda ulug`vorligi uchun uni ko`pincha “dunyo tomi” deb ham atashadi. Xitoylik sayyoh va tarjimon tang sulolasi (VII asr) davrida diplomatik maqsadlar bilan Amudaryo daryosining havzasidagi mamlakatlarga tashrif buyurgan va uning ma`lumotlarida “Pomir” so`zi birinchi marta adabiyotlarda keltirilgan. Syuan Szyan “Ikki qorli tog` tizmasi oralig`ida Po-mi-lo mamlakati joylashgan, boshqa ma’lumotlarga ko‘ra - Pa-mi-yay, bu yerda sovuq va shamollar hukm suradi, qishda ham, yozda ham qor yog`adi, tuproq sho`r va toshlar bilan qoplangan” deb, mahalliy aholining so`zlaridan iqtibos keltirgan. U xitoy tilida bo‘g‘inlarga ajratib yozib qoldirgan Po-mi-lo (yoki Pa-mi-yay) nomini. Bundan ko`rinadiki haqiqatdan ham bu yerda Pomirning tabiati bayon etilgan.

IX-X asrlardagi asarlarda “Pomir” nomi “Famir” ba`zan “Bamir” shaklida uchraydi. Arablar “Pomir” nomni hindlardan o`zlashtirgan holda talqin qilishgan degan fikrlar mavjud. Italiyalik savdogar va sayyoh Marko Polo esa o`z bitiklarida bu nomni “Pamer” yoki “Pamier” deb yozgan. Hind va Amudaryo daryolarining yuqori oqimidagi ko`plab geografik nomlar bir-biriga o`xshash. Jumladan, Kashmir, Tirichmir, Pomir va boshqalar. Ba`zan bu nomlar sanskrit tilidagi “ko‘l” ma`nosini anglatuvchi “mir” so`zidan kelib chiqqan, degan fikrlar ham bor. Ma`lumki, Pomirda haqiqatan ham ko`llar ko`pligidan balki aynan shunday nomlangan bo`lishi mumkin. Mirza Haydarning XVI asrda yozilgan forscha asarida ham “Pomir” yoki “Bamir” nomlari tilga olingan. Fors tilshunoslari Pomir so`zi forschada Bamiar so`zidan kelib chiqqan bo`lib, “yer tomi” degan ma`noni bildirishini taxmin qilishgan. “Mixr” yoki “Mitr” - qadimgi eroniylarning quyosh xudosi sifatida, Pay-mixr so`zi “quyosh oyog`i yoki quyosh xudosi” degan ma`noni anglatishi ifodalanadi.

XX asrning o`rtalarida o`zbek geografi X.Xasanov Pomir so`zi “quyosh oyog‘i yoki quyosh xudosi” degan ma’noni anglatishi kerakligini bayon etgan. Pomir haqiqatdan ham qadimgi eron xalqlari yashagan yerlarga nisbatan sharqdagi tog`li mamlakat, undan quyosh chiqadi, deb geografik jihatdan ifodalaydi.

Pomir tog`larini eng baland cho`qqilari dengiz sathidan 7 ming metrdan oshiq bo`lib, sharqida Qashqar tog`larining eng baland cho`qqilari – Qo`ng`ir (7579 m), Muztog`ota (7555 m), Oqsoyboshi (6148 m) Xitoy hududida joylashgan. Ismoil Somoniy (7495 m) va Ibn Sino (7134 m) cho`qqilari O`rta

Osiyo o`lkasidadir. Pomir tog` tizimi hududi relyefining xususiyatlari jihatidan ikkita tabiiy geografik rayonga ajratiladi: G`arbiy Pomir va Sharqiy Pomir.

a) 

b) c)

b) d)

1-rasm. a) Pomir tog`lari zahjiri (Tojikiston), b) Romir tog`I kartasi, c) Muztog`ota tog`i(Xitoy), d) Ismoil Samoniy va Korjenevskiy cho`qqilari

Sharqiy Pomir yer yuzasining tuzilishi G`arbiy Pomirnikidan farq qilgan holda, uning bu qismida tog` tizmalari yassi tekislik ko`rinishdagi keng vodiylar va balandligi 3500- 4500 m li botiqlar (Rangko‘l, Sho`rko‘l, Qorako`l va boshqalar) orqali bir-biridan ajralib turadi.

Ma`lumki, O`rta Osiyodagi ko`plab tog` tizimlari o`rnida paleozoy erasining boshidan to neogenga qadar iliq Tetis dengizi havzasi qoplab yotgan. Paleozoy erasida Tetis dengizi qisqara borib, mezozoyda janubga tomon chekingan va kaynozoyga kelib, bu yerlar suv ostidan butunlay chiqqan. Pomir tog` tizimi kaynozoyda alp burmalanishi davrida, asosan qadimgi Tetis dengizi o`rnida paydo bo`lgan. Quyi paleozoy yotqiziqlari Badaxshonning shimoliy rayonlarida va yuqori paleozoy yotqiziqlari esa Sharqiy Pomirning katta qismida keng tarqalgandir.

O`rta Osiyoning tog`li hududlarida alp tipidagi relyef shakllari keng tarqalgan bo`lib, bular eng yangi tektonik harakatlarning intensivligi, muzliklar ta`siri va sovuqdan nurash bilan bog`liqdir. Sharqiy Pomir tog`ligining relyefida keng yassi vodiylar ko`p bo`lib, tog` tizmalari vodiylaridan 1000-1500 m gacha balandga ko`tarilib turadi. Vodiylar relyefining yassiligi qadimgi muzliklar denudatsiyasi bilan bog`liqdir. Bundan tashqari relyefda muzlash jarayonlari natijasida vujudga keladigan bo`rtma do`nglar ham uchrab turadi.

Pomir hududi subtropik iqlim mintaqasida joylashgan. G`arbiy Pomirning shimoliy va shimoli-g`arbiy qismlarida baland tizmalari joylashganligi, kelayotgan nam havo massalarini to`sib qoladi. Natijada Sharqiy Pomirning iqlimi qurg`oqchil bo`lib, bulutli kunlarining kamligi bilan tavsiflanadi. Pomir tog`li o`lka bo`lganligi uchun bu hududda balandlik iqlim mintaqalari shakllangan. G`arbiy Pomirning baland qismlarida yillik harorat 0°ga yaqin, daryo vodiylarida esa + 15° dir. Dengiz sathidan 2100 m balandlikda yanvarning o`rtacha harorati -

7,4°. iyulning o`rtacha harorati Xorog shahrida +22°, mutlaq maksimum + 40° gacha ko`tariladi. 4200 m balandda Fedchenko mateostansiyasida mutlaq minimum -31,4°, iyulning o`rtacha harorati 3,9°, maksimum harorat 15,5°ni tashkil etadi. Pomirning shimoli-g`arbiy qismida yillik yog`inning miqdori 1500 mm gachadir.

Sharqiy Pomirning iqlimi G`arbiy Pomirnikidan ancha farq qilib, yillik o`rtacha harorati hamma qismida manfiy ko`rsatkichdadir. Yanvarning o`rtacha harorati 3600 m balandlikda -17,8°, minimum -50° ga yaqin bo`ladi. Dengiz sathidan 4000 m balandlikdagi Qorako`lda yanvar oyining o`rtacha harorati -20°. Bu yerda yoz qisqa va salqin, tungi vaqtlarda harorat 0° dan pastga tushadi. Iyulning o`rtacha harorati esa +15° dan oshmaydi. Sharqiy Pomirning ba`zi hududlarida sovuqsiz davr kuzatilmaydi.

Pomir tog` tizimlari hududiga g`arbdan nam havo massalari kelganligi sababli, uning g`arbiy va shimoli-g`arbiy qismlarida yog`ingarchilik ko`p, sharqiy qismida esa yog`ingarchilik kam. Fanlar Akademiyasi va boshqa unga yondosh tizmalarning yillik yog`in miqdori 2230-2500 mm ga yetsa, unning sharqda joylashgan hududlarda yog`in miqdori juda kam 60 -100 mm ga yetadi, yog`in miqdori Murg`obda 60-72 mm, Qorako`l botig`ida esa 60 mm dan oshmasligi kuzatiladi.

Pomirning suvlari asosan Amudaryo havzasiga va qisman oqimsiz tog` ko`llariga, Sharqiy Pomirdan boshlanuvchi ba`zi daryolar esa Yorkent va Qashqar daryolari havzalariga boradi.

Pomirda tektonik va morena ko`llar ko`p bo`lib, juda balandda joylashgan. Masalan, Qorako`l - 3910 m, Yashilko`l - 3734 m, Zorko`l 4125 m balandlikda joylashgan. Ko`llar Pomir hududi landshaftining o`ziga xos komponenti sifatida ekotizim hosil qiladi. Pomir hozirgi zamon muzliklari (7100 ta) keng tarqalgan hudud hisoblanadi.

G`arbiy va Sharqiy Pomirda har xil balandlik mintaqalari shakllangan. A. N. Rozanov (1958)ning ta`kidlashicha, Pomir oblasti tuproqlari gumusi kam va sho`rlangan taqirsimon cho`l hosilalari, cho`l-dashtlarining toshloq qo`ng`ir tuproqlari hamda sho`rxoklardan iborat.

G`arbiy Pomirning shimoliy qismidagi baland tog` mintaqasi tog` o`tloqlari va o`tloq-dasht o`simliklari bilan band. Baland tog`lardagi cho`l va cho`l-dasht va nival mintaqadan iborat.

Sharqiy Pomir iqlimining kontinentalligidan, tuproq va o`simlik qoplami ham shunga mos ravishda o`zgaradi. Bu joylar uchun baland tog` cho`li tipik landshaft hisoblanadi. Sharqiy Pomir o`zining tabiati jihatidan Tibet tabiatiga yaqin turadi va Tibet botanik-geografik provinsiyaga kiradi.

Mintaqa tabiiy resurslarga jumladan, gidroenergetika va mineral resurslariga boy. Bu yerda 50 dan ortiq issiq va sovuq mineral shifobaxsh buloqlar mavjud.

Keyingi yillarda dunyo bo`yicha iqlim o`zgarishi natijasida tog` muzliklarining erishi kuzatilmoqda. Ayniqsa, antropogen faoliyatining ortishi Pomir tog`larida bir qancha ekologik muammolarni yuzaga keltirgan. Tog`

muzliklarning erishi O`rta Osiyo daryo oqimlariga salbiy ta`sir ko`rsatib, mintaqada ichimlik suvi muammolarini yuza kelishiga sabab bo`lmoqda.

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USTYURT PLATOSI TABIATINING O`ZIGA XOS SIRLARI

Annotatsiya*: maqolada Ustyurt platosi tabiatining o`ziga xos jihatlari, geologic va geomorfologik tuzilishi, iqlimi va boshqalari haqida bayon etilgan. Platodagi qiziqarli geografik obyektlarning mavjudligi va ularni o`rganilish muammolari qarab chiqilgan. Ushbu platoda hududni shakllanishida tabiiy omillarning roli yoritilgan.*

Tayanch so'zlar: *geologic, arxeologik, Tetis dengizi, geoglif, skat, tosh qo`rg`on, sho`rxok, botqoq, urochishe, botiq.*

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UNIQUE SECRETS OF THE USTYURT PLATEAU NATURE

Abstract: *The article describes the nature features of the Ustyurt plateau, its geological and geomorphological structure, climate, and much more. The issues of the existence of interesting geographical objects on the plateau and the problems of their study are considered. The article highlights the role of natural factors in shaping the relief of this plateau.*

Keywords: *geological, archaeological, Tethys Sea, geoglyph, slope, stone fortress, salt marsh, swamp, tract, depression.*

Kirish

Bugungi kunda zamonaviy geografiya tabiiy- hududiy komplekslar hamda hududiy ishlab chiqarish komplekslarining rivojlanish qonuniyatlarini tadqiq etadigan va o`rganadigan, nazariy asoslariga ega fandir. Zero,har qanday geografik obyektning o`ziga xoslik xususiyati uning joylashgan o`rni hamda taraqqiyot tarixi bilan bog`liq. Ustyurt keyingi yillarda o`zining iqtisodiy salohiyati bilan ajralib turadigan tabiiy geografik o`lkalardan biriga aylanib bormoqda. Ayniqsa, Ustyurtning murakkab, keskin kontinental iqlimi va noqulay geografik sharoiti bu regionning o`zlashtirilishida eng asosiy to`siqlarning biri bo`lishiga qaramasdan

iqtisodiy ahamiyati muhim omillardan hisoblanadi. Binobarin, tabiiy resurslarga juda boy ekanligi, hudud kelgusida tadqiqot ishlari olib borish talab qilanadigan geografik obyektlar qatoriga kiradi.

Ammo uning murakkab geologic rivojlanish tarixiga bog`liq tabiatini haqidagi ma`lumotlarni o`rganishda olimlar tomonidan hali ochilmagan sirlarning ko`pligi va bilish qiziqarli ekanligini e`tiborga olib Ustyurt platosi tanlangan.

O`rganilganlik darajasi

Ustyurt hududning tabiati va o`ziga xos rayonlari to`g`risida dastlab N.A.Gvozdetskiy (1961), L.N.Babushkin va N.A.Kogay (1969), A.S.Saidov (1965), J.A.Xoshimov (1966), T.Jumaboyevlarning (1978), A.Rahmatullayev (1979-2009) va boshqalarning ishlarida ancha mufassal yoritilgan. Bugungi kunda ham olimlar tomonidan hududda tadqiqotlar olib borilmoqda.

Asosiy qism

Yer sharidagi eng qiziqarli va g`aroyib xususiyatlarga ega joylaridan biri - bu Ustyurt platosi hisoblanadi. O`rganilayotgan obyekt O`rta Osiyoning g`arbiy qismida katta hududini egallab yotadi. Ustyurt platosi qadimgi Tetis dengizining o`rni hisoblanadi. Geologlarning taxmin qilishicha Ustyurt platosining o`rni 20 milliondan 60 million yillar oldin dengiz chekinishidan hosil bo`lgan.

Ustyurt platosi O`rta Osiyo o`lkasida Kaspiy va Orol dengizlari orasida joylashgan hududni o`z ichiga olib, O`zbekistonning shimoli-g`arbini egallaydi. Ustyurt platosining umumiy maydoni 160 ming $km^2$ (ba`zan 200 ming km^2 ga yaqin, deb berilgan) bo`lib, O`zbekiston va Qozog`iston hududlarida joylashgandir. Shundan, 40 ming $km^2$ maydoni Ustyurtning janubi-sharqiy qismi O`zbekiston hududidagi Qoraqalpoq Ustyurti deb ham yuritiladi.

Ustyurt arid-denudatsion plato hisoblanib, g`arbda Mang`ishloq yarimoroli bilan, sharqda Orol dengizi bilan chegaralangan. Uning shimoliy chinklari g`arbda O`likqo`ltiq sho`rligidan boshlanib, shimoli-sharqga qarab Shagan daryo vodiysigacha davom etadi. So`ngra shimoliy chegara Katta Bo`rsitq qumligiga borib taqaladi.

Ustyurt platosi Kaspiy va Orol dengizlari oralig`ida barcha tomonlardan tabiiy chegara, ya`ni chinklar bilan chegaralangan. Ustyurt platosi ma`muriy jihatdan Qozog`istan Respublikasi (shimoliy-g`arbiy qismi), Turkmaniston Respublikasi janubiy qismining ozgina hududi va O`zbekiston Respublikasiga (janubiy sharqiy qismi) tarkibiga kiradi. Ustyurtning O`zbekiston hududidagi janubi-sharqiy qismi Qoraqalpoq Ustyurti deb ham yuritiladi.

Ustyurt platosi (ayrim botiq va balandliklarni hisobga olmaganda) O`rta Osiyodagi eng katta va tekis hudud hisoblanadi. Bu yerda tekisliklar, tepaliklar, daralar va siyrak vohalarni ham uchratish mumkin. Ustyurtning o`ziga xos xususiyatlaridan biri shuki, uning deyarli hamma chekkasi jarlik yonbag`ir (chink) bilan tugallanadi. Chinklarning nisbiy balandligi 50-150 m, Orolbo`yida esa 190 m gacha boradi. Ularning kengligi esa bir necha yuz metrdan 1,5 km gacha boradi. Chinklar tektonik jarayonlar hisoblanib, dengizning abrazion faoliyati va qadimgi daryolar eroziyasi natijasida vujudga kelgan. Chinklarda uchlamchi davrning ohaktosh, mergel va gildan tarkib topgan gorizonatal yotqiziqlari ochilib

qolganligini uchratish mumkin. Chinklar yonbag`irlarda tik jarliklar hosil qilgan holda Ustyurtning tabiiy chegarasi hisoblanadi.

Ustyurtda geografik parallellar bo`ylab yo`nalgan bir necha tektonik strukturalar mavjud. Mutaxasislarning ma`lumotlariga ko`ra, karst relyef shakllari Ustyurtda keng tarqalgan bo`lib, ular yerning har xil chuqirlar va jinslarning cho`kishidan paydo bo`lgan. Ularning eng kattalari Ustyurtning Qoraqalpoqistonga tegishli qismida joylashgan. Borsakelmas, Shaxpaxti, Shorcha Asakaovdan va Sariqamish ko`lidan iborat. Janubiy qismiga Qoplonqir va Sariqamish botig`i kirib borgan. Uning shimoliy qismida Sam, Matayqum, Uchtagan qumliklari va bir qancha sho`rxoklar (Qo`shbuloq, Osmontaymatay, Sam va boshqalar) hamda taqirlar mavjud. Ustyurtda karst va karst-suffozion relyef shakllari (karst voronkalar, botiqlar, g`orlar) vujudga kelgan.

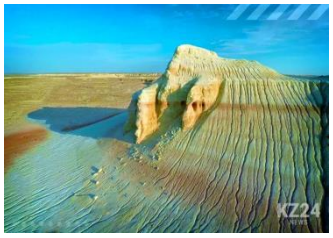
Ustyurt platosi O`rta Osiyoning g`arb qismidagi tekislik bo`lib, mo`tadil va subtropik iqlim mintaqalari tutashgan joyida joylashgan. Shuning uchun uning iqlimi oraliq iqlim. Ustyurga shimoldan keladigan antisiklonlarga ochiq bo`lganligi uchun uning iqlimi juda o`zgaruvchan, qishi sovuq, yozi issiq va quruqdir. Plato iqlimi juda ham kontinental bo`lib, haqiqiy qishning uzoq davom etishi (4 oy), yozgi havo haroratining baland bo`lib, yog`inning kamligidir. Ammo Ustyurtda yillik yog`in-sochin miqdori (80-90 mm) fasllar bo`yicha deyarli bir tekis taqsimlangan. Platoda doymiy oqar suvlar mavjud emas, ammo vaqtinchalik, mavsimiy suvlar bor. Ustyurt hududida yer osti suvlarining sathi ancha chuqurda joylashgan, ularning sathi yil davomida doymiy ekanligini aniqlangan. Yer osti suvlari aholi va xo`jalik extiyojlarini suvga bo`lgan talabini qondirishda muhim ahamiyatga ega.

Ustyurt platosi tabiatida faqat shu hududga xos bo`lgan, xaligacha ochilmagan sirlar yashiringan butun olamni hayratga soluvchi g`aroyibotlari mavjud.1986 yilda olimlar tomonidan quruqlikni aerokosmik o`rganish

1-rasm. Ustyurt platosining geogliflar.

Vaqtida tasodifan Beynau va Sai-Utes qishloqlari orasidagi 100 km masofada sirli belgilarni uchratganlar. Ustyurt o`qlari Manaysor sho`rxogi (Doniztau chink) ning atrofida 46°13'22 shimoliy uzoqlik va 56°09'39 sharqiy uzoqliklar orasida joylashgan.Bu tasvirlar uchburchak chizmalar yarim oylarga o`xshash ulkan halqalar bilan tugaydigan diametri 10 metr bo`lgan uzun o`q uchlarini ko`rishgan. Bu chiziqlar shimolga ishora qiluvchi 900 m gacha uzunlikdagi o‘qsimon belgilarga tutashgan. Bu o‘q tizimi yuz kilometrdan ortiq masofaga yoyilgan. Bugungi kunda bu geogliflarning kelib chiqishi haqida ikkita nazariya bor: 1.Uchburchaklar ov qilish uchun ishlatilgan. Arxeologlar Ustyurt “o`qlari”ning kelib chiqishi haqida bir to`xtamga kela olmaganlar. Taxminlarga ko`ra, bular qulon va sayg`oq podalarini katta miqdorda ovlash uchun qurilgan inshootlar bo`lishi mumkin.

2. O`zga sayyoraliklar nazariyasi. Bu yerlarda sayyohlar ko`p yillar davomida tungi osmonda sirli chiroqlar ko`rayotganligini ta`kidlashgan. Bundan tashqari plato ustida shu uchburchak chizmalar kosmik kemalar uchun yo`l ko'rsatuvchi ustunlar b`lib xizmat qilganligini va qo`nish chizig`iga ishora qilganligini ta`kidlashadi.



2-rasm. Tuzbair tog`ida inson boshi (*Sfenks*)ga o`xshash ko`rinishi.

**Tuzbair Sho`ri**–sho`r botqoqlik Mang`ishloqdagi qoyali cho`qqining g`arbiy chekkasi yaqinida Tuzli kvartira joylashgan. Qoya toshlari Quyosh botganda qizil rangda, kunduzi esa qor kabi oq tuz kristallari qimmatbaho toshlar kabi ko`rinadi. Tuzbair tog`i mashhur Sfenksning ya`ni, inson boshi bilan Misr sheriga o`xshab ketadi.

3-rasm.Qqum skati. ***Qqum skati.*** Ba`zan sayyohlar platoning Qozog'iston qumlarida yirtqich hayvon yashashi haqida xabar berishadi. Bu olmos shaklidagi ko`zsiz va og`zisiz bo`lgan skatni eslatadi. Uning rangi uni qumga o`xshaydi va balandligi 1,5-3 metrgacha ekanligi ba`zi sayyohlar tomonidan taxmin qilingan. Bu qum skat yolg`iz sayohatchilarga hujum qilganligi va juda katta kuchga egali ta`kidlanadi.

4-rasm.Torish-Tuzbair tosh sharlari.

Torish urochishesi – bu yerda mukammal yumaloq toshlar bilan qoplangan vodiy bor. Ushbu toshlar olimlar tomonidan o`rganilganda, ularning yadrosi Tetis dengizining qoldiqlaridan iborat ekanligi aniqlangan. Bu toshlarning tarkibiga ko`ra, yuzasiga qum va loy yopishgan bo`lib, sharlarning yoshi esa 200 million yilga borishi mumkinligi aniqlangan. Boshqa tadqiqotchilarning nazariyasiga ko`ra esa, bu toshlar tektonik harakatlar natijasida jinslarning erib, siqilishidan paydo bo`lganligi ta`kidlanadi.

Tosh urushlari - 1983 yilda geologlar Bayte bulog`i yonida tosh qo`shinni topdilar. Ushbu jang butlari deyarli vayron bo`lgan, ammo ularning kelib chiqishi tarixi noma`lumligicha qolmoqda. Bu yerdagi devorlarida qurol-yarog`lar va jang holatidagi otlarningtasvirlari topilgan. Plato ustida tez-tez noma`lum

5-rasm.Tosh urushlari.

uchuvchi jismlar va chaqnashlar paydo bo`lib turishi aniqlangan. Ushbu chaqnashlarni o`rgangan mutaxassislar (ufologlar)ning ta`kidlashicha, bu yorug`lik atrofni yorituvchi kichik, yorqin nurlarda go`yoki ufqdan tashqarida paydo bo`ladi.

6-rasm. Urga burunidagi mayoq poydevori va Qo`rg`oncha qal`a xarobalari.

Buyuk Ipak yo`li uchun ulkan Ustyurt platosi xavfli va jonsiz joy hisoblangan. Bu hudud bo`ylab o`tadigan karvonlar odatda Ustyurt platosini janubidan, O`zboy daryosi bo`yidan aylanib o`tgan yoki Orol dengizi sohilini yoqalab, shimolga qarab yo`l olishgan. Bu karvon yo`li esa gullab-yashnagan davrda kimsasiz, buloq va quduqlarsiz yuzlab kilometrga cho`zilgandir. O`sha davrlardan bugungi kungacha ikkita yodgorligi – Qo`rg`oncha qal`a xarobalari va Urga burunidagi mayoq poydevori saqlanib qolgan.

Xulosa

Bulardan tashqari Ustyurt platosida arxeologik yodgorliklar majmuasi anchagina bo`lib, eng so`nggilari X-XV asrlarga oiddir. Masalan, butun bir - massagetlarning yodgorliklari, qo`rg`onlar, qabrlar, diniy inshootlar topilgan. Yuqoridagi obyektlardan sayyohlikda va ilmiy tadqiqotlarda foydalanganimizda har bir regionning ekologik sharoitini buzmasdan, ularga minimal darajada ta`sir ko`rsatishimiz kerak. Bu hozirgi davrdagi ekologik inqiroz sharoytida zamon talabi va bizning tabiat va kelajak avlod oldidagi eng asosiy vazifalarning biri bo`lib hisoblanadi.

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DORIVOR O‘SIMLIKLAR ASOSIDAGI FITOPREPARATLARNING FARMATSEVTIK TEXNOLOGIYADAGI O‘RNI

Annotatsiya:*Ushbu maqolada dorivor o‘simliklardan olinadigan biologik faol moddalar, ularning farmakologik xususiyatlari hamda farmatsevtik texnologiyada qo‘llanilishi ilmiy adabiyotlar asosida tahlil qilindi. Farmakognoziya o‘simlik xom ashyosining kimyoviy tarkibi va biologik faol komponentlarini o‘rganadi, farmatsevtik texnologiya esa ushbu moddalar asosida samarali dori shakllarini ishlab chiqishni ta’minlaydi. Tahlillar dorivor o‘simlik ekstraktlari asosida yaratilgan fitopreparatlar klinik jihatdan muhim terapevtik ahamiyatga ega ekanini ko‘rsatadi.*

Kalit so‘zlar: *farmakognoziya, dorivor o‘simliklar, biologik faol moddalar, flavonoidlar, ekstrakt, fitopreparatlar, farmatsevtik texnologiya.*

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THE ROLE OF PHYTOTHERAPEUTIC PREPARATIONS BASED ON MEDICINAL PLANTS IN PHARMACEUTICAL TECHNOLOGY

Annotation: *This article analyzes biologically active compounds obtained from medicinal plants, their pharmacological properties, and their application in pharmaceutical technology based on scientific literature. Pharmacognosy studies the chemical composition of plant raw materials and their biologically active components, while pharmaceutical technology ensures the development of effective dosage forms based on these substances.*

The analysis shows that phytopreparations developed from medicinal plant extracts have significant therapeutic importance in clinical practice.

Keywords: *pharmacognosy, medicinal plants, biologically active compounds, flavonoids, extracts, phytopreparations, pharmaceutical technology*

Kirish

So‘nggi yillarda farmatsevtika sanoatida tabiiy manbalardan olingan biologik faol moddalar asosida yangi dori vositalarini yaratishga qiziqish sezilarli darajada ortmoqda. Dorivor o‘simliklar insoniyat tomonidan qadimdan tibbiyotda qo‘llanib kelinadi va hozirgi zamonaviy farmatsevtika uchun ham muhim xom ashyo manbai hisoblanadi. Xalqaro tadqiqotlar natijalariga ko‘ra, ko‘plab mamlakatlarda aholi turli kasalliklarni davolashda fitopreparatlardan foydalanadi. Shu sababli o‘simlik xom ashyosini ilmiy asosda o‘rganish farmakognoziya fanining muhim vazifalaridan biridir.

Tadqiqot materiallari va usullari

Mazkur tadqiqot dorivor o‘simliklar asosida olinadigan fitopreparatlarning farmatsevtik texnologiyadagi o‘rni, ularning sifat ko‘rsatkichlari va samaradorligini baholashga qaratildi. Tadqiqot obyekti sifatida farmakopeya talablariga javob beruvchi dorivor o‘simlik xomashyosi (Calendula officinalis, Hypericum perforatum, Valeriana officinalis) tanlab olindi.

O‘simlik xomashyosi yig‘ish, quritish va saqlash jarayonlari GACP (Good Agricultural and Collection Practices) talablari asosida amalga oshirildi. Quritilgan xomashyo maydalanib, ekstraksiya jarayoniga tayyorlandi.

Fitopreparatlar olishda quyidagi texnologik usullar qo‘llanildi:

suvli va spirtli ekstraksiya (maceratsiya, perkolyatsiya usullari);

Soxhlet apparatida ekstraksiya;

vakuum ostida kontsentratsiya qilish;

quruq ekstraktlar olish uchun spray-drying (purkash orqali quritish) usuli.

Olingan ekstraktlar asosida turli dori shakllari ishlab chiqildi: damlamalar (tinctura), ekstraktlar (extractum), kapsulalar, tabletkalar va malhamlar.

Fitopreparatlarning sifat ko‘rsatkichlarini aniqlash uchun quyidagi tahlil usullari qo‘llanildi:

organoleptik tahlil (rang, hid, ta’m);

fizik-kimyoviy ko‘rsatkichlar (pH, zichlik, namlik miqdori);

xromatografik usullar (TLC, HPLC) yordamida biofaol moddalarning identifikatsiyasi;

mikrobiologik tozaligi va xavfsizligini baholash.

Shuningdek, preparatlarning biologik faolligi in vitro sharoitda antioksidant va antibakterial testlar yordamida baholandi.

Maqolani tayyorlash jarayonida dorivor o‘simliklarning kimyoviy tarkibi va farmakologik xususiyatlari haqidagi ilmiy adabiyotlar o‘rganildi. Shuningdek, fitokimyoviy tahlil usullari, spektrofotometrik tekshiruvlar hamda turli ekstraksiya texnologiyalari bo‘yicha mavjud ilmiy ma’lumotlar tahlil qilindi.

Natijalar va muhokama

Tadqiqot natijasida dorivor o‘simliklardan olingan fitopreparatlar yuqori biologik faollikka ega ekanligi aniqlandi. Calendula officinalis asosidagi ekstraktlarda flavonoidlar va karotinoidlar miqdori yuqori bo‘lib, ular yallig‘lanishga qarshi ta’sir ko‘rsatishi kuzatildi.

Hypericum perforatum ekstraktida giperezin va giperozid kabi biofaol moddalar aniqlanib, ularning antidepressant va antiseptik xususiyatlari tasdiqlandi. Valeriana officinalis asosidagi preparatlarda esa efir moylari va valepotriatlar mavjudligi aniqlanib, ularning sedativ (tinchlantiruvchi) ta’siri qayd etildi.

Texnologik jarayonlar natijasida olingan quruq ekstraktlar yaxshi eruvchanlik va barqarorlik ko‘rsatkichlariga ega bo‘ldi. Spray-drying usuli yordamida olingan kukunsimon ekstraktlar yuqori disperslikka ega bo‘lib, tabletkalash jarayoniga mos kelishi aniqlandi.

Fitopreparatlar asosida tayyorlangan dori shakllari farmakopeya talablariga javob berishi, ya’ni ularning fizik-kimyoviy va mikrobiologik ko‘rsatkichlari me’yoriy hujjatlar bilan mos kelishi tasdiqlandi.

Dorivor o‘simliklar tarkibida organizm uchun foydali bo‘lgan ko‘plab biologik faol birikmalar mavjud. Ular orasida flavonoidlar, alkaloidlar, saponinlar, efir moylari va fenol birikmalari alohida ahamiyatga ega. Flavonoidlar kuchli antioksidant xususiyatga ega bo‘lib, hujayralarni erkin radikallarning zararli ta’siridan himoya qiladi. Alkaloidlar esa ko‘pincha markaziy nerv tizimiga ta’sir qiluvchi moddalar sifatida tavsiflanadi. Saponinlar immun tizimini faollashtirishi va yallig‘lanishga qarshi ta’sir ko‘rsatishi bilan ajralib turadi.

Farmatsevtik texnologiyada qo‘llanilishi

Dorivor o‘simliklardan biologik faol moddalarni ajratib olish jarayoni farmatsevtik texnologiyaning muhim bosqichlaridan biridir. Amaliyotda mazeratsiya, perkolyatsiya, Soxlet apparatida ekstraksiya, ultratovush yordamida ekstraksiya kabi usullar keng qo‘llaniladi. Ushbu texnologiyalar yordamida o‘simlik xom ashyosidan maksimal miqdorda faol moddalarni olish va ularni standartlashtirilgan dori shakllariga aylantirish mumkin.

Olingan natijalar dorivor o‘simliklar asosidagi fitopreparatlar zamonaviy farmatsevtik texnologiyada muhim o‘rin tutishini ko‘rsatadi. Biofaol moddalar majmuasi tufayli fitopreparatlar ko‘p yo‘nalishli farmakologik ta’sirga ega bo‘lib, ularning kompleks terapevtik samarasi yuqori hisoblanadi.

Fitopreparatlarning afzalliklaridan biri ularning nisbatan past toksikligi va organizm tomonidan yaxshi o‘zlashtirilishidir. Shu bilan birga, ularning tarkibidagi biofaol moddalarning miqdori o‘zgaruvchan bo‘lishi texnologik standartlashtirishni talab qiladi.

Zamonaviy texnologiyalar (spray-drying, mikroenkapsulyatsiya, nanoformulyatsiya) fitopreparatlarning barqarorligi va bioo‘zlashtirilishini oshirish imkonini beradi. Bu esa ularni sanoat miqyosida ishlab chiqarishda muhim ahamiyat kasb etadi.

Shuningdek, tadqiqot natijalari fitopreparatlarning sintetik dorilarga alternativ sifatida qo‘llanishi mumkinligini ko‘rsatadi, ayniqsa surunkali kasalliklar va profilaktika sohasida.

Xulosa

O‘tkazilgan tahlillar dorivor o‘simliklar farmakognoziya va farmatsevtik texnologiya sohalarida muhim ilmiy ahamiyatga ega ekanini ko‘rsatadi. Ularning tarkibidagi biologik faol moddalar asosida turli fitopreparatlar ishlab chiqish imkoniyati mavjud. Kelgusida o‘simlik xom ashyosini chuqurroq o‘rganish va zamonaviy texnologiyalarni qo‘llash yangi samarali dori vositalarini yaratishda muhim ahamiyat kasb etadi. Dorivor o‘simliklar asosidagi fitopreparatlar farmatsevtik texnologiyada muhim o‘rin egallaydi. Ekstraksiya va qayta ishlash usullari biofaol moddalarning saqlanishiga bevosita ta’sir ko‘rsatadi. Zamonaviy texnologiyalar yordamida fitopreparatlarning sifat va samaradorligini oshirish mumkin. Fitopreparatlar xavfsizligi va samaradorligi tufayli tibbiyot amaliyotida keng qo‘llanilishi mumkin.

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DORIVOR O‘SIMLIKLARNING BIOFAOL MODDALARI VA ULARNING FARMAKOLOGIK AHAMIYATI

Annotatsiya: *Ushbu maqolada dorivor o‘simliklar tarkibidagi biofaol moddalar, ularning kimyoviy xususiyatlari hamda farmakologik ta’sir mexanizmlari o‘rganilgan. Shuningdek, zamonaviy farmakognoziyada o‘simlik xomashyosidan samarali foydalanish va yangi dorivor preparatlar yaratish istiqbollari tahlil qilingan.*

Kalit so‘zlar: *farmakognoziya, dorivor o‘simliklar, biofaol moddalar, alkaloidlar, flavonoidlar, fitopreparatlar*

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BIOACTIVE COMPOUNDS OF MEDICINAL PLANTS AND THEIR PHARMACOLOGICAL SIGNIFICANCE

Abstract: *This article examines biologically active compounds found in medicinal plants, their chemical properties, and mechanisms of pharmacological action. It also analyzes the prospects for effective use of plant raw materials and the development of new medicinal products in modern pharmacognosy.*

Keywords: *pharmacognosy, medicinal plants, biologically active compounds, alkaloids, flavonoids, phytopreparations*

Kirish

Hozirgi kunda dorivor o‘simliklarga bo‘lgan qiziqish butun dunyoda ortib bormoqda. Buning asosiy sababi sintetik dorilarning nojo‘ya ta’sirlarining mavjudligi hamda tabiiy preparatlarning nisbatan xavfsizligidir. Farmakognoziya fani dorivor o‘simliklar va ularning xomashyolarini o‘rganib, tibbiyot amaliyotida qo‘llash imkoniyatlarini aniqlaydi.

Tadqiqot metodikasi

Mazkur tadqiqot dorivor o‘simliklar tarkibidagi biofaol moddalarning sifat va miqdoriy tarkibini aniqlash, shuningdek ularning farmakologik ta’sirini baholashga qaratildi. Tadqiqot obyekti sifatida keng tarqalgan dorivor o‘simliklar (masalan, Mentha piperita, Matricaria chamomilla, Glycyrrhiza glabra) tanlab olindi.

O‘simlik xomashyosi vegetatsiya davrining optimal bosqichida yig‘ib olindi va laboratoriya sharoitida quritilib, maydalanib tayyorlandi. Biofaol moddalarni ajratib olish uchun quyidagi usullar qo‘llanildi:

ekstraksiya (suvli, spirtli va gidrospirtli erituvchilar yordamida);

Soxhlet apparatida qayta ekstraksiya;

ultratovush yordamida tezlashtirilgan ekstraksiya.

Ajratib olingan ekstraktlar tarkibi quyidagi fizik-kimyoviy va analitik usullar orqali o‘rganildi:

spektrofotometriya (UV/Vis) yordamida flavonoidlar va fenolik birikmalarni aniqlash;

yuqori samarali suyuqlik xromatografiyasi (YSSX/HPLC) yordamida individual komponentlarni identifikatsiya qilish;

gaz xromatografiyasi (GC) yordamida efir moylari tarkibini tahlil qilish;

titrimetrik usullar orqali umumiy biologik faol moddalarning miqdorini aniqlash.

Farmakologik faollikni baholash uchun in vitro va ayrim hollarda in vivo modellardan foydalanildi. Antibakterial faollik disk-diffuziya usuli yordamida, antioksidant faollik esa DPPH-radikalni neytrallash testi orqali baholandi.

Dorivor o‘simliklarning biofaol moddalari

Dorivor o‘simliklar tarkibida turli kimyoviy birikmalar mavjud bo‘lib, ular biologik faol moddalar hisoblanadi. Ularning asosiy guruhlari quyidagilardan iborat:

- **Alkaloidlar** – markaziy nerv tizimiga ta’sir etuvchi moddalar
- **Flavonoidlar** – antioksidant xususiyatga ega
- **Glikozidlar** – yurak faoliyatini tartibga solishda muhim
- **Efir moylari** – antiseptik va yallig‘lanishga qarshi ta’sir ko‘rsatadi
- **Saponinlar** – immun tizimini mustahkamlaydi

Farmakologik ta’sir mexanizmlari

Biofaol moddalar inson organizmiga turli yo‘llar orqali ta’sir qiladi. Masalan:

- Antioksidantlar erkin radikallarni zararsizlantiradi
- Alkaloidlar nerv impulslarini uzatishga ta’sir qiladi
- Flavonoidlar qon tomirlarini mustahkamlaydi

Bu xususiyatlar dorivor o‘simliklardan tayyorlangan preparatlarning keng qo‘llanishiga sabab bo‘ladi.

Zamonaviy farmakognoziyada tadqiqotlar

So‘nggi yillarda farmakognoziya sohasida innovatsion yondashuvlar rivojlanmoqda. Xususan:

- Biotexnologik usullar yordamida o‘simlik hujayralaridan biofaol moddalar olish
- Nanotexnologiyalar asosida fitopreparatlar yaratish
- O‘simlik ekstraktlarining molekulyar darajadagi ta’sirini o‘rganish

Bu yo‘nalishlar yangi va samarali dorilar ishlab chiqish imkonini bermoqda.

Natijalar va muhokama

Olib borilgan tadqiqotlar natijasida dorivor o‘simliklar tarkibida turli xil biofaol moddalar mavjudligi aniqlandi. Jumladan, flavonoidlar, alkaloidlar, terpenoidlar, fenol kislotalari, saponinlar va efir moylari asosiy biologik faol komponentlar sifatida qayd etildi.

Spektrofotometrik tahlil natijalariga ko‘ra, flavonoidlar miqdori Matricaria chamomilla ekstraktida yuqori ekanligi (0,85–1,2% diapazonda) aniqlandi. HPLC tahlili orqali esa Glycyrrhiza glabra tarkibida glytsirrizin va boshqa triterpenoid birikmalar mavjudligi tasdiqlandi.

Gaz xromatografik tahlil natijalari Mentha piperita efir moyi tarkibida mentol, menton va limonen asosiy komponentlar ekanligini ko‘rsatdi. Ushbu komponentlar o‘simlikning antiseptik va spazmolitik xususiyatlarini belgilab beradi.

Farmakologik tadqiqotlar natijasida barcha o‘rganilgan ekstraktlar ma’lum darajada antibakterial va antioksidant faollikka ega ekanligi aniqlandi. Eng yuqori antioksidant faollik fenolik birikmalar miqdori yuqori bo‘lgan ekstraktlarda kuzatildi.

Tadqiqotlar shuni ko‘rsatadiki, dorivor o‘simliklar asosida yaratilgan preparatlar ko‘plab kasalliklarni davolashda samarali hisoblanadi. Ular kam toksikligi va kompleks ta’sir ko‘rsatishi bilan ajralib turadi. Shu bilan birga, xomashyo sifatini standartlashtirish muhim ahamiyatga ega. Olingan natijalar dorivor o‘simliklarning farmakologik faolligi ularning kimyoviy tarkibi bilan bevosita bog‘liqligini ko‘rsatadi. Flavonoidlar va fenolik birikmalar antioksidant xususiyatlarga ega bo‘lib, erkin radikallarni zararsizlantirish orqali organizmni oksidlovchi stressdan himoya qiladi.

Alkaloidlar va terpenoidlar esa asosan antibakterial, yallig‘lanishga qarshi va analgetik ta’sir ko‘rsatadi. Masalan, Glycyrrhiza glabra tarkibidagi glytsirrizin moddasi yallig‘lanishga qarshi va immunomodulyator xususiyatga ega.

Shuningdek, efir moylari tarkibidagi komponentlar (mentol, limonen va boshqalar) nafas yo‘llari kasalliklarini davolashda muhim ahamiyatga ega. Tadqiqot natijalari shuni ko‘rsatadiki, biofaol moddalar kompleks holda ta’sir ko‘rsatib, sinergik effekt hosil qiladi.

Natijalar mavjud ilmiy adabiyotlar bilan mos keladi va dorivor o‘simliklardan samarali farmatsevtik preparatlar yaratish imkoniyatini tasdiqlaydi.

Xulosa

Farmakognoziya fani dorivor o‘simliklarni chuqur o‘rganish orqali zamonaviy tibbiyot uchun muhim manba bo‘lib xizmat qiladi. Biofaol moddalarni aniqlash va ularni amaliyotga joriy etish kelajakda yangi avlod dorilarini yaratishga zamin yaratadi. Dorivor o‘simliklar tarkibida flavonoidlar, alkaloidlar, terpenoidlar va boshqa biofaol moddalar keng tarqalganligi aniqlandi. Biofaol moddalarning miqdori va tarkibi o‘simlik turiga va ekstraksiya usuliga bog‘liq ekanligi isbotlandi.

O‘rganilgan ekstraktlar yuqori antioksidant va antibakterial faollikka ega ekanligi aniqlandi. Dorivor o‘simliklar asosida yangi samarali va xavfsiz farmatsevtik preparatlar yaratish istiqbollari mavjud.

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REVMATIZM KASALLIGIDA OSHQOZON SEKRETSIYASINING O’ZGARISHI

Annotatsiya. *Ushbu tadqiqotda revmatizm bilan og‘rigan bemorlarda oshqozon sekretsiyasining buzilishlari va ularning kasallik kechishiga ta’siri o‘rganildi. Uch yil davomida o‘tkazilgan kuzatuvlar natijasida revmatik kasalliklar bilan kasallangan 100 nafar bemor (60 nafar ayol va 40 nafar erkak, yoshi 30 gacha) tadqiqotga jalb qilindi. Bemorlarga har kuni Riss-Petrov usuli bo‘yicha tayyorlangan karam shirasi qaynatmasi berildi. Fraksionaviy tekshirish usuli yordamida oshqozon sekretsiyasi, kislotaliligi, pepsin faolligi, gastromukoprotein darajasi, evakuator va ekskretor funktsiyalari baholandi. Tahlillar natijalariga ko‘ra, bemorlarning 60% da patologik sekretsiya o‘zgarishlari aniqlandi, shundan 35% da gipersekretsiya, 25% da giposekretsiya kuzatildi. Kislotalilik ko‘rsatkichlari 77% bemorda o‘zgargan (59% da oshgan, 18% da pasaygan). Gastromukoprotein darajasi 67% hollarda o‘zgargan bo‘lib, 38% da ortishi qayd etilgan. Oshqozonning evakuator funktsiyasi 74% bemorda buzilgan (34% da tezlashgan, 40% da sekinlashgan). Bundan tashqari, 44% bemorlarda dispeptik shikoyatlar (ko‘ngil aynishi va boshqalar) kuzatilgan, 1–2 darajali qon aylanishining buzilishi aniqlangan.*

Kalit so‘zlar: *revmatizm, oshqozon sekretsiyasi buzilishlari, gipersekretsiya, giposekretsiya, gastromukoprotein, Riss-Petrov usuli, karam shirasi, qon aylanishining buzilishi, dispepsiya.*

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GASTRIC SECRETION DISORDERS IN RHEUMATISM

Abstract: *This article examines the impact of gastric secretion on rheumatic diseases. The study included data spanning three years. Sixty women and 40 men with rheumatic diseases were included, for a total of 100 patients under 30 years of age. For the study, subjects were given a cabbage juice decoction daily using the Riess-Petrov method. Test results revealed increased hypersecretion and gastromucoprotein. Circulatory impairment of grades 1-2 and nausea were observed.*

Keywords: *Rheumatism, stomach, patient, Riess-Petrov method, hypersecretion, gastromucoprotein, circulatory impairment, hyposecretion.*

Kirish

Zamonaviy bemorning eng xarakterli belgisi — polimorbidlikdir. Klinik amaliyotda sintropiyalar (turli kasalliklarning bir organizmda qonuniyatli birikishi), distropiyalar (turli kasalliklarning bir organizmda qonuniyatli ravishda kam uchraydigan yoki imkonsiz birikishi) va interferensiya (bir kasallikning ikkinchisiga ta'siri) ning xususiy namoyon bo'lishlarini o'rganish muhim ahamiyatga ega. Sintropiya mavjud bo'lganda amaliy qiziqish ikki kasallikning aniq xususiyatlari va rivojlanishining asosiy tendensiyalarini o'rganishdan iborat: bir vaqtda rivojlanishi, ikkinchi kasallikning birinchisiga nisbatan ketma-ket rivojlanishi kuzatiladi [1,2,3]. Nozologik shakllarning patomorfizi o'zgarishi fonida bu jarayonni aniqlash qiyinlashmoqda. Oshqozonning saraton oldi kasalliklarini shakllantirishda oshqozon sekretsiya funktsiyasi holati muhim rol o'ynaydi. Bunda uning buzilishlari ko'pincha morfologik o'zgarishlar, ya'ni shilliq qavatning progressiv atrofiyasi, asosiy oshqozon bezlarining shikastlanishi va oshqozon shilliq qavatida disregenerator jarayonlar bilan bog'liq bo'ladi [4,5]. Yallig'lanish va distrofik jarayonga ham parietal hujayralar, ham asosiy hujayralar jalb qilinishi mumkin. Bu esa xlorid kislota va pepsinogenlar ajralishining kamayishiga olib keladi. Atrofiya jarayonida bu ixtisoslashgan hujayralar mukotsitlar bilan almashtiriladi. So'nggi yillarda oshqozon va o'n ikki barmoqli ichak shilliq qavatining eroziya va yara shikastlanishlarining rivojlanishi va qaytalanishida oshqozon-ichak trakti mikromuxitining o'zgarishlariga muhim ahamiyat berilmoqda. Bu o'zgarishlar shiliq qavtni mikrofloraning haddan tashqari ko'payishi va uning agressiv xususiyatlarining kuchayishi bilan tavsiflanadi [6,7]. Revmatizmda ovqat hazm qilish a'zolarining funksional holati yetarli darajada o'rganilmagan. Ma'lumki, revmatizm bilan og'rigan bemorlar ko'pincha ovqat hazm qilish tizimi tomonidan shikoyatlar bildiradilar.

Tadqiqot maqsadi

Ushbu ishning maqsadi revmatizm bilan og'rigan bemorlarda oshqozonning ayrim funktsiyalari holatini o'rganishdan iborat. Oshqozon holatini baholashda sekretsiya, kislotalilik, pepsin, shilimshiq, xloridlar, gastromukoprotein, oshqozon shirasi oqsillari, sinov nonushtasining evakuatsiya tezligi va neytral ekskretor funktsiya ma'lumotlari hisobga olindi.

Tadqiqot materiallari va usullari

Tadqiqotlar fraksionaviy usulda, sinov nonushtasi sifatida Riss-Petrova usuli bo'yicha tayyorlangan karam qaynatmasi yordamida o'tkazildi. Kuzatuv ostida 100 nafar revmatizm bilan og'rigan bemor bo'ldi. Ulardan 60 nafari ayollar, 40 nafari erkaklar olindi. Bemorlarning ko'pchiligi 30 yoshdan kichikni tashkil qildi. Tekshirilganlarning 72% ni revmatizm bilan 3 yildan ortiq vaqt davomida kasallangan bemorlar olindi.

Tadqiqot natijalari

Revmatizmning faol fazasi 76% bemorlarda (15% bemorlarda — birinchi revmoatakada) qayd etildi, nofaol faza — 24% ni tashkil qildi. Yurak klapnlari nuqsonlari 78% bemorlarda aniqlandi. 46% bemorlarda 1–2 darajali qon aylanishining buzilishi kuzatildi. 44% bemorlar dispeptik shikoyatlar bildirgan.

Ko‘rinib turibdiki, sekretsiyaning patologik o‘zgarishlari 60% bemorlarda aniqlandi (35% da — gipersekretsiya, 25% da — giposekretsiya); kislotalilik darajasi — 77% da o’zgargan. Kislotalik oshgan — 59% da, kislotalik pasaygan — 18% da; parchalash kuchi — 60% da o’zgargan. Shundan oshgan — 41% da, pasaygan — 18% da; gastromukoprotein — 67% da o’zgarish kuzatilgan. Oshgan holat — 38%, pasaygan holati — 29% da kuzatiladi; evakuatsiya funktsiya — 74% da bizilgan. Tezlashgan ko’rsatkich — 34% da, sekinlashgan — 40% bemorlarda); ekskretor funktsiya — 75% bemorlarda buzilgan. 47 ta bemorda oshqozon shirasida shilimshiqning sezilarli miqdori mavjud bo’lnan. Oshqozon shirasi oqsillari tomonidan ham sezilarli o‘zgarishlar kuzatildi. Fol’gard bo‘yicha shira xloridlari o‘rtacha ko‘rsatkichi 311 mg% ni tashkil etdi. Naxorda kislotalilikning oshgan raqamlari 18% da, pepsin — 31% da, gastromukoprotein — 40% bemorlarda qayd etildi. Naxorda gipersekretsiya kuzatilmadi. Xloridlarning o‘rtacha ko‘rsatkichi 291 mg% ni tashkil etdi. Birlamchi revmatizmda bemorlarda ko‘pincha gipersekretsiya va sekinlashgan evakuatsiya kuzatilgan bo‘lsa, qon aylanishi yetishmovchiligida giposekretsiya va tezlashgan evakuatsiya aniqlandi.

Xulosa

Revmatizmda oshqozonning asosiy funktsiyalari tomonidan sezilarli siljishlar kuzatiladi. Buni klinik amaliyotda hisobga olish lozim. Kasallikning dastlabki bosqichlarida (faol faza, kasallik boshlanishi) ko‘pincha xlorid kislota sekretsiyasining oshgan yoki normal holati (gipersekretsiya yoki normoatsid holat) qayd etiladi. Kasalik uzoq davom etgan hollarda, ayniqsa cho‘ziluvchan va qaytalanuvchi shakllarda sekretsiya funktsiyasining pasayishi — gipoatsid yoki anatsid holat tez-tez kuzatildi. Bu esa aniq sekretsiya yetishmovchiligi bilan kechadigan surunkali atrofik gastrit shaklida namoyon bo‘ladi.

Olingan natijalar revmatizmda oshqozon sekretsiyasining sezilarli darajada buzilishini ko‘rsatadi va bu o‘zgarishlar kasallikning sistemali kechishida muhim rol o‘ynashi mumkin. Riss-Petrov usuli bo‘yicha karam shirasi qaynatmasidan foydalanish oshqozon sekretsiyasi va gastromukoprotein darajasini oshirishga yordam bergan bo‘lib, bu revmatik bemorlarda oshqozon funksional holatini baholash va davolashda hisobga olinishi lozim.

Foydalanilgan adabiyotlar:

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THE RELEVANCE OF STUDYING LIPOPROTEIN EXCHANGE IN REGULAR BLOOD DONORS

Annotation*: The relevance of this work is the identification and study of low-density lipoproteins in the blood of regular donors, which is associated with metabolic disorders related to the circulatory system and its composition, changes in lipid metabolism and cholesterol levels, including diseases of the cardiovascular system: atherosclerosis, ischemic heart disease, arterial hypertension, diseases of the microcirculatory system, changes leading to serious complications such as thrombosis, embolism, ischemia in peripheral organs, etc. is to shed light on the scientific and practical significance of atherosclerosis and its complications, which are less common in people without it. Atherosclerosis and its complications are a serious medical and social problem and rank first in the world in terms of the number of patients compared to other cardiovascular diseases. Pathologies associated with low-density lipoproteins (LDL) first manifest clinically at the most active age (30-50 years) and tend to cause complications. In recent years, a steady trend toward an increase in cardiovascular diseases associated with atherosclerosis and its complications among young people has been observed.*

Keywords*: atherosclerosis, blood donation, low-density lipoproteins (LDL), high-density lipoproteins (HDL), cholesterol, triglycerides.*

Introduction

Several studies have shown that regular blood donation is associated with a decrease in lipid profile parameters. Lipid profile assessment is an accepted personality assessment method that helps determine the risk of coronary heart disease. Regular blood donation can reduce iron stores, which in turn reduces lipid peroxidation. This study is conducted to determine the impact of blood donation on the lipid profile.

Objective of the study

By studying lipid metabolism in the body of regular blood donors and assessing its state, it is necessary to scientifically substantiate the relatively low incidence of cardiovascular diseases and their complications (myocardial infarction, unstable angina, ischemic and hemorrhagic strokes, hypertensive disease), atherosclerosis, dystrophic diseases of the liver and other parenchymal organs, metabolic disorders, circulatory disorders in the central nervous system, and musculoskeletal disorders (rheumatoid arthritis, polyarthritis, osteochondrosis, arthrosis) in regular donors, highlighting the importance of this activity in human health and the prevention of many diseases.

Materials and methods

226 participants agreed to participate and registered,

were included in the study, of which 154 were regular blood donors (study group) and 72 were non-donors (control group). Venous blood (10 ml) was collected from each subject into disposable plastic tubes with a new screw cap. This serum was used to determine total cholesterol, triglycerides, low-density lipoproteins, and high-density lipoproteins.

The study was conducted on a total of 226 subjects, including 154 permanent donors (study group) and 72 non-donors or first-time donors (control group).

- 21-58 years old with at least two blood donations
- within the last 12 months, four times within the last 24 months, or
- at least six times in the last 36 months. Exclusion criteria:

donors with a history of tobacco use, hypertension, diabetes mellitus, and cardiovascular diseases, as well as pregnant and breastfeeding women.

Commercial test kits manufactured by Roche Diagnostics (Basel, Switzerland) were used to determine HDL (HDL-cholesterol and the 3rd-generation set), total cholesterol (Chad-Pap Cholesterol set), LDL (LDL-cholesterol plus the 2nd-generation set), and triglycerides (triglyceride set).

All analyses were performed using a Hitachi 902 autoanalyzer (Hitachi Ltd, Tokyo, Japan).

Results:

A total of 226 subjects were included in the study, including 154 regular blood donors (the study group) and 72 first-time donors (the control group). As shown in Table 1, the age of the subjects ranged from 21 to 58 years. There was no significant difference in the mean age between the two groups (35.29 ± 7.94 years in the study group and 33.77 ± 9.15 years in the control group; P = 0.461).

Mean total cholesterol (4.66 ± 0.86 mmol/L), triglycerides (1.22 ± 0.64 mmol/L), and low-density lipoprotein (2.32 ± 0.73 mmol/L) were significantly lower in regular blood donors compared to the group of first-time donors (5.61 ± 1.26 mmol/L, 1.77 ± 2.9 mmol/L, and 3.06 ± 0.89 mmol/L), respectively; P<0.05, in all cases). Furthermore, 42% of the study group had a low/high-density lipoprotein ratio of at least three, while approximately 57% of the control group had at least three ratios (P=0.21).

Table 1.
Age distribution of subjects

Age group	Regular blood donors	Donors donating blood for the first time	General
Ages 20 - 29	39	23	62
Ages 30 - 39	55	24	79
Ages 40 - 49	43	15	58
Ages 50+	17	10	27
General	154	72	226
Average age	35.29 ± 7.94	33.77 ± 9.15	34.70 ± 8.4;

Note: P = 0.461.

In the group of regular blood donors, there were 144 men and 10 women, while in the group of first-time donors, there were 69 men and 3 women. There is no significant difference between the sexes in both groups.

(P = 0.281; Table 2.

Table 2. Distribution of subjects by gender

Genus	Regular blood donors	Donors donating blood for the first time	General
Men	144	69	213
Women	10	3.	13
General	154	72	226

Note: P = 0.281.

The mean body mass index (26.50 ± 4.20 kg/m2) in the group of regular blood donors did not differ significantly (26.30 ± 4.00 kg/m2) from the group of donors donating blood for the first time (P = 0.744). The comparison of the average serum lipid content in the study and the control groups is presented in Table 3. Total cholesterol (4.66 ± 0.86), triglycerides (1.22 ± 0.64), and LDL (2.32 ± 0.73) in the study group compared to 0.64) and LDL (0.73) in the control group (5.61 ± 1.26, 1.77 ± 2.91, and 3.06 ± 0.89, respectively). However, only values for total cholesterol and LDL showed a statistical difference in both cases (P = 0.000). In the control group (1.00±0.26 mm/L), serum HDL levels were significantly higher (P=0.016), compared to the study group (0.86±0.24 mm/L). The LDL/HDL ratio was lower in the study group (2.90±1.28 mm/L) compared to the control group (3.22±1.04 mm/L), but not significant (P=0.247).

Table 3.
Comparison of mean serum lipids (mmol/L) (n=44) between the study and control groups (n=32).

Plasma lipids	Regular blood donors	Donors donating blood for the first time	P-value
Total cholesterol	4.66 ± 0.86.	5.61 ± 1.26	0.000
Triglycerides	1.22 ± 0.64	1.77 ± 2.91	0.119
HDL	0.86 ± 0.24	1.00 ± 0.26	0.016
LDL	2.32 ± 0.73;	3.06 ± 0.89.	0.000
HDL/LDL ratio	2.90 ± 1.28	3.22 ± 1.04	0.247

Abbreviations: HDL - high-density lipoprotein; LDL is a low-density lipoprotein.

Although there was no statistical difference, it was found that total cholesterol, triglycerides, and LDL were lower in the study group compared to the control group (Table 4). The average women in the study group had total cholesterol, triglycerides, and LDL levels (4.79 ± 0.75 mmol/L, 1.04 ± 0.43 mmol/L, and 2.40 ± 0.77 mmol/L, respectively) lower than the total cholesterol, triglycerides, and LDL levels of women in the control group (5.24 ± 0.98 mmol/L, 2.21 ± 4.27 mmol/L, and 2.84 ± 0.76 mmol/L, respectively). Similarly, these values were lower in men in the study group (4.59 ± 0.91 mmol/L, 1.15 ± 0.73 mmol/L, and 2.28 ± 0.71 mmol/L, respectively) than in the control group (5.94 ± 1.44 mmol/L, 1.39 ± 0.47 mmol/L, and 3.24 ± 0.98 mmol/L, respectively) (Table 4).

Table 4.

Comparison of mean serum lipids (mmol/L) (n=44) between the studied and control groups (n=32) by gender.

Serum lipids	Regular blood donors			Donors donating blood for the first time			P-value			
	Women N=15;	Men N=29	General N=44	Women N=15;	Men N=17;	General N=32	*	**	***	***
Total cholesterol	*4.79 ± 0.75*	*4.59 ± 0.91;*	*4.66 ± 0.86.*	*5.24 ± 0.98;*	*5.94 ± 1.41*	*5.61 ± 1.26*	*0.400*	*0.822*	*0.165*	*0.160*
Triglycerides	*1.04 ± 0.43;*	*1.15 ± 0.73;*	*1.11 ± 0.64*	*2.21 ± 4.27*	*1.39 ± 0.47*	*1.77 ± 2.91*	*0.498*	*0.481*	*0.315*	*0.169*
HDL	*0.89 ± 0.22*	*0.84 ± 0.25*	*0.86 ± 0.24*	*0.99 ± 0.28*	*1.00 ± 0.26*	*1.00 ± 0.26*	*0.464*	*0.921*	*0.291*	*0.045*
LDL	*2.40 ± 0.77;*	*2.28 ± 0.71*	*2.32 ± 0.73;*	*2.84 ± 0.76*	*3.24 ± 0.98;*	*3.06 ± 0.89.*	*0.585*	*0.219*	*0.117*	*0.000*

Notes: * Comparison of women and men in the group of regular blood donors; * * Comparison of women and men in the group of first-time blood donors; ** * Comparison of women in the regular blood donor group with women in the control group; * * * * Comparison of men in the group of regular blood donors with men in the group of first-time donors.

Abbreviations: HDL - high-density lipoprotein; LDL is a low-density lipoprotein.

Discussion:

It was found that regular blood donors have a lower risk of cardiovascular diseases compared to non-donors or first-time donors. This study examined a total of 226 subjects - 154 regular donors and 72 non-permanent or first-time donors. This study showed that total cholesterol (P=0.000) and LDL (P=0.000) were lower in the study group than in the control group. Triglyceride levels in the study group were also lower than in the control group (P = 0.119). The mean HDL level in the control group was significantly higher than in the study group (P = 0.016).

The available literature indicates that high LDL/HDL values are associated with an increased risk of cardiovascular diseases. In this study, no significant difference in serum lipid content was found between 57% of the control group and 42% of the study group. However, regular blood donation and a healthy lifestyle reduce the risk of developing cardiovascular pathologies [3, 6, 10, 11, 12, 13, 14, 15, 16, 17].

Conclusion

Regular blood donation can protect against cardiovascular diseases.

Regular blood donors are characterized by significantly lower levels of average total cholesterol and low-density lipoprotein compared to non-donors.

The blood bank is suffering from blood shortages worldwide due to limited donation. In general, blood donation has many health benefits. However, there are not enough scientific studies showing this [8, 9, 18].

Donation is dedication. In medical terms, donation is the transfer of a part of a tissue, such as blood or an organ, from one organism—the "donor"—to the receiving organism, the "recipient." Currently, donation is one of the developed areas of medicine. Donation is actually one of the examples of humanity. An example of a "angel of salvation" for patients with serious illnesses is healthy people who are constantly on the state list of donors.

The state has established rights and benefits for donors, through which donors monitor their health through annual medical examinations.

Today, the lack of popularity of donor activities in our country, the presence of negative opinions among the population about donor activities, and the high demand for this activity in medicine are of particular importance [1, 7].

Research has shown that average total cholesterol, triglycerides, and low-density lipoproteins in regular blood donors are significantly lower than in non-donors. Regular blood donation can protect against cardiovascular diseases, which means that average levels of total cholesterol and low-density lipoproteins in regular blood donors can be significantly lower than in non-donors.

Regular blood donation was found to be beneficial in many ways. This stimulates bone marrow activity and increases the production of blood-forming elements. In addition, it prevents the accumulation of iron in the body (hemosiderosis) and reduces the formation of iron-related free radicals in the body during pathologies [2, 4, 5, 19].

The effect of regular blood donation on cholesterol levels in the plasma prevents the development of atherosclerosis. Studies have shown that blood donation every 6 weeks reduces oxidative processes, reduces the formation of low-density lipoproteins (LDL), and reduces the risk of developing atherosclerosis.

Some studies suggest that high levels of iron may play a role in the oxidation process, which is an early sign of atherosclerosis. Other studies suggest that regular blood donation can help reduce such risk factors.

Accordingly, this study focused on assessing serum lipids in regular blood donors and with non-donors or first-time donors.

Regular blood donors have significantly lower levels of total cholesterol and LDL compared to first-time donors, indicating a lower risk of cardiovascular diseases.

Thus, regular blood donation leads to a decrease in serum lipids. However, more extensive research is needed to substantiate these conclusions.

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ZAMONAVIY TIBBIYOTDA KLINIK FARMASEVTNING O‘RNI VA AHAMIYATI

Annotatsiya: *Mazkur ilmiy ishda zamonaviy tibbiyot tizimida klinik farmasevtning roli, vazifalari va amaliy ahamiyati tahlil qilingan. Bugungi kunda dori vositalarining soni ortib borayotgani, farmakoterapiyaning murakkablashishi va bemorlarda bir vaqtning o‘zida bir nechta kasalliklarning uchrashi dorilarni ratsional qo‘llashni talab etadi. Shu nuqtai nazardan klinik farmasevt tibbiy jamoaning muhim a’zosi hisoblanadi. U dorilarni to‘g‘ri tanlash, dozalash, dori–dori o‘zaro ta’sirlarini aniqlash va noxush dorivor reaksiyalarning oldini olishda faol ishtirok etadi. Tadqiqot jarayonida klinik farmasevtning tibbiy amaliyotdagi ahamiyati, uning bemor xavfsizligini ta’minlashdagi roli va farmakoterapiya samaradorligiga ta’siri o‘rganildi. Olingan natijalar klinik farmasevtning tibbiy jamoadagi ishtiroki davolash sifatini oshirishga xizmat qilishini ko‘rsatdi.*

Kalit so‘zlar: *klinik farmatsiya, klinik farmasevt, farmakoterapiya, dori vositalari, ratsional dori qo‘llash, noxush dorivor reaksiyalar, tibbiy jamoa, bemor xavfsizligi.*

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THE ROLE AND SIGNIFICANCE OF THE CLINICAL PHARMACIST IN MODERN MEDICINE

Abstract: *This research paper analyses the role, responsibilities and practical significance of the clinical pharmacist in the modern healthcare system. Today, the growing number of medicines, the complexity of pharmacotherapy and the simultaneous presence of multiple conditions in patients necessitate the rational use of medicines. From this perspective, the clinical pharmacist is regarded as a key member of the healthcare team. They play an active role in the correct selection and dosing of medicines, the identification of drug interactions, and the prevention of adverse drug reactions. This study examined the importance*

of the clinical pharmacist in medical practice, their role in ensuring patient safety, and their influence on the effectiveness of pharmacotherapy. The results showed that the involvement of the clinical pharmacist in the work of the medical team contributes to improving the quality of care.

Keywords: *clinical pharmacy, clinical pharmacist, pharmacotherapy, medicines, rational use of medicines, adverse drug reactions, healthcare team, patient safety.*

Kirish

So‘nggi o‘n yilliklarda tibbiyot va farmatsiya sohasida katta ilmiy va texnologik taraqqiyot kuzatilmoqda. Yangi dori vositalari, murakkab farmakologik sxemalar, individual yondashuvga asoslangan davolash usullari va innovatsion terapiya tamoyillarining amaliyotga joriy qilinishi klinik davolash sifatini oshirdi. Biroq shu bilan birga, farmakoterapiyani boshqarish jarayoni ham ancha murakkablashdi. Ayniqsa, polipragmaziya, ya’ni bemor tomonidan bir vaqtning o‘zida bir nechta dori vositalarini qabul qilish holatlari keng tarqalib, davolash samaradorligi va xavfsizligi masalasini yanada dolzarb qilmoqda.

Ko‘p sonli dori vositalarini qo‘llash dori–dori o‘zaro ta’siri, noxush dorivor reaksiyalar, noto‘g‘ri dozalanish, kontrendikatsiyalarni e’tibordan chetda qoldirish va dorilarni noto‘g‘ri qabul qilish kabi muammolarni yuzaga keltiradi. Bunday holatlar, ayniqsa, surunkali kasalliklarga chalingan, yoshi katta, bir nechta mutaxassis nazoratida bo‘lgan yoki intensiv davolanish olayotgan bemorlarda ko‘proq uchraydi. Shu sababli tibbiyot amaliyotida farmakoterapiyani ratsional tashkil etish masalasi alohida ahamiyat kasb etmoqda.

Mazkur jarayonda klinik farmasevtning o‘rni tobora ortib bormoqda. Klinik farmatsiya farmatsevtika fanining bemor manfaatini markazga qo‘yuvchi zamonaviy yo‘nalishi bo‘lib, uning asosiy vazifasi dori vositalarining xavfsiz, samarali va iqtisodiy jihatdan maqbul qo‘llanilishini ta’minlashdan iborat. Klinik farmasevt shifokor bilan birgalikda davolash sxemasini tahlil qiladi, dori vositalarining farmakokinetik va farmakodinamik xususiyatlarini baholaydi, dori–dori o‘zaro ta’sirlarini aniqlaydi, dozalash tartibini optimallashtiradi va bemorlarga dori vositalarini to‘g‘ri qabul qilish bo‘yicha tavsiyalar beradi.

Shunday qilib, klinik farmasevt zamonaviy sog‘liqni saqlash tizimida davolash jarayonining bevosita ishtirokchisiga aylanmoqda. Uning faoliyati nafaqat farmakoterapiya samaradorligini oshirish, balki bemor xavfsizligini ta’minlash, davolashdagi xatolarni kamaytirish va sog‘liqni saqlash tizimi resurslaridan oqilona foydalanishga xizmat qiladi.

Mazkur maqolaning maqsadi klinik farmasevtning zamonaviy tibbiyotdagi o‘rni va farmakoterapiya samaradorligini oshirishdagi ahamiyatini ilmiy jihatdan tahlil qilishdan iborat.

Materiallar va usullar

Ushbu tadqiqotni amalga oshirishda ilmiy va tahliliy yondashuvlardan foydalanildi. Avvalo, klinik farmatsiya va klinik farmasevtlar faoliyatiga oid mahalliy va xorijiy ilmiy adabiyotlar o‘rganildi. Tahlil jarayonida klinik

farmakologiya, farmatsevtik parvarish, dorilarni ratsional qo‘llash va bemor xavfsizligiga doir ilmiy maqolalar, monografiyalar hamda o‘quv adabiyotlari ko‘rib chiqildi.

Qiyosiy tahlil usuli orqali klinik farmasevtlar ishtirok etgan va ishtirok etmagan tibbiy muassasalardagi farmakoterapiya samaradorligi bo‘yicha ma’lumotlar nazariy jihatdan taqqoslandi. Ushbu yondashuv davolash natijalari, dori vositalarini ratsional qo‘llash darajasi, noxush dorivor reaksiyalar soni va bemor xavfsizligi ko‘rsatkichlarini baholash imkonini berdi.

Kuzatish usuli yordamida klinik farmasevtlarning bemorlar bilan ishlash jarayoni, dori tanlash va dozalashdagi ishtiroki, shifokorlar bilan multidissiplinar hamkorligi hamda bemorlarga beriladigan maslahatlarning mazmuni tahlil qilindi. Bu yondashuv klinik farmasevt faoliyatining amaliy jihatlarini yanada chuqurroq ochib berishga xizmat qildi.

Bundan tashqari, umumlashtirish va tizimlashtirish usullari asosida olingan ma’lumotlar tartibga solindi va ilmiy xulosalar shakllantirildi. Tadqiqotning metodologik asosini klinik farmatsiyaning amaliy ahamiyati, farmakoterapiya xavfsizligi va davolash sifatini oshirish mexanizmlarini tahlil qilish tashkil etdi.

Natijalar

Tadqiqot natijalari klinik farmasevtlarning tibbiy muassasalardagi faoliyati farmakoterapiya samaradorligini sezilarli darajada oshirishini ko‘rsatdi. Birinchi navbatda, klinik farmasevtlar bemorga buyurilgan dori vositalarini tahlil qilib, ularning o‘zaro ta’siri va ehtimoliy nojo‘ya ta’sirlarini baholaydi. Natijada noxush dorivor reaksiyalar xavfi kamayadi va davolash jarayoni xavfsizroq bo‘ladi.

Klinik farmasevtlar shifokorlar bilan birgalikda bemor uchun individual farmakoterapiya rejasini ishlab chiqishda ishtirok etadi. Bunda bemorning yoshi, jinsi, asosiy va hamroh kasalliklari, buyrak va jigar faoliyati, avval buyurilgan dorilar, allergik anamnezi hamda individual farmakologik javobi hisobga olinadi. Bunday individual yondashuv, ayniqsa, ko‘p dori qabul qiladigan bemorlarda davolash sifatini oshiradi.

Shuningdek, klinik farmasevtlarning muhim yo‘nalishlaridan biri bemorlarni dori vositalarini to‘g‘ri qabul qilish qoidalari bo‘yicha xabardor qilishdir. Tadqiqot natijalariga ko‘ra, bemorga dorini qachon qabul qilish, ovqatdan oldinmi yoki keyinmi ichish, doza va qabul qilish oralig‘iga qat’iy rioya qilish, davolash kursini o‘zboshimchalik bilan o‘zgartirmaslik kabi tavsiyalar berilishi dori terapiyasining samaradorligini oshiradi.

Tahlillar shuni ko‘rsatdiki, klinik farmasevtlar faoliyat yuritayotgan tibbiy muassasalarda dori vositalarini noto‘g‘ri qo‘llash holatlari kamayadi, noxush dorivor reaksiyalar kamroq qayd etiladi va davolash natijalari yaxshilanadi. Bu esa klinik farmasevtning bemor xavfsizligini ta’minlashdagi roli juda muhim ekanini tasdiqlaydi.

Bundan tashqari, klinik farmasevt dori vositalarini tanlashda iqtisodiy samaradorlikni ham inobatga oladi. U davolash samaradorligini saqlagan holda nisbatan maqbul va samarali dori vositalarini tavsiya qilishi mumkin. Bu tibbiy

muassasa xarajatlarini kamaytirish, resurslardan oqilona foydalanish va bemorlar uchun farmakoterapiyani iqtisodiy jihatdan yengillashtirishga yordam beradi.

Zamonaviy tibbiyot amaliyotida klinik farmasevtlar intensiv terapiya, kardiologiya, onkologiya, endokrinologiya, nefrologiya va geriatrik yo‘nalishlarda ayniqsa muhim o‘rin egallaydi. Aynan ushbu bo‘limlarda murakkab, uzoq muddatli va ko‘p komponentli farmakoterapiya olib borilishi klinik farmasevt ishtirokini zaruratga aylantiradi.

Muhokama

Olingan natijalar klinik farmasevtning zamonaviy tibbiyotdagi o‘rni tobora kengayib borayotganini ko‘rsatadi. Ilgari farmasevt faoliyati asosan dori vositalarini tayyorlash, saqlash va tarqatish bilan bog‘liq deb qaralgan bo‘lsa, hozirgi davrda u bevosita klinik qarorlar qabul qilish jarayonining muhim bo‘g‘iniga aylangan. Ayniqsa, polipragmaziya kuchaygan va davolash protokollari murakkablashgan sharoitda klinik farmasevtning ishtiroki davolash xavfsizligini ta’minlashda katta ahamiyatga ega.

Muhokama natijasida shuni ta’kidlash mumkinki, klinik farmasevtning faoliyati farmakoterapiyani individualizatsiya qilishga xizmat qiladi. Har bir bemorda dori vositalariga bo‘lgan javob turlicha bo‘lishi, hamroh kasalliklar va boshqa terapiyalar mavjudligi davolash rejasini muntazam qayta ko‘rib chiqishni talab qiladi. Klinik farmasevt aynan shu bosqichda ilmiy asoslangan tahliliy tavsiyalar berib, dori tanlashni optimallashtiradi.

Klinik farmasevtlar faoliyatining muhim afzalliklaridan biri noxush dorivor reaksiyalar profilaktikasi bilan bog‘liqdir. Dori vositalarining o‘zaro mos kelmasligi, dozaning noto‘g‘ri tanlanishi yoki farmakokinetik xususiyatlarni hisobga olmaslik ko‘plab asoratlarga olib kelishi mumkin. Klinik farmasevt ushbu xavflarni oldindan baholash orqali shifokorga ilmiy asoslangan maslahat beradi va farmakoterapiya xavfsizligini oshiradi.

Shuningdek, klinik farmasevt bemor ta’limida ham muhim o‘rin tutadi. Dorilarni to‘g‘ri qabul qilish bo‘yicha yetarli ma’lumotga ega bo‘lmagan bemorlarda davolash rejimiga rioya qilmaslik hollari ko‘p uchraydi. Bu esa dori samaradorligini pasaytiradi, asoratlar xavfini oshiradi va surunkali kasalliklarni boshqarishni qiyinlashtiradi. Klinik farmasevtning individual maslahatlari bemorlarning davolanishga sodiqligini oshirishga yordam beradi.

Boshqa tomondan, klinik farmatsiya tizimini rivojlantirish uchun tashkiliy, o‘quv-uslubiy va me’yoriy asoslarni yanada mustahkamlash talab etiladi. Tibbiy muassasalarda klinik farmasevt shtat birliklarini kengaytirish, ularning vakolatlarini aniq belgilash va shifokorlar bilan samarali hamkorlik mexanizmlarini yo‘lga qo‘yish muhimdir.

Xulosa

Olib borilgan tahlillar shuni ko‘rsatdiki, klinik farmasevt zamonaviy sog‘liqni saqlash tizimida muhim o‘rin egallaydi. Uning asosiy vazifasi dori vositalaridan oqilona foydalanishni ta’minlash, farmakoterapiya samaradorligini oshirish va bemor xavfsizligini mustahkamlashdan iborat.

Klinik farmasevtning tibbiy jamoada faol ishtiroki dori–dori o‘zaro ta’sirlarini kamaytirish, noxush dorivor reaksiyalarni oldini olish, davolash natijalarini yaxshilash va iqtisodiy jihatdan maqbul terapiyani tanlashga xizmat qiladi. Shu bilan birga, bemorlarni dorilarni to‘g‘ri qabul qilish bo‘yicha xabardor qilish ham farmakoterapiya muvaffaqiyatining muhim omili hisoblanadi.

Kelgusida tibbiy muassasalarda klinik farmasevtlar faoliyatini yanada kengaytirish, ularning multidissiplinar jamoalardagi rolini kuchaytirish va amaliyotga kengroq joriy etish zarur. Bu esa tibbiy xizmat sifati oshishiga, bemorlar salomatligi yaxshilanishiga va farmakoterapiya xavfsizligi ta’minlanishiga xizmat qiladi.

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GASTRIT VA XOLETSISTIT KASALIKLARI BO'LGAN BEMORLARDA OSHQOZON SHIRASIINING FUNKSIONAL FAOLLIGI

Annotatsiya: *Maqolada yillar davomida gastrit va xoletsistit kasaligi bilan kasallangan bemorlarda oshqozon shirasi funksional holatini olib borilgan kuzatuv va tekshruv natijalari keltirilgan. Erkak va ayollarda oshqozondagi ximozin fermenti faolligi o'rganilgan. Ximozin fermentining faolligi xoletsistit kasaligi bilan kasallangan bemorlarda, gastrit kasalligi bilan kasallangan bemorlarga qaraganda ancha past ko'rsatkichni tashkil qiladi.*

Kalit so'zlari: *Odamlar, bemor, kuzatuv, gastrit, xoletsistit, oshqozon shirasi, ximozin, erkak, ayol.*

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FUNCTIONAL ACTIVITY OF GASTRIC JUICE IN PATIENTS WITH GASTRITIS AND CHOLECYSTITIS

Abstract: *This article presents the results of observations and studies of the functional state of gastric juice in patients with gastritis and cholecystitis over recent years. The activity of the enzyme chymosin in the stomach of men and women was studied. Chymosin activity in patients with cholecystitis is significantly lower than in patients with gastritis.*

Keywords: *People, patient, observation, gastritis, cholecystitis, gastric juice, chymosin, man, woman.*

Kirish

Hozirgi vaqtda yara paydo bo‘lishining umumqabul qilingan nazariyalari H. pylori ning doimiy saqlanishi va kislota-peptik omilning o‘zaro patogen ta’sirini kuchaytirishi nuqtai nazaridan ko‘rib chiqilmoqda. Shu bilan birga, H. pylori kasallikning surunkali kechishini qo‘llab-quvvatlaydi va qaytalanish xavfini yaratadi [1,2]. Surunkali qabziyat bugungi kunda eng keng tarqalgan patologik holatlardan biri hisoblanadi. Qabziyatlar izolyatsiya shaklida uchraydi yoki biror patologiyaning (gastrit, xoletsistit, spastik yoki atonik kolit va boshqalar) simptomi sifatida namoyon bo‘lishi mumkin [3,4]. Yara kasalligining dolzarb masalalariga bag‘ishlangan ko‘plab tadqiqotlar mavjud bo‘lishiga qaramay,

hozirgacha o‘n ikki barmoqli ichak va oshqozon yara kasalligining qaytalanishi, oshqozon shilliq qavatida HP ning yuqishi, yara kasalligining davomiyligi, asoratlangan yoki asoratlanmagan kechishi, bemorlarning jinsi va yoshi, davolanishgacha bo‘lgan yara soni va o‘lchami hamda yuqoridagi ko‘rsatkichlarga bog‘liq holda yara bitish samaradorligi o‘rtasidagi mumkin bo‘lgan bog‘liqlik (yoki uning yo‘qligi) aniq emas [5,6,7]. Oshqozon bezlarining ko‘p sonli funktsiyalaridan biri uning proteolitik faoliyatidir. Shuning uchun oshqozon shirasining ximaz faolligi holati bo‘yicha oshqozonning proteolitik funktsiyasi haqida xulosa chiqarish mumkin. Surunkali o‘t yo‘llari kasalliklarida oshqozon sekretsiyasi holati yoritilgan. Biroq oshqozonning proteolitik funktsiyasini o‘rganishga kam e’tibor qaratilgan.

Tadqiqot maqsadi

Gastrit va xoletsistit bilan kasalangan bemorlarda oshqozon shirasining funksional faolligini o‘rganish.

Tadqiqot materiallari va usullari

Bir yil davomida biz turli etiologiyali xoletsistit bilan og‘rigan 53 nafar bemorni kuzatdik. Deyarli barcha bemorlarda qo‘shimcha kasallik sifatida gastrit aniqlangan. 39 nafar bemorda oshqozon tarkibi Leporskiy usuli bo‘yicha 5% li spirtli Ertman nonushtasi yordamida, 14 nafarida esa insulin-gistaminli qo‘zg‘atuvchi bilan o‘rganildi. Ximaz faolligi Savich usuli bo‘yicha och qoringa va qo‘zg‘atuvchilardan keyin aniqlandi. Tekshirilganlar orasida ayollar 43 nafar, erkaklar 10 nafar edi.

Tadqiqot natijalari

Ayollar orasida normal ximaz faolligi 38 nafar bemorda, pasaygan — 3 nafarda, qoniqarsiz — 1 nafarda kuzatildi. Erkaklar orasida normal ximaz faolligi 6 nafar bemorda, pasaygan — 2 nafarda, qoniqarsiz — 2 nafarda aniqlandi.Normal ximaz faolligi uchun oshqozon shirasining 1:640 va 1:320 darajada sutni ivitishi qabul qilindi, pasaygan — 1:160 va 1:80, qoniqarsiz — 1:40, 1:20, 1:10 yoki barcha darajalarda sutning umuman ivitilmasligi kuzatildi.

Oshqozon shirasining ximaz faolligi kasallik davomiyligiga, sekretsiya va kislota hosil qilish funktsiyasiga bog‘liq holda o‘rganildi. Shu bilan birga, ximaz faolligining kasallik davomiyligiga bog‘liqligini aniqlashning iloji bo‘lmadi.

Xulosa

Shunday qilib, xoletsistitli bemorlarda oshqozon shirasining ximaz faolligi bemorlar jinsidan va kasallik davomiyligidan qat’i nazar, biroz pasayish tendentsiyasiga ega; u sekretsiya va kislota hosil qilish funktsiyasiga to‘g‘ridan-to‘g‘ri bog‘liq bo‘lib, bu guruh bemorlarda oshqozonning funksional holatini baholashda hisobga olinishi lozim.

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O‘ZBEKISTONDA IJTIMOIY DAVLAT: HUQUQIY-INSTITUTSIONAL TRANSFORMATSIYA

Annotatsiya. *Maqolada O‘zbekistonda ijtimoiy himoya tizimining huquqiy va institutsional jihatdan tubdan yangilanishi hamda bu jarayonning jamiyatda ijtimoiy adolatni qaror toptirishdagi o‘rni tizimli tahlil qilinadi. Tadqiqot markazida Yangi tahrirdagi Konstitutsiya normalari hamda “O‘zbekiston-2030” strategiyasida belgilangan ustuvor maqsadlar yotadi. Shuningdek, O‘zbekistondagi “Inson” ijtimoiy xizmatlar ko‘rsatish markazlari faoliyati Finlyandiyaning 2021-yilda joriy etilgan “farovonlik tumanlari” islohoti bilan qiyosiy o‘rganilib, milliy tizimning o‘ziga xos jihatlari ochib berilgan.*

Kalit so‘zlar: *Ijtimoiy davlat, inson qadri, ijtimoiy adolat, “Mahalla yettiligi”, manzilli ijtimoiy himoya, Finlyandiya modeli, raqamlashtirish, kambag‘allikni qisqartirish siyosati.*

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SOCIAL STATE IN UZBEKISTAN: LEGAL AND INSTITUTIONAL TRANSFORMATION

Abstrakt. *The article provides a systematic analysis of the fundamental legal and institutional renewal of the social protection system in Uzbekistan and its role in establishing social justice within society. The research focuses on the norms of the newly revised Constitution and the priority goals set in the “Uzbekistan-2030” strategy. Furthermore, the activities of the “Inson” (Human) social services centers in Uzbekistan are compared with Finland’s 2021 “wellbeing counties” reform, revealing the unique aspects of the national system.*

Keywords: *Social state, human dignity, social justice, “Mahalla Seven”, targeted social protection, Finnish model, digitalization, poverty reduction policy.*

KIRISH

Zamonaviy globallashuv sharoitida ijtimoiy adolat tushunchasi yangi mazmun kasb etib bormoqda. Bu mustaqillikning dastlabki yillaridagi “davlat - jamiyat-inson” modelidan bugungi kunda hayotiy zaruratga aylangan “inson-jamiyat-davlat” paradigmasiga o‘tishning obyektiv sabablaridan biri sifatida izohlanmoqda[43]. Mazkur paradigma barcha davlat organlari faoliyatini inson qadrini ulug‘lashga yo‘naltiruvchi asosiy g‘oya vazifasini o‘tashi maqsad qilindi.

[43] Mirziyoyev Sh.M. Yangi O‘zbekiston taraqqiyot strategiyasi. Toshkent: 2021.

Prezident huzuridagi ijtimoiy himoya Milliy agentligining tashkil etilishi va “mahallabay” ishlashning yangi shakli bo‘lgan “Mahalla yettiligi” tizimi ijtimoiy yordamni manzilli va shaffof yetkazishda asosiy institutsional poydevor vazifasini o’tamoqda deb aytishmiz mumkin. Shu boisdan ham ijtimoiy soha xodimlari malakasini oshirish, xarajatlarni optimallashtirish va xalqaro hamkorlikni raqamli platformalar orqali kengaytirish ijtimoiy soha samaradorligini oshirishda e’tibor qaratishimiz lozim bo‘lgan jihatlardan hisoblanadi.

TADQIQOT METODOLOGIYASI

Tadqiqotning ilmiy jihatdan shakllantirishda shunchaki ma’lumotlarni tavsiflash emas, balki Yangi O‘zbekistondagi ijtimoiy-huquqiy transformatsiyalarning ichki mohiyatini ochib berishga qaratilgan kompleks va fanlararo yondashuv ustuvor qilib olindi. Tadqiqot jarayonida davlat boshqaruvi paradigmasining o‘zgarishini va ijtimoiy adolat tamoyillarining institutsionalizatsiyalashuvini tahlil qilish uchun quyidagi metodologik vositalar uyg‘unlikda qo‘llanildi: dialektik va tarixiy-mantiqiy tahlil metodi, qiyosiy-huquqiy (komparativistik) metod, aksiologik yondashuv meetodi, empirik va statistik ma’lumotlarni qayta ishlash metodidan foydalanildi. Xususan, Finlyandiyaning 2021-yildagi islohoti natijasida tashkil etilgan “farovonlik tumanlari” modeli[44] bilan O‘zbekistondagi “Inson” ijtimoiy xizmat markazlari faoliyati o‘rtasidagi tipologik o‘xshashliklar chuqur qiyoslandi. Bu solishtirish ijtimoiy xizmatlarni yagona ma’muriyat ostida birlashtirishning samaradorligini ilmiy asoslash imkonini berdi. 2017-2024-yillardagi rasmiy statistik ko‘rsatkichlar tahlil qilinib, ijtimoiy yordam ko‘rsatilgan 3,5 milliondan ortiq fuqaroning ijtimoiy holati dinamikasi baholandi[45]. Mazkur metodologik sintez tadqiqot natijalarining ishonchliligini va xulosalarning amaliy ahamiyatini kafolatlaydi. Shuningdek Aksiologik yondashuv asosida ijtimoiy adolat hodisasi faqatgina huquqiy normagina emas, balki xalqimizning ko‘p asrlik tarixi va milliy qadriyatlaridan unib chiqqan ma’naviy kategoriya sifatida talqin etildi. Shu bilan birga, tizimli-funksional yondashuv yordamida Milliy ijtimoiy himoya agentligining tashkil etilishi, mahallabay ishlash mexanizmi (“Mahalla yettiligi”) va “Ijtimoiy himoya yagona reyestri” platformasining korrupsiyaviy xavflarni minimallashtirishdagi roli o‘rganildi[46].

TAHLIL VA NATIJALAR

O‘tkazilgan tadqiqotlar, normativ-huquqiy hujjatlar tahlili va 2017-2024-yillar oralig‘idagi statistik ko‘rsatkichlarni o‘rganish natijasida Yangi O‘zbekistonda ijtimoiy davlat barpo etishning huquqiy-institutsional poydevori borasida bir qator fundamental natijalar qo‘lga kiritildi. Ushbu natijalar

[44] Finnish Government. Health and social services reform: Well-being services counties. Ministry of Social Affairs and Health. 2021.

[45] O‘zbekiston Respublikasi Prezidenti huzuridagi Statistika agentligi ma’lumotlari. O‘zbekistonning ijtimoiy-iqtisodiy holati: Statistik to‘plam-2024.

[46] O‘zbekiston Respublikasi Prezidentining 2023-yil 1-iyundagi PF-82-son Farmoni. Aholiga sifatli ijtimoiy xizmat va yordam ko‘rsatish hamda uning ijtimoiy himoyasini kuchaytirish chora-tadbirlari to‘g‘risida.

mamlakatning boshqaruv paradigmasi tubdan o‘zgarganini va ijtimoiy himoya tizimi butunlay yangi sifat bosqichiga ko‘tarilganini tasdiqlaydi.

Konstitutsiyaviy maqom va huquqiy kafolatlarning kengayishi. Tadqiqotning eng birlamchi va muhim natijasi sifatida O‘zbekistonning 2023-yilgi yangi tahrirdagi Konstitutsiyasiga muvofiq ilk bor rasman “ijtimoiy davlat” deb e’lon qilinganini ko‘rsatish mumkin[47]. Bu shunchaki normativ-huquqiy hujjat bolmasdan, balki davlatning fuqarolar oldidagi majburiyatlarini huquqiy jihatdan yangi bosqichga olib chiqdi. Tahlillar shuni ko‘rsatadiki, yangi bosh qomusda ijtimoiy sohaga oid normalar soni uch baravarga ko‘paygan. Natijada, ijtimoiy yordam ko‘rsatish tizimi “hukumat yordami” maqomidan fuqarolarning qat’iy “konstitutsiyaviy huquqi” darajasiga ko‘tarildi. Davlat zimmasiga kambag‘allikni qisqartirish, bandlikni ta’minlash va ehtiyojmand qatlamni uy-joy bilan ta’minlash bo‘yicha aniq konstitutsiyaviy majburiyatlar yuklatildi. Bu esa har qanday siyosiy o‘zgarishlardan qat’i nazar, ijtimoiy himoya ustuvorligini kafolatlaydigan huquqiy immunitet yaratilganidan dalolat beradi.

Institutsional markazlashuv va “Inson” xizmatlarining joriy etilishi. O‘zbekistonda ijtimoiy xizmatlar ko‘rsatish tizimining tarqoqligiga barham berish maqsadida amalga oshirilgan eng yirik natija bu Milliy ijtimoiy himoya agentligining tashkil etilishi bo‘ldi[48] (2023-PF-82-son). Tadqiqot natijalari shuni ko‘rsatadiki, barcha ijtimoiy xizmatlarning yagona boshqaruvga birlashtirilishi resurslarni adolatli taqsimlashda xalqaro standartlarga, xususan, Finlyandiya modelidagi “yagona ma’muriyat” tamoyiliga mos keladi. Hududlarda tashkil etilgan 200 dan ortiq “Inson” ijtimoiy xizmatlar ko‘rsatish markazlari orqali professionallashgan ijtimoiy ish tizimi yo‘lga qo‘yildi. Bu tizim yordamga muhtoj shaxslarni shaxsiy kabinetda kutib o‘tirmasdan, ularni bevosita xonadonlarda aniqlash (proaktiv usul) imkonini yaratdi. Bu tizimning samaradorligini oshirishda muhim qadam bo‘ldi deyishimiz mumkin.

“Mahallabay” ishlash tizimi va ijtimoiy ko‘mak ko‘lami. Ijtimoiy davlat modelining quyi bo‘g‘indagi amaliy ifodasi sifatida “Mahalla yettiligi” (hokim yordamchisi, ijtimoiy xodim, yoshlar yetakchisi va b.) tizimining samaradorligi aniq raqamlarda namoyon bo‘ldi. Tadqiqot davomida ma’lum bo‘ldiki, ushbu tizimli yondashuv natijasida 2017-2024-yillar davomida 3,5 milliondan ortiq fuqaroga manzilli amaliy yordam ko‘rsatilgan[49]. Amalga oshirilgan islohotlarning natijasida yurtimizda inson shaxsiyati yuksak qadriyat sifatida baholana boshladi deyishimiz mumkin, shuningdek, davlat ko‘rsatayotgan xizmatlari bevosita xalqqa yaqinlashib, hokim yordamchilari orqali kambag‘al oilalarga 100 million so‘mgacha garovsiz kreditlar va subsidiyalar ajratish mexanizmi yo‘lga qo‘yilgan.

[47] O‘zbekiston Respublikasi Konstitutsiyasi. Toshkent: “O‘zbekiston” NMIU. 2023.

[48] O‘zbekiston Respublikasi Prezidentining 2023-yil 1-iyundagi PF-82-son Farmoni. Aholiga sifatli ijtimoiy xizmat va yordam ko‘rsatish hamda uning ijtimoiy himoyasini kuchaytirish chora-tadbirlari to‘g‘risida.

[49] O‘zbekiston Respublikasi Prezidenti huzuridagi Statistika agentligi. O‘zbekistonning ijtimoiy-iqtisodiy holati: Statistik to‘plam. Toshkent. 2024.

Bu ijtimoiy himoyaga muhtoj bo‘lgan fuqarolar uchun bu yordam o‘zlarini iqtisodiy jihatdan yaxshilab olishlari uchun yaxshigini imkoniyatdir

Kambag‘allikni qisqartirish va ijtimoiy mobillik. “Kambag‘allikdan farovonlik sari” dasturining dastlabki natijalari shuni ko‘rsatadiki, O‘zbekiston statistik raqamlar ketidan quvmasdan, har bir oilaning individual ehtiyojlarini o‘rganishga o‘tgan. Natijalar shuni tasdiqlaydiki, 2024-yil yakuniga qadar 500 ming, 2025-yilda esa 1 million nafar aholini kambag‘allikdan chiqarish bo‘yicha aniq strategik yo‘l xaritasi ishlab chiqilgan va ijroga qaratilgan[50]. Bunda asosan ijtimoiy nafaqa berish bilan cheklanib qolmasdan, inson kapitalini rivojlantirish va kasb-hunarga o‘qitish orqali iqtisodiy mustaqillikka erishish natijalari aniqlangan. Ayniqsa, xotin-qizlarning magistratura bosqichida o‘qish xarajatlarini to‘liq davlat tomonidan qoplab berilishi ijtimoiy barqarorlikni ta’minlashda katta natija berayotgani tahsinga loyiq.

Institutsional birlashuv va Finlyandiya tajribasi bilan qiyos. Natijalar qismida ko‘rib o‘tilganidek, O‘zbekistonda Milliy ijtimoiy himoya agentligining tashkil etilishi tarqoq xizmatlarni yagona boshqaruvga birlashtirdi. Bu jarayonni Finlyandiyaning 2021-yildagi “farovonlik tumanlari” (*well-being services counties*) islohoti bilan qiyoslash o‘rinli[51]. Finlyandiya tajribasi shuni ko‘rsatadiki, ijtimoiy va tibbiy xizmatlarning turli munitsipalitetlar qo‘lida tarqoq bo‘lishi resurslarning notekis taqsimlanishiga va xizmat sifatining pasayishiga olib keladi.

O‘zbekistondagi “Inson” ijtimoiy xizmatlar ko‘rsatish markazlari ham aynan shu “yagona boshqaruv” tamoyiliga tayanadi. Ammo, fin modelidan farqli o‘laroq, bizda ijtimoiy xodimlar hali professional darajada yetarli tayyorgarlikka ega emasligi, ya’ni tizimga mos keladigan salohiyatli kadrlarning yetishmasligi mazkur tizimni yanada optimallashtirish yo‘lidagi asosiy to‘siqlardan biri hisoblanadi. Shu sababli, ijtimoiy soha xodimlarini xorijda malaka oshirishga yuborish va bunda xodimning mas’uliyatini oshirish uchun xarajatlarning bir qismini ularning hisobidan qoplash tizimini joriy etish taklifimiz tizim samaradorligini oshirishning muhim vositasi bo‘lishi mumkin deb ayta olamiz.

Kambag‘allikni qisqartirish: “Kambag‘allikdan farovonlik sari” strategiyasi. O‘zbekistonda kambag‘allikni qisqartirish strategiyasi statistik raqamlardan har bir xonadonning individual muammosini o‘rganishga o‘tdi. 2025-yilga qadar 1 million kishini kambag‘allikdan chiqarish bo‘yicha belgilangan maqsad ulkan siyosiy irodani talab qiladi, chunki kambag‘allikni qisqartirish shunchaki nafaqa berish emas, balki shaxsni tadbirkorlikka, kasb-hunarga o‘rgatish va unga bozor iqtisodiyotida o‘z o‘rnini topish uchun start imkoniyatlarini yaratish demakdir[52]. Bu yerda “mahallabay” ishlash tizimi doirasidagi “hokim yordamchilari” va “ijtimoiy xodimlar”ning roli beqiyos.

[50] O‘zbekiston Respublikasi Prezidentining 2024-yil 23-sentyabrdagi “Kambag‘allikdan farovonlik sari” dasturini amalga oshirish chora-tadbirlari to‘g‘risida”gi Farmoni.

[51] Finnish Government. Health and social services reform: Well-being services counties. Ministry of Social Affairs and Health. 2021.

[52] O‘zbekiston Respublikasi Prezidentining “Kambag‘allikdan farovonlik sari dasturi to‘g‘risida” 2024-yil 23-sentyabrdagi PF-143-son Farmoni.

Sog‘liqni saqlash: Tibbiy sug‘urta va hududiy tengsizlik. O‘zbekistonda tibbiy sug‘urta tizimiga o‘tish jarayoni davlatning ijtimoiy majburiyatlarini yangi bosqichga olib chiqdi. Natijalarimiz shuni ko‘rsatadiki, bugungi kunda tibbiy xizmat ko‘rsatishda hududlararo tengsizlik hali ham saqlanib qolmoqda. Ijtimoiy davlat konsepsiyasida “geografik paradigma” muhim o‘rin tutadi, ya’ni makon adolatning asosiy omili bo‘lishi kerak. Bu muammoni hal etish uchun birlamchi tibbiy bo‘g‘inni raqamlashtirish va mahallabay tizim orqali aholiga yaqinlashtirish lozim.

Konstitutsiyaviy islohotlarning barqarorlik kafolati sifatidagi roli. 2023-yilgi Konstitutsiyaviy islohotlar O‘zbekistonda ijtimoiy adolat uchun “huquqiy immunitet” yaratdi. Falsafiy nuqtayi nazardan, konstitutsiyaviy davlat bu jamiyatdagi ijtimoiy qarorlarning barqarorligini ta’minlovchi tizimdir[53]. Biroq, muhokama natijalari shuni anglatadiki, huquqiy normalarni deklarativ e’lon qilish yetarli emas, ularni amalda ta’minlash uchun sud hokimiyatining mustaqilligi va Ombudsmanning vakolatlarini yanada kengaytirish lozim.

XULOSA.

Yangi O‘zbekistonda ijtimoiy davlat barpo etish jarayoni shunchaki iqtisodiy islohotlar yig‘indisi emas, balki davlat boshqaruvining “Inson-jamiyat-davlat” paradigmasiga asoslangan tub transformatsiyasidir. 2023-yilda umumxalq referendumi orqali yangi tahrirda qabul qilingan Konstitutsiya ushbu jarayonning mustahkam huquqiy poydevori bo‘lib xizmat qilmoqda. Bu o‘zgarish ijtimoiy yordamni “davlatning ixtiyoriy marhamati” darajasidan fuqarolarning muqaddas va daxlsiz “konstitutsiyaviy huquqi” darajasiga ko‘tardi. Tadqiqot davomida aniqlangan asosiy xulosalarimiz shuni tasdiqlaydiki, Milliy ijtimoiy himoya agentligining tashkil etilishi va tarqoq ijtimoiy xizmatlarning yagona boshqaruv tizimiga birlashtirilishi xalqaro standartlarga, xususan, ilg‘or Finlandiya modeliga to‘la muvofiq keladi. Bu yondashuv resurslarni adolatli taqsimlash va byurokratiyani kamaytirish imkonini yaratdi. Shuningdek, quyi bo‘g‘inda joriy etilgan “Mahalla yettiligi” tizimi ijtimoiy himoyaning manzilliligini ta’minlashda hal qiluvchi rol o‘ynadi. 2017–2024-yillar davomida 3,5 milliondan ortiq fuqaroga ko‘rsatilgan amaliy ko‘mak ijtimoiy adolat tamoyili qog‘ozdan real hayotga ko‘chganligining amaliy isbotidir. Biroq, tadqiqotda aniqlangan ta’lim tizimidagi kadrlar sifati muammosi ijtimoiy davlatning barqarorligiga jiddiy xavf tug‘dirishi mumkin. Sifatli ta’limsiz ijtimoiy mobillikka erishish va kambag‘allikni bartaraf etish imkonsizdir.

Tizimni yanada takomillashtirish maqsadida quyidagi tavsiyalar ilgari surishimiz mumkin:

1) Kadrlar salohiyatini oshirish: Ijtimoiy xodimlar malakasini oshirish(ya’ni ijtimoiy ximoya tizimi yuqori darajada rivojlangan xorijiy davlatlarga xodimlarni malakasini oshirish uchun davlat+xodim hamkorligida malaka oshirish yo‘l xaritasi ishlab chiqish)da xarajatlarning bir qismini (40 foizdan oshmagan

[53] O‘zbekiston Respublikasi Konstitutsiyasi. Toshkent: O‘zbekiston. 2023.

holda) xodimlar hisobidan qoplash mexanizmini joriy etish orqali shaxsiy mas'uliyat va professionallikni kuchaytirish lozim.

2) Raqamli monitoring va xalqaro muloqot: Xorijiy tajribalarni doimiy o'rganish va tizimdagi kamchiliklarni tahlil qilish uchun xalqaro agentliklar bilan yiliga kamida 3 marta onlayn muloqot platformalarini tashkil etish zarur.

3) Manzillilikni raqamlashtirish: "Ijtimoiy karta" tizimini to'liq integratsiya qilish orqali yordam ajratishda inson omilini minimallashtirishni davom ettirish darkor.

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JUN IPIDAN KOSTYUMBOP TO‘QIMA ISHLAB CHIQARISH TEXNOLOGIYASI VA SIFAT KO‘RSATKICHLARINI TADQIQ ETISH

Annotatsiya. *Ushbu maqolada jun ipidan kostyumbop to‘qima materiallar ishlab chiqarish texnologiyasi, ipning tarkibiy xususiyatlari va tayyor mahsulotning fizik-mexanik xossalarini yaxshilash usullari o‘rganilgan. Ilmiy tadqiqotda tabiiy jun iplari asosida turli xil tolali qo‘shimchalar bilan aralashma to‘qimalar tayyorlandi hamda ularning hosil bo‘lgan to‘qimalardagi sifat ko‘rsatkichlari tahlil qilindi.*

Kalit so‘zlar: *jun ip, kostyumbop to‘qima, fizik-mexanik xossalar, ip tayyorlash texnologiyasi, tola aralashmasi, tabiiy materiallar.*

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RESEARCH OF THE TECHNOLOGY AND QUALITY INDICATORS OF WOOL YARN SUIT FABRICS

Annotation.*This article discusses the technology of producing suit textile materials from wool yarn, the structural properties of yarn and methods for improving the physical and mechanical properties of finished products. In scientific studies, blended fabrics with various fiber additives based on natural wool threads were produced, and their quality indicators in the resulting fabrics were analyzed.*

Key words: *wool yarn, suit fabric, physical and mechanical properties, yarn production technology, fiber mixture, natural materials.*

To‘qimachilik sanoatida kostyumbop to‘qimalar inson hayotining har kunida muhim ahamiyatga ega bo‘lib, ular nafaqat kiyim-kechak sifatida, balki estetik va funksional jihatlardan ham yuqori talablarga mos kelishi kerak. Jun ipidan tayyorlangan kostyumbop to‘qimalar zamonaviy moda va sanoat talablariga javob beradi, chunki ular tabiiy, ekologik toza va yuqori strukturali material hisoblanadi. Shuningdek, jun ipining tabiiy elastikligi va chidamliligi kostyumbop

to‘qimalarning mexanik va reologik xossalarini yaxshilashda muhim rol o‘ynaydi. Jahonda tayyor sifatli mahsulot ishlab chiqarishda, to‘qima sifati va raqobatbardoshligini oshiruvchi samarali texnologiyani yaratish, zamonaviy texnologiyalarni qo’llab to‘qima ko‘rsatkichlarini optimallashtirish usullarini yaratishga katta e’tibor qaratilmoqda. Bugungi kunda tabiiy va kimyoviy tolalarni aralashtirib yangi assortimentdagi to‘qimalar yaratish yo‘llarini izlab topish muhim hisoblanadi.

Respublikamizda mavjud imkoniyatlardan foydalanib, sifatli to‘qima ishlab chiqarish hajmini kengaytirish, jahonda O‘zbekiston yorlig‘i ostida raqobatbardosh mahsulotlar bilan savdo qilishga erishish yechimini kutayotgan asosiy muammo lardan. O’zbekiston Respublikasi Prezidentining 01.05.2024 yil PF-71-sonli "To‘qimachilik va tikuv-trikotaj sanoatini rivojlantirishni yangi bosqichga olib chiqish chora-tadbirlari to‘g‘risida"gi Farmonida, 2022-2026 yillarga mo’ljallangan Yangi O‘zbekistonning taraqqiyot strategiyasida belgilanganidek,“... to‘qimachilik mahsulotlarini ishlab chiqarish hajmini 2 baravarga ko‘paytirish...” bo‘yicha muhim vazifalar belgilangan. To‘qima, trikotaj mato ishlab chiqarish hajmini oshirish 2027 yil yakunigacha bosqichma-bosqich 100 foizga olib chiqilishi ko‘zda tutilgan. To‘qima mahsulotlarini ishlab chiqarish hajmini oshirish, ishlab chiqarish turlarini kengaytirish, ilg‘or texnologiyalarni joriy etish, qimmatbaho tabiiy xom-ashyolarga nisbatan arzon kimyoviy xomashyolarini aralashtirib yangi turdagi to‘qimachlik mahsulotlarini ishlab chiqarish dolzarb hisoblanadi. Kostyumbop to‘qimalarning sifat ko‘rsatkichlari asosan to‘qimaning strukturasi, ip turi va to‘qish texnologiyasiga bog‘liq. Jun ipidan tayyorlangan matolarda yuqori cho‘zilish mustahkamligi, elastiklik, shuningdek, yaxshi gigroskopiklik kuzatiladi. Bundan tashqari, turli aralashmalar (jun–viskoza, jun–poliester) ishlab chiqarish jarayonida modifikatsiya qilinishi mumkin bo‘lib, ularning mexanik va ekspluatatsion xossalariga sezilarli ta’sir ko‘rsatadi. Hozirgi kunda to‘qimachilik sanoatida jun ipidan tayyorlangan kostyumbop to‘qimalarning struktura-reologik xossalari va sifat ko‘rsatkichlarini kompleks tadqiq etish ilmiy va amaliy ahamiyatga ega. Bu tadqiqot turli to‘qimalarning ekspluatatsion sifatini baholash, yuqori sifatli materiallarni ishlab chiqish va sanoatda samarali qo‘llash imkonini beradi.

Polyester va jun aralashmasidan tayyorlangan mato yuqori tabiiylik va sintetik mustahkamlikning ajoyib uyg‘unligi bo‘lib, eng yaxshi xususiyatlarini (mustahkamlik, g‘ijimlanmaslik, elastiklik xossalari oshib borishi) birlashtirib, universal to‘qimachilik yechimini yaratadi. Ushbu innovatsion kombinatsiya odatda yumshoqlikni saqlab qolgan holda, estetik ko‘rinishni ta’minlaydi.

Ilgari kostyumlar 100% jundan tikilgan. Bu juda qimmat kiyimga olib keldi. Bitta kostyum butun umrga sotib olingan va faqat eng maxsus holatlarda kiyiladi. Aralashtirilgan matolar yuqori sifat va tashqi ko'rinishni saqlab qolgan holda narxlarni pasaytirish imkonini beradi. Aralashtirilgan matolardan tayyorlangan kostyumlar har kuni ish uchun, maxsus holatlarda yoki kundalik kiyim uchun kiyilishi mumkin. Quyida turli tolaviy tarkibga ega bo‘lgan kostyumbop to‘qimalar to‘g‘risida ma’lumotlar keltiriladi.

Jun+ viskoza + sintetik tolalardan - ko'pincha elastan va poliesterdan tayyorlangan kostyumbop matolar tabiiy va sintetik materiallarning foiziga qarab, kostyum matolari turli xil xususiyatlarga ega bo'lishi mumkin. Mato juda yumshoq va gigienik xususiyatlari yuqori, g‘ijimlanmaydi. Ushbu aralashma tarkibli matodan tikilgan kostyumboplarda tizzalar va tirsaklari cho'zilmaydi. Kostyumdan asosan ayollar biznes kostyumlari va maktab formalarini tayyorlash uchun ishlatiladi.

Paxta-polyester aralashmasidan tayyorlangan kostyumbop to‘qimalar asosan shakl saqlash xususiyati yuqori bo‘ladi. Havo o‘tkazuvchanligi yuqori. Paxta-polyester aralashmasidan foydalanishning asosiy afzalliklaridan biri uning sifati va arzonligidir. Tabiiy va sintetik tolalarning aralashmasi bardoshli va nafas oladigan, yumshoqlik va changni yutish qobiliyatini ta'minlaydi, polyester qisqarishga qarshilik qiladi. Paxta polyester aralashmasi iplaridan kiyim-kechak, choyshablar va uy to'qimachilik buyumlari, masalan, pardalar va dasturxon ishlab chiqarishda qo'llaniladi. Paxta poliester aralashmasi iplarini bo'yash oson, ya'ni ishlab chiqaruvchilar ranglarning keng assortimentini taklif qilishlari mumkin. Umuman olganda, paxta-polyester aralashmasidan tayyorlangan ip yuqori sifatli, ko'p qirrali va arzon to'qimachilik materiali bo'lib, keng doiradagi ilovalar uchun mos keladi. Uning tabiiy va sintetik tolalar aralashmasi yumshoqlik, mustahkamlik va chidamlilikning muvozanatli kombinatsiyasini ta'minlaydi, bu uni kiyim ishlab chiqaruvchilar va iste'molchilar uchun mashhur tanlovga aylantiradi. Ipakdan tayyorlangan kostyumbop matolar. So‘nggi yillarda ipak asosidagi kostyumbop matolar assortimenti sezilarli darajada kengaydi. Bunga shtapel tolalar, shuningdek, sun’iy, sintetik va teksturali ipliklardan tayyorlangan matolarning ishlab chiqarish hajmi oshgani sabab bo‘ldi. Kostyumbop ipak matolar libos-kostyumbop matolardan quyidagi xususiyatlari bilan farqlanadi: yuqori zichlik va massaga ega (160–340 g/m² oralig‘ida); asosan silliq bo‘yalgan, rangli (pestrotkan), kam hollarda oqartirilgan yoki mouliné texnologiyasida ishlab chiqarilgan bo‘ladi.Tikuvchilikda nam va issiqlik bilan ishlov berish jarayonlari qat’iy rejim asosida olib borilishi talab etiladi. Hozirgi kunda butun dunyoda iste’molchilar talabining ortishi sababli iplar, yigirilgan iplar va matolarning sifati va turli-tumanligiga yuqori talablar qo‘yilmoqda. Bu muammolarni yechishda to‘qimachilik sohasi mutaxassislarining oldiga to‘qimachilik mahsulotlarining, asosan, to‘qimachilik iplarning yangi assortimentlarini yaratish kabi vazifalarni echishni qo‘yadi. Bularning tarkibiga: tabiiy, kimyoviy, aralash, ya’ni tabiiy va kimyoviy iplardan yangi avlod iplari, turli jiloga ega bo‘lgan teksturlangan iplar, shakldor iplar va kombinirlangan iplar kiradi. Hozirgi kunda to‘qimachilik sanoatida qo‘llaniladigan to‘qimachilik iplarining assortimentlari juda keng va turli-tuman. Yer yuzi aholisi sonining keskin ortib borishi, tabiiy tolalar yetishtiriladigan maydonlarning qisqarishi sababli, tabiiy tolalar bilan birgalikda kimyoviy tolalardan, ya’ni sun’iy va sintetik tolalalardan foydalanib, to‘qimachilik mahsulotlari assortimentlarini kengaytirish maqsadga muvofiqdir. Dunyo

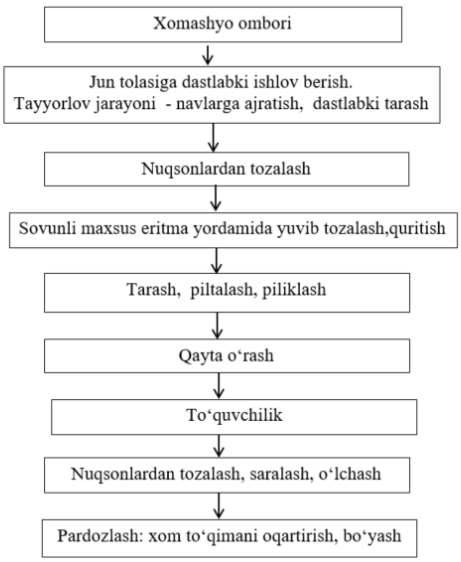
miqyosida to‘qimachilik tolalarning deyarli 90% kimyoviy iplar tashkil qiladi. Bundan ko‘rinib turibdiki, ishlab chiqarilayotgan to‘qimachilik mahsulotlari, asosan, kimyoviy va aralash iplardan ishlab chiqarilishini bilish zarur. Ishlab chiqarilayotgan to‘qimachilik mahsulotlarining ishlatilish sohasiga ko‘ra, ayrimlariga qat’iy talablar qo‘yilib, ularni tabiiy va kimyoviy tolalardan ishlab chiqarish mumkin. Matolarning mustahkamligi ularning tola tarkibiga, hosil qiluvchi iplarning tuzilishi va chiziqiy zichligi, o‘rilishi, zichligi, pardozlash turiga bog‘liq. Iplar qancha yo‘g‘on va qanchalik zich bo‘lsa, u shuncha mustahkamdir. Bosish, appretlash kabi pardozlash jarayonlari matolarning mustahkamligini oshiradi, oqartirish, bo‘yash jarayonlari bo‘lsa, matolarning mustahkamligini biroz pasaytiradi. Kostyumbop matolarning mexanik xossalarini aniqlash borasida ilmiy-tadqiqot ishlari olib borildi va olingan sinov natijalari 1-jadvalda keltirilgan.

1-jadval

Tola tarkibi	Iplarning cho‘zilishi	Zichlik, g/sm³	Ipning chiziqiy zichligi, teks	Uzilishdagi uzayishi,%	Mustah kamlik, N
Paxta ipi	7-9	1,52–1,56	0,12–0,2	19–36	900
Ipak ipi	18-24	1,37	0,11–0,13	27–31,5	-
Viskoza	20-30	1,5–1,56	0,33–0,5	14,5–25	450
Poliamid ipi	20-25	1,14	0,17–0,4	35–70	2200
Poliefir (lavsan)	20-25	1,38–1,39	0,13–0,44	40–55	1360
Polipropilen	15-30	0,91-0,92	0,12–0,3	25–45	-
Poliuretan (spandeks, laykra)	600-800	1,1-1,25	–	6–8	–

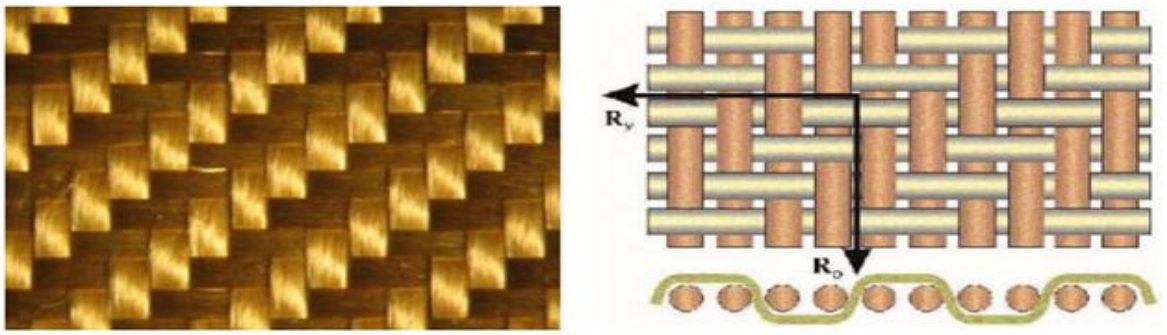
Aralashma tarkibli iplardan 3 xil variantda jun ipi aralashtirib to‘qima mahsuloti ishlab chiqarildi. Kimyoviy tarkibli iplarni tayyor holatda tayyor holatda kimyo zavodlaridan tayyor holatda olib kelinadi.

Ilmiy tadqiqot ishida mavsumiy kuz va qishki ustki kostyumbop to‘qimalar ustida ish olib borildi. Jundan kostyumbop to‘qimalar ishlab chiqarishda quyida texnologik jarayonlar orqali junni to‘quvchilikka tayyorlab olinadi:



Rasm.1. Junni to‘quvchilikka tayyorlash texnologik jarayonlar ketma ketligi/

Aralashma tarkibli to‘qimalarning barcha sarja 2/2 o‘rilishi asosida ishlab chiqarildi va ularning fizik-mexanik xususiyatlari bir birlari bilan solishtirildi.



Rasm.1. 2/2 sarja asosida to‘qilgan to‘qimaning tashqi ko‘rinishi va to‘qimadagi iplarning bog‘lanish. Kiyimda inson butun kunini jamiyatda o‘tkazadi — ishda, transportda, bankda va hokazo. Ko‘pincha kiyim orqali nafaqat egasining professional maqomi, balki joyga mos va did bilan kiyinish qobiliyati, uslubi va hatto xarakteri ham aniqlanadi. So‘nggi yillarda yengil sanoatda ekologik toza va tabiiy xomashyolarga bo‘lgan talab ortib bormoqda. Jun iplari o‘zining tabiiyligi, issiqlik izolyatsiyasi, havo o‘tkazuvchanligi va estetik ko‘rinishi bilan kostyumbop to‘qimalar ishlab chiqarishda muhim ahamiyatga ega. Shu bilan birga, jun iplarini boshqa tolalar bilan aralashtirish orqali ularning kiyishdagi qulayligi va chidamliligi oshirilishi mumkin

Jadval 2

Fizik-mexanik xossalarning solishtirma tahlili

Namuna	deformatsiyasi (%)	Cho’zilish kuchi, MPa	Ishqalanish kuchi (sikl)	Yuza zichligi (g/m²)	Havo o‘tkazuv chanlik (%)
100% jun	28.9 ± 1.2	111 ± 3.4	12 000	210	17.8
Jun+Viskoza 70/30	31.2 ± 1.0	118 ± 2.8	15 800	205	18.6
Jun + Poliester 60/40	26.7 ± 0.9	125 ± 2.5	21 300	198	15.1

To‘qimachilik matolarining o‘ziga xos xususiyatlari (geometrik, fizik, mexanik, kimyoviy) va sirt ko‘rinishining o‘zgarishida tanda va arqoq iplarining tolaviy tarkibi muhim ahamiyat kasb etadi. Matolarning iste’mol xususiyatlarini yaxshilash maqsadida tabiiy va kimyoviy tolalar aralashmasidan ishlab chiqarilgan iplardan foydalaniladi.

Kostyum materiallarining asosiy xossa ko‘rsatkichlari me’yorlari tolalar tarkibi, yuza zichligi va ishlab chiqarish usuliga qarab belgilangan: jun gazlamalar uchun GOST 10641 - 88, GOST 23559 - 89; ip gazlamalar uchun GOST 21790 - 76; zig‘ir tolali gazlamalar uchun GOST 15968 - 87; trikotaj polotnolar uchun GOST 9997 - 82.

Xulosa

Jun iplarini 30–40% sintetik tolalar bilan aralashtirish orqali to‘qimalarning mexanik xossalari 10–15% ga yaxshilanadi. Jun–poliester aralashmasi (60/40)

cho‘zilish mustahkamligi (125 MPa) va chidamlilik (21 300 sikl) bo‘yicha eng yuqori natijani ko‘rsatdi. Jun–viskoza aralashmasi (70/30) gigroskopiklik jihatidan eng fiziologik qulay.

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QO‘QON XONLIGINI O‘RGANISHDA MUSTAQILLIK YILLARIDA NASHR ETILGAN MANBALARNING O‘RNI

Annotatsiya: *Ushbu maqolada O‘zbek davlatchiligining ajralmas qismi sanalgan Qo‘qon xonligining tahlil etilgan. O‘zbekiston mustaqillikni qo‘lga kiritgandan so‘ng manbalarni o‘rganish va ularni nashr etish ishlari sezilarli oshdi. Shu qatori Qo‘qon xonligi tarixiga oid bo‘lgan manbalar ham talaygina qayta nashr etildi. Aynan mana shu manbalar orqali Qo‘qon xonligini o‘rganish tarixchilar va keng jamoatchilikka yanada qulaylik tug‘dirdi. Maqolada mana shunday manbalar va ularning xonlikni o‘rganishdagi o‘rni haqida so‘z boradi.*

Kalit so‘zlar: *Qo‘qon xonligi, manba, mustaqillik, nashr, tahlil, Rossiya imperiyasi, davlatchilik, Toshkent, ilmiylik, xolislik, tadqiqot.*

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THE ROLE OF SOURCES PUBLISHED DURING THE YEARS OF INDEPENDENCE IN THE STUDY OF THE KOKAND KHANATE

Annotation: *This article chronicles the history of the Kokand Khanate, which was an integral part of the Uzbek statehood. After Uzbekistan gained independence, the work of studying sources and publishing them increased significantly. Along with this, many sources related to the history of the Kokand Khanate were republished. It is through these sources that the study of the Kokand Khanate became more convenient for historians and the general public. The article discusses such sources and their role in the study of the khanate.*

Keywords: *Kokand Khanate, source, independence, publication, analysis, Russian Empire, statehood, Tashkent, scientificity, impartiality, research.*

KIRISH

O‘zbekiston mustaqillikka erishgandan so‘ng davlatchilik tarixi masalalari, xususan, Qo‘qon xonligi tarixini o‘rganish imkoniyatlari ham kengayib, xonlik tarixining turli jihatlarini yoritib bergan bir qator tadqiqotlar amalga oshirildi. Amalga oshirilgan har bir tadqiqotning asosida tarixiylikka, ilmiylikka, xolislikka asoslanilgan qarashlar va tamoyillar ustuvor omil sifatida birinchi o‘ringa ko‘tarila boshladi. Tarix fani sohasidagi ilmiy izlanishlarning keyingi yillarda asosiy tadqiqot ob’ektlaridan biriga aylangan Qo‘qon xonligi tarixining turli yo‘nalishlarida mustaqillik yillarida o‘nlab dissertatsiyalar himoya qilindi,

adabiyotlar va monografiyalar nashr etildi, yuzlab maqolalar e’lon qilindi va bir qancha konferensiyalar o‘tkazildi.

Amalga oshirilgan ilmiy tadqiqotlar bilan bir qatorda mustaqillik yillarida mahalliy tarixnavislar tomonidan yozilgan manbalarning nashr etilishi o‘quvchilar oldida tarixni haqqoniy o‘rganishda muhim omil bo‘lib xizmat qilmoqda.

Tarix ilmining rivojlanishi ko‘p jihatdan yozma manbalarning o‘rganilishi va ularning ilmiy muomalaga kiritilishi bilan bog‘liqdir.

TADQIQOT METODOLOGIYASI

Dastlab qo‘qonlik tarixchilarning eski o‘zbek tilida bitilgan asarlari, jumladan, Ibratning “Farg‘ona tarixi”, Mirza Olim Maxdum Hojining “Tarixi Turkiston”, Mirza Olim Mushrifning “Ansob us-salotin va tavorix ul-xavoqin” kitoblari qayta nashr etildi. Ushbu nashrlar tadqiqotchi va izlanuvchilarni ajdodlarimizning ma’naviy merosi bilan yaqindan tanishtirish jihatidan ahamiyatli edi.

Jumladan, qayta nashr qilingan dastlabki asarlardan biri - Is’hoqxon Ibratning “Tarixi Farg‘ona” asari tadqiqotchi H.Bobobekov tomonidan o‘rganilib, 1991 yilda qisqacha sharh bilan nashr etildi. Ushbu asar Qo‘qon xonligi tarixini, rus bosqinchilariga qarshi olib borilgan kurashlarni, ijtimoiy-siyosiy hayotini o‘rganish va tahlil qilishda muhim manba bo‘lib xizmat qiladi.

Muhammadyunus ibn Muhammadamin (taxallusi Toib) ning “Tarixi Aliquli Amirlashkar” asari Sh.Vohidov tomonidan kirillchaga o‘girliib, 1996 yilda “Sharq yulduzi” jurnalida chop etilgan. Mazkur asar Turkiston xalqi qaxramoni Aliquli amirlashkarning faoliyati haqida zarur ma’lumotlarni beradi. Bundan tashqari, asarda XIX asr davomida xonlikning Rossiya bilan diplomatik aloqalariga oid diqqatga sazovor ma’lumotlar mavjud. Ushbu ma’lumotlar Qo‘qon xonligining tashqi siyosati, diplomatiyasi xususida tasavvur shakllanishida muhim o‘rin tutadi.

TADQIQOT NATIJALARI VA MUHOKAMA

1998 yilda O‘zbekiston Respublikasi Birinchi Prezidenti I.A.Karimov tomonidan tarixchilar oldiga qo‘yilgan vazifalar natijasida o‘zbek davlatchiligi masalasiga yangicha yondashuv paydo bo‘ldi. Aynan manbalarning qayta nashr etilishi borasida ham shu davrdan keyin e’tibor yanada kuchaydi. Manbalarning tadqiqot ob’ekti sifatida tanlab olinib, uni izohlar va xulosalar bilan nashr etish hamda shu asosida dissertatsiya ishini yoqlash keng tus oldi.

Jumladan, mahalliy tarixnavislar tomonidan yozilgan manbalarning nashr etilishi borasida Sh.Vohidovning ishlari diqqatga sazovordir. U 1998 yilda “XIX-XX asrning boshlarida Qo‘qon xonligida tarixnavislikning rivojlanishi” mavzusida doktorlik dissertatsiyasini yoqladi. Muallif keyinchalik ushbu dissertatsiya materiallari asosida “Qo‘qon xonligida tarixnavislik” nomli monografiyasini chop ettirdi. Tarixchi Sh.Vohidovning asarlari tufayli ilmiy jamoatchilikda XIX–XX asrning boshlarida Qo‘qonda o‘ziga xos tarixnavislik maktabi vujudga kelganligi hamda bu maktabga mansub bo‘lgan muarrixlar asarlarining Qo‘qon xonligi tarixini o‘rganishda g‘oyat muhim o‘rin tutganligi haqida aniq tushuncha va fikr shakllandi.

MUHOKAMA: TADQIQOT NATIJALARINING NAZARIY VA AMALIY AHAMIYATI

Shuningdek, 1999 yilda D.Sangirova tomonidan xonlik tarixiga oid muhim manbalardan yana biri - Muhammad Aziz Marg‘iloniyning “Tarixi Aziziy” nomli asari o‘rganilib, “Muhammad Aziz Marg‘iloniyning “Tarixi Aziziy” asari muhim tarixiy manba” mavzusidagi nomzodlik dissertatsiyasini himoya qilingan. Unda ushbu asarning Qo‘qon xonligi tarixini o‘rganishdagi ahamiyatini ko‘rsatib o‘tilgan. Jumladan, bu asarda Xudoyorxonning oxirgi boshqaruvi davrida xonlikdagi ijtimoiy-iqtisodiy ahvol, *“mahrumi meros”* va boshqa yangi soliqlarning joriy etilishi, Po‘latxon qo‘zg‘oloni hamda Farg‘onaning chor Rossiyasi tomonidan bosib olinishi to‘g‘risida qimmatli ma’lumotlar berilgan. Ko‘p o‘tmasdan Sh.Vohidov bilan D.Sangirova hammualliflikda Muhammad Aziz Marg‘iloniy asarining asl qismi bo‘lgan beshinchi bobini izohlar bilan nashr etdi. Mazkur manbani o‘rganish orqali Qo‘qon xonligining siyosiy tarixi, Rossiya imperiyasiga qarshi xalq harakatlari haqida tasavvur hosil bo‘ladi.

Mirzo Olim ibn Mirzo Rahim Toshkandiyning “Ansob us- salotin va tavorix al xavoqin” asari “Qo‘qon xonligining tarixi” nomi bilan 2001-yilda nashr etildi. Ammo mazkur nashrda asarning to‘liq matni chop etilmagan va unga izohlar berilmagan. Bu kamchiliklarni 2007-yilda Sh.Vohidov rahbarligida bir guruh tarixchilar tomonidan rus tilida izohlar va ko‘rsatkichlar bilan nashr etilishi orqali bartaraf etilgan. Mazkur asar ham Qo‘qon xonligi tarixini o‘rganishda qimmatli manba hisoblanadi. U Qo‘qon tarixnavislik maktabi vakillaridan biri Mirzo Olimning boshidan kechirgan voqealari hamda ko‘pgina tarixiy manbalar asosida yozilgan. Ushbu asar xonlikning Rossiya imperiyasi itoatiga o‘tgandan so‘ng yozilgan. Unda Rossiya imperiyasining o‘lkani bosib olishdagi shafqatsizliklari qattiq qoralanadi. Jabr va zulmning haddan oshib ketishi hamda jamiyatning inqirozga duch kelgani ta’kidlanadi. Shuningdek, asarda xonlik siyosiy hayotiga oid ma’lumotlardan tashqari Qo‘qonda yashab ijod etgan ayrim shaxslar haqida ham qimmatli ma’lumotlar saqlanib qolgan.

Muhammad Hakimxon to‘raning “Muntaxab at-tavorix” asari ham Sh.Vohidov tomonidan tarjima qilinib, dastavval fors-tojik tilida arab imlosida Tokioda, so‘ngra esa o‘zbek tilida nashr etildi. Ushbu nashr o‘zining mukammalligi va bir necha qo‘lyozma nusxalarning qiyosiy tahlili asosida yaratilganligi bilan oldingi nashrlaridan ajralib turadi. Asarda Buxoro va Qo‘qon xonliklarining tashkil topishidan boshlab, XIX asrning 40-yillarigacha bo‘lgan tarixi to‘liq tasvirlangan. Asar umumjahon tarixiga bag‘ishlangan bo‘lsa-da, ammo uning hajmi va ahamiyatiga qarab, mazmunan O‘rta Osiyo tarixiga oid bo‘lganligi tufayli birinchi navbatda unga mahalliy tarixni yorituvchi asar sifatida qarash mumkin. “Muntaxab at-tavorix” XIX asrda O‘rta Osiyodagi mavjud ijtimoiy-siyosiy tuzum va madaniy hayotni o‘rganishda muhim manbalardan biridir.

O‘.Sultonov esa Qo‘qon xonligiga oid yana bir muhim manba - Muhammad Solih Toshkandiyning “Tarixi jadidayi Toshkand” asari ustida izlanishlar olib borib, “Solixxo‘ja va uning “Tarixi jadidayi Toshkand asari” muhim tarixiy manba

sifatida” mavzusida nomzodlik dissertatsiyasini himoya qilgan va “Muhammad Solihxo‘ja va uning “Tarixi jadidayi Toshkand asari” nomli monografiyasini chop ettirdi”. Mazkur manbada Toshkent va uning atrof hududlari tarixi, ayniqsa, uning ruslar tomonidan bosib olinishi batafsil yoritilgan. Asarni o‘rganish orqali Rossiya imperiyasining O‘rta Osiyoga nisbatan bosqinchilik siyosati hamda tajovuzkorona harakatlarini ko‘rish mumkin. Ko‘rsatib o‘tilgan manba muallif tomonidan Toshkent shahri tarixining yoritilishi nuqtai nazaridan o‘rganilgan. Tadqiqotchi XIX asrda Toshkent shahri topografiyasi, shaharning mashhur kishilari, aholining mashg‘ulotlari kabi masalalarga asosiy e’tiborni qaratdi.

Shuni ham qayd etish lozimki, Qo‘qon mahalliy tarixchilari tomonidan yaratilgan asarlar nafaqat O‘zbekistonda, balki xorijiy mamlakatlarda ham o‘rganilib, nashr etila boshlandi. Jumladan, 1991 yilda Tohir Xo‘jandiyning “G‘aroyibi sipoh” asari Tojikiston Respublikasining Xo‘jand shahrida nashr etildi. O‘zbek va yapon olimlari B.Babadjanov, Sh.Vohidov va X.Kamatsularning hamkorligi tufayli 2002 yilda Muhammad Yunusxo‘ja Toibning “Tuhfai Toib” asari chop etildi. Mazkur asarda Qo‘qon xonligining Rossiya imperiyasining bosqinchilik siyosatiga qarshi kurashi aks ettirilgan.

XULOSA

Xulosa qilib aytganda, O‘zbekiston Respublikasining mustaqillik yillarida Qo‘qon xonligi tarixiga oid yozma manbalarning tarjima va qayta nashr etilishi tarixiy tadqiqotlar bazasini kengaytirishga xizmat qildi hamda ilmiy izlanishlarni jonlantirishga turtki bo‘ldi. Bundan tashqari, ushbu manbalarning nashr va tahlil etilishi kelajakda nafaqat Qo‘qon xonligi, balki o‘zbek davlatchiligi borasida olib boriladigan tadqiqotlar uchun asos bo‘lib xizmat qiladi. Mazkur manbalarning aksariyati XIX asrda, Rossiya imperiyasi bosqini davrida hamda mualliflarning o‘zlari guvohligida yaratilgani bois o‘sha davr tarixi birmuncha xolisona hamda haqqoniy ravishda yozilgan deyish mumkin. Shu sababli, manbalarning qayta nashr etilishi o‘quvchilar va tadqiqotchilar oldida o‘zbek davlatchiligini tarixini haqqoniy ravishda, ayniqsa Rossiya imperiyasining bosqinchilik siyosatini xolisona o‘rganishlarida asos bo‘lib xizmat qilmoqda.

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БИОЭКОЛОГИЧЕСКИЕ ОСОБЕННОСТИ ПРЕДСТАВИТЕЛЕЙ ОТРЯДА РЖАНКООБРАЗНЫЕ (CHARADRIIFORMES), РАСПРОСТРАНЁННЫХ В ГОРОДЕ НУКУСЕ И ЕГО ОКРЕСТНОСТЯХ

Аннотация: *В статье представлены результаты исследования биоэкологических особенностей представителей отряда Charadriiformes в городе Нукус и его окрестностях. Проанализированы видовой состав, сезонная динамика и структура орнитофауны. Установлено высокое видовое разнообразие с преобладанием перелётных форм, что подчёркивает роль региона как миграционного узла. Рассмотрено влияние гидрологических, климатических и антропогенных факторов, а также значение водно-болотных экосистем для сохранения биоразнообразия.*

Ключевые слова: *ржанкообразные, орнитофауна, миграция, биоэкология, экосистемы, антропогенные факторы.*

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BIOECOLOGICAL CHARACTERISTICS OF REPRESENTATIVES OF THE ORDER CHARADRIIFORMES DISTRIBUTED IN NUKUS CITY AND ITS SURROUNDINGS

Abstract: *The article presents the results of a study on the bioecological characteristics of representatives of the order Charadriiformes in Nukus city Нукус and its surroundings. The species composition, seasonal dynamics, and structure of the avifauna were analyzed. A high level of species diversity with a predominance of migratory forms was established, emphasizing the region's role as an important migration hub. The influence of hydrological, climatic, and anthropogenic factors was examined, as well as the significance of wetland ecosystems in maintaining biodiversity.*

Key words: *Charadriiformes, avifauna, migration, bioecology, ecosystems, anthropogenic factors.*

Введение

Отряд Charadriiformes (ржанкообразные) включает куликов, ржанок, чаек и крачек, тесно связанных с водно-болотными и прибрежными экосистемами. Представители отличаются высокой экологической пластичностью, миграционной активностью и способностью обитать в пресноводных, солёных и антропогенных водоёмах, выступая важными биоиндикаторами состояния среды. Территория Южного Приаралья, включая Нукус, сформирована под влиянием природных факторов и последствий Аральский кризис. Дельта Амударья, солончаки и озёра различной минерализации образуют мозаичные местообитания, где ржанкообразные занимают ведущие позиции. Несмотря на аридный климат, наличие водоёмов обеспечивает существование различных экологических групп птиц, а регион выполняет важную роль миграционного узла Центральной Азии. Цель исследования — анализ биоэкологических особенностей представителей Charadriiformes в данном регионе с учётом видового состава, сезонной динамики и экологических факторов.

Материалы и методы

Настоящее исследование основано на интеграции литературных данных и результатов полевых наблюдений, проведённых в разные сезоны года на территории города Нукус и его окрестностей. Теоретической основой послужили работы региональных орнитологов (Мамбетжумаев, 1995; Жуманов, 2013, 2017; Аметов, 2017; Матекова, 2020, 2022), отражающие вопросы видового разнообразия и экологии птиц Южного Приаралья. Полевые исследования охватывали основные типы биотопов региона: пойму Амударья, естественные и искусственные озёра, солёные водоёмы, коллекторно-дренажные системы, а также степные и полупустынные территории. Учёт птиц проводился маршрутным и точечным методами в местах их концентрации (мелководья, острова, прибрежные зоны). Видовая идентификация осуществлялась визуально с использованием биноклей и определителей. Полученные данные подвергались сравнительно-экологическому и статистическому анализу с оценкой сезонной динамики, распределения по местообитаниям и выявлением доминирующих видов.

Результаты и обсуждение

В результате проведённых исследований установлено, что на территории города Нукус и его окрестностей зарегистрирован 61 вид птиц отряда Charadriiformes, относящихся к 8 семействам. Орнитофауна характеризуется преобладанием перелётных видов (60 видов), что отражает транзитную роль региона в миграционных путях. Гнездящиеся виды представлены 21 видом, зимующие — 3 вида, что связано с особенностями климатических и гидрологических условий. В структуре авифауны доля гнездящихся составляет 34,42%, зимующих — 4,9%, а пролётных — 98,36%, что подчёркивает значение территории как ключевой миграционной зоны.

Сезонный анализ показал, что среди гнездящихся видов доминируют представители семейства Laridae (52,3%), обладающие высокой экологической пластичностью и способностью адаптироваться к разнообразным условиям среды, включая антропогенные ландшафты. Второе место занимают представители семейства Charadriidae (28,5%), предпочитающие открытые прибрежные участки и солончаковые территории.

Остальные таксоны представлены в меньшей степени: представители семейства Recurvirostridae, а также группы травников (род Tringa) и чибисов (род Vanellus) составляют по 4,8% каждая, что связано с ограниченностью специализированных экологических ниш. Среди пролётных видов доминируют кулики (45,0%), далее следуют чайковые (23,3%) и ржанковые (20,0%), что обусловлено их зависимостью от временных водно-болотных угодий в период миграций. Зимующие виды представлены исключительно семейством Laridae, что объясняется их высокой экологической пластичностью и устойчивостью к неблагоприятным условиям среды.

К широко распространённым гнездящимся видам относятся *Burhinus oedicnemus, Himantopus himantopus, Charadrius dubius, Charadrius alexandrinus, Vanellus leucurus, Glareola pratincola, Larus cachinnans, Sterna hirundo* и *Sterna albifrons*. Данные виды обладают высокой экологической пластичностью и способны использовать различные типы местообитаний, включая как пресноводные, так и солёные водоёмы аридной зоны. К редко гнездящимся видам относятся *Haematopus ostralegus, Chroicocephalus ridibundus, Chlidonias hybrida* и *Chlidonias leucopterus*, численность которых ограничена узкой специализацией гнездовых биотопов и высокой чувствительностью к фактору беспокойства.

Особую категорию составляют редкие и находящиеся под угрозой исчезновения виды, занесённые в национальные и международные охранные списки, среди которых *Vanellus gregarius, Numenius tenuirostris, Numenius arquata, Limosa limosa, Limnodromus semipalmatus, Glareola nordmanni u Larus ichthyaetus.* Их присутствие свидетельствует о высокой природоохранной значимости исследуемой территории и необходимости усиления мер по сохранению биоразнообразия.

Результаты исследования показывают, что формирование орнитофауны ржанкообразных в городе Нукус определяется взаимодействием абиотических, биотических и антропогенных факторов. Ведущая роль принадлежит гидрологическому режиму, который влияет на доступность кормовых ресурсов и условия гнездования. Колебания уровня воды в Амударья и озёрах могут как расширять кормовую базу за счёт образования мелководий, так и вызывать затопление гнёзд либо сокращение пригодных биотопов при обмелении.

Климатические факторы, прежде всего температурный режим, существенно влияют на жизненные циклы ржанкообразных. Раннее наступление весны смещает сроки гнездования и миграции, тогда как резкие похолодания снижают успешность размножения и выживаемость молодняка. В условиях аридного климата важную роль играет адаптация птиц к экстремальным температурам и дефициту влаги.

Среди биотических факторов значительное влияние на ржанкообразных оказывает хищничество лисицы, шакала и камышового кота, приводящее к гибели яиц и птенцов. Существенное воздействие также оказывают антропогенные факторы: разрушение местообитаний, выжигание прибрежной растительности, выпас скота и беспокойство со стороны человека. Особенно уязвимы колониально гнездящиеся виды, такие как Larus cachinnans и Chroicocephalus ridibundus, численность которых снижается при нарушении условий гнездования. Несмотря на это, представители отряда Charadriiformes сохраняют важное экологическое значение, участвуя в регуляции численности насекомых-вредителей, поддержании трофических цепей и выступая биоиндикаторами состояния окружающей среды; в целом их роль в экосистемах остаётся положительной.

Заключение

Таким образом, представители отряда Charadriiformes в районе Нукус характеризуются высоким видовым разнообразием и сложной структурой, сформированной под влиянием природных и антропогенных факторов. Преобладание перелётных видов подчёркивает роль региона как важного миграционного узла, а наличие гнездящихся и редких видов свидетельствует о сохранении благоприятных условий обитания. Основным фактором является гидрологический режим, тогда как климатические и антропогенные воздействия усиливают нагрузку на популяции. Это обуславливает необходимость охраны водно-болотных экосистем и мест гнездования, а дальнейшие исследования должны быть направлены на мониторинг популяций и изучение адаптаций птиц в условиях изменений Приаралья.

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ИНТЕЛЛЕКТУАЛЬНОЕ РАЗВИТИЕ ОБУЧАЮЩИХСЯ НАЧАЛЬНЫХ КЛАССОВ НА УРОКАХ С УЧЕТОМ ИХ ИНДИВИДУАЛЬНЫХ СПОСОБНОСТЕЙ В УСЛОВИЯХ РЕАЛИЗАЦИИ ФГОС НОО

Аннотация: в *статье рассматривается проблема интеллектуального развития обучающихся начальных классов с учетом их индивидуальных способностей в условиях реализации ФГОС НОО. Раскрывается сущность понятия «интеллектуальное развитие» и его компоненты применительно к младшему школьному возрасту. Анализируются возможности дифференциации и индивидуализации обучения на уроках в начальной школе как средства учета индивидуальных способностей. Представлены методы и приемы работы, направленные на интеллектуальное развитие младших школьников с учетом их познавательных особенностей.*

Ключевые слова: *интеллектуальное развитие, начальная школа, индивидуальные способности, ФГОС НОО, дифференциация обучения, индивидуализация обучения, познавательная активность.*

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INTELLECTUAL DEVELOPMENT OF PRIMARY SCHOOL STUDENTS IN THE CLASSROOM TAKING INTO ACCOUNT THEIR INDIVIDUAL ABILITIES IN THE CONTEXT OF THE IMPLEMENTATION OF THE FSES

Abstract. *The article examines the problem of intellectual development of primary school students taking into account their individual abilities in the context of the implementation of the Federal State Educational Standard of Primary General Education. The essence of the concept of «intellectual development» and its components in relation to primary school age are revealed. The possibilities of differentiation and individualization of education in primary school lessons as a means of taking into account individual abilities are analyzed. Methods and techniques of work aimed at the intellectual development of primary schoolchildren taking into account their cognitive characteristics are presented.*

Keywords: *intellectual development, primary school, individual abilities, FSES, differentiation of education, individualization of education, cognitive activity.*

Современная система начального общего образования ориентирована не только на усвоение младшими школьниками предметных знаний, умений и навыков, но и на их личностное развитие, формирование универсальных учебных действий, развитие познавательных способностей. Федеральный государственный образовательный стандарт начального общего образования (ФГОС НОО) в качестве одного из приоритетных направлений выделяет интеллектуальное развитие обучающихся, которое является основой для успешного обучения на последующих ступенях образования.

Особую значимость проблема интеллектуального развития приобретает в начальной школе, поскольку младший школьный возраст является сенситивным периодом для развития познавательных процессов: мышления, памяти, внимания, воображения. Именно в этот период закладываются основы интеллектуальной активности, формируются учебные интересы, развиваются способности к анализу, синтезу, обобщению, классификации. Однако достижение этих целей невозможно без учета индивидуальных способностей обучающихся, которые существенно различаются по темпу усвоения материала, познавательным интересам, уровню развития мышления и других психических процессов.

Целью данной статьи является теоретическое обоснование и практическая разработка подходов к интеллектуальному развитию младших школьников на уроках с учетом их индивидуальных способностей в условиях реализации ФГОС НОО.

Интеллектуальное развитие младшего школьника представляет собой процесс качественных изменений в познавательной сфере личности, проявляющийся в овладении мыслительными операциями (анализ, синтез, сравнение, обобщение, классификация, абстрагирование), развитии познавательных процессов (восприятия, памяти, внимания, воображения, речи), формировании учебной деятельности и познавательной активности.

В структуре интеллектуального развития младших школьников выделяют следующие компоненты: когнитивный (развитие мыслительных операций, гибкость ума, способность к переносу знаний); процессуальный (развитие познавательных процессов: восприятия, памяти, внимания); регулятивный (способность к планированию, контролю и оценке своих действий); мотивационный (познавательные интересы, любознательность, стремление к умственной деятельности).

Индивидуальные способности обучающихся представляют собой устойчивые психологические особенности, определяющие успешность овладения учебной деятельностью. К ним относятся: особенности познавательных процессов (тип памяти, скорость и качество запоминания, устойчивость и переключаемость внимания); особенности мышления

(наглядно-действенное, наглядно-образное, словесно-логическое; темп мыслительной деятельности); особенности учебной мотивации (познавательные интересы, эмоциональное отношение к учению); особенности темперамента и характера (работоспособность, усидчивость, самостоятельность).

Учет индивидуальных способностей в образовательном процессе реализуется через дифференциацию и индивидуализацию обучения. Дифференциация предполагает группировку обучающихся на основе сходства их индивидуальных особенностей. Индивидуализация – более глубокая форма учета индивидуальных способностей, предполагающая создание для каждого обучающегося индивидуального образовательного маршрута. В условиях классно-урочной системы наиболее доступной и эффективной формой является уровневая дифференциация, при которой задания различаются по сложности, объему, характеру познавательной деятельности.

В практике работы учителя начальных классов МАОУ СОШ № 9 разработана и апробирована система методов и приемов, направленных на интеллектуальное развитие младших школьников с учетом их индивидуальных способностей. Система включает следующие компоненты.

Диагностика индивидуальных способностей. В начале учебного года проводится диагностика уровня развития познавательных процессов (памяти, внимания, мышления), выявление познавательных интересов, определение ведущего типа восприятия и переработки информации. По результатам диагностики обучающиеся распределяются по условным группам с учетом их индивидуальных особенностей.

Уровневая дифференциация заданий. На разных этапах урока используются разноуровневые задания. Первый уровень (базовый) – репродуктивные задания, направленные на воспроизведение изученного материала. Второй уровень (повышенный) – задания, требующие применения знаний в знакомой ситуации, выполнения мыслительных операций по образцу. Третий уровень (творческий) – задания, требующие применения знаний в нестандартной ситуации, выполнения творческих работ, решения проблемных задач. Каждый обучающийся имеет право выбрать уровень сложности в соответствии со своими возможностями и интересами.

Приемы развития мыслительных операций. На уроках русского языка и математики используются задания на сравнение (сравнить слова по составу, сравнить числовые выражения), классификацию (распределить слова по группам, разбить числа на группы по общему признаку), обобщение (найти общее понятие, сделать вывод по теме), аналогию (подобрать аналогичный пример). Для развития логического мышления используются логические задачи, ребусы, головоломки.

Приемы развития памяти и внимания. Для развития памяти используются: ассоциативные цепочки для запоминания словарных слов;

графические диктанты; пересказ текста по опорным словам или иллюстрациям; заучивание стихотворений с использованием мнемотехник. Для развития внимания используются: корректурные пробы (нахождение заданных букв или цифр в тексте); задания на нахождение отличий; графические диктанты; задания на распределение и переключение внимания.

Индивидуальные образовательные маршруты. Для обучающихся, испытывающих трудности в обучении, разрабатываются индивидуальные образовательные маршруты, включающие: дополнительные занятия по отработке базовых умений; адаптированные задания; увеличение времени на выполнение заданий; использование визуальных опор. Для одаренных обучающихся разрабатываются индивидуальные траектории, включающие: углубленное изучение отдельных тем; выполнение творческих и исследовательских заданий; участие в олимпиадах и конкурсах; выполнение проектных работ.

Апробация разработанной системы методов и приемов проводилась в 3-4 классах МАОУ СОШ № 9 г. Армавира в течение 2024-2026 учебных годов. В исследовании приняли участие 60 обучающихся. Для оценки эффективности использовались: диагностика уровня развития познавательных процессов (методики исследования памяти, внимания, мышления); анализ успеваемости; наблюдение за познавательной активностью на уроках; анкетирование обучающихся и родителей.

Результаты показали положительную динамику интеллектуального развития обучающихся. Уровень развития мыслительных операций повысился: умение сравнивать увеличилось с 62% до 78%; умение классифицировать – с 55% до 72%; умение обобщать – с 48% до 68%. Улучшились показатели памяти и внимания: объем кратковременной памяти увеличился в среднем с 5 до 7 единиц; устойчивость внимания повысилась на 25%; переключаемость внимания – на 20%. Качество знаний по русскому языку повысилось с 54% до 68%, по математике – с 58% до 72%. Познавательная активность обучающихся возросла: увеличилось количество задаваемых вопросов, желание выполнять дополнительные задания, интерес к предметным олимпиадам и конкурсам.

Таким образом, учет индивидуальных способностей обучающихся на уроках в начальной школе является эффективным средством интеллектуального развития младших школьников. Предложенная система методов и приемов может быть рекомендована к использованию учителям начальных классов в условиях реализации ФГОС НОО. Дальнейшие исследования могут быть направлены на разработку цифровых инструментов диагностики индивидуальных способностей, создание электронных банков разноуровневых заданий, развитие тьюторского сопровождения одаренных обучающихся.

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КОМПЛЕКСНАЯ ОЦЕНКА ФИНАНСОВОГО СОСТОЯНИЯ ПРЕДПРИЯТИЯ КАК ОСНОВЫ ЕГО ИНВЕСТИЦИОННОЙ ПРИВЛЕКАТЕЛЬНОСТИ

Аннотация*: В статье рассматривается финансовое состояние предприятия как одна из ключевых основ его инвестиционной привлекательности. Цель работы состоит в обосновании и апробации комплексного подхода к оценке финансового состояния предприятия на основе ограниченного, но аналитически достаточного набора показателей. Практическая часть выполнена на материалах ПАО «Магнит» за 2022-2024 гг. Проведенный анализ показал, что рост выручки и повышение оборачиваемости активов не обеспечивают автоматического усиления инвестиционной привлекательности, если одновременно сохраняются ограничения по структуре капитала, уровню долговой нагрузки и денежному покрытию обязательств. Сделан вывод о том, что итоговая инвестиционная оценка определяется не отдельным сильным показателем, а сочетанием устойчивости, прибыльности, деловой активности и долгового профиля компании.*

Ключевые слова: *финансовое состояние предприятия, инвестиционная привлекательность, финансовая устойчивость, ликвидность, рентабельность, долговая нагрузка, комплексная оценка.*

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COMPREHENSIVE ASSESSMENT OF THE FINANCIAL CONDITION OF AN ENTERPRISE AS THE BASIS OF ITS INVESTMENT ATTRACTIVENESS

Abstract*: The article examines the financial condition of an enterprise as one of the main foundations of its investment attractiveness. The purpose of the study is to substantiate and test a comprehensive approach to assessing the financial condition of a company on the basis of a limited but analytically sufficient set of indicators. The practical section is based on the data of PJSC Magnit for 2022-2024. The analysis shows that revenue growth and higher asset turnover do not automatically increase investment attractiveness if the company*

remains constrained by capital structure, debt burden and weakening cash coverage of liabilities.

Keywords: *financial condition of an enterprise, investment attractiveness, financial stability, liquidity, profitability, debt burden, comprehensive assessment*

Введение

В условиях нестабильной экономической среды, роста стоимости заемных ресурсов и повышения требований инвесторов к качеству корпоративной отчетности проблема инвестиционной привлекательности предприятия приобретает не только теоретическое, но и прикладное значение. Инвестора интересуют не отдельные финансовые показатели сами по себе, а способность компании поддерживать устойчивость, выполнять обязательства и сохранять приемлемое соотношение доходности и риска.

По этой причине финансовое состояние предприятия следует рассматривать как базу для инвестиционного суждения. Именно через систему финансовых коэффициентов формируется наиболее доступное и сопоставимое представление о надежности организации, качестве структуры капитала, эффективности использования активов и способности бизнеса генерировать устойчивый результат.

Цель статьи состоит в обосновании и практической апробации комплексного подхода к оценке финансового состояния предприятия как основы его инвестиционной привлекательности. Для достижения этой цели в работе последовательно рассмотрены методические подходы к оценке инвестиционной привлекательности, сформирован набор ключевых показателей и проведен анализ финансовых данных ПАО «Магнит» за 2022-2024 гг.

Теоретические основы оценки инвестиционной привлекательности предприятия

В экономической литературе инвестиционная привлекательность предприятия обычно трактуется как совокупная характеристика, отражающая целесообразность вложения средств в конкретную организацию с учетом ожидаемой доходности, устойчивости и уровня риска [1; 4; 7].

Анализ публикаций по данной теме позволяет выделить три наиболее распространенных подхода. Коэффициентный подход строится на системе финансовых показателей и ориентирован на анализ ликвидности, рентабельности, структуры капитала, оборачиваемости и платежеспособности. Факторный подход расширяет рамки исследования и дополняет финансовые характеристики качественными параметрами: положением компании на рынке, отраслевыми особенностями, уровнем корпоративного управления и степенью информационной прозрачности [1; 3; 5; 6].

Наиболее продуктивным для прикладного исследования представляется интегрированный подход, поскольку он позволяет совместить аналитическую содержательность и сопоставимость результатов.

При этом ядром такой оценки остается финансовое состояние предприятия, так как именно оно создает наиболее надежную эмпирическую основу для сравнения компаний и анализа динамики их положения [4; 7].

Таблица 1.
Показатели комплексной оценки финансового состояния предприятия

Блок	Показатель	Формула	Назначение
Финансовая устойчивость	Коэффициент автономии	Кавт = Собственный капитал / Активы	Характеризует степень независимости от заемных источников
Доходность	Рентабельность продаж	Rпрод = Чистая прибыль / Выручка х 100%	Показывает долю прибыли в выручке
Доходность	Рентабельность активов	Rакт = Чистая прибыль / Активы х 100%	Отражает эффективность использования активов
Деловая активность	Оборачиваемость активов	Коб = Выручка / Активы	Показывает интенсивность использования активов
Долговая нагрузка	Net Debt / EBITDA	Чистый долг / EBITDA	Характеризует долговую нагрузку и возможности ее обслуживания
Ликвидный резерв	Cash / Debt	Денежные средства / Совокупный долг	Показывает обеспеченность долга денежными средствами

Источник: составлено автором на основе обобщения современных подходов [1; 3; 4; 7].

Финансовое состояние предприятия как основа инвестиционной привлекательности

Финансовое состояние предприятия характеризует его способность обеспечивать непрерывность деятельности, поддерживать платежеспособность, сохранять устойчивость структуры капитала и получать финансовый результат, достаточный для дальнейшего развития. Речь идет не только о наличии прибыли, но и о том, насколько сбалансированно функционируют основные элементы финансовой системы организации [3; 6; 7].

Для целей оценки инвестиционной привлекательности наибольшее значение имеют пять аналитических блоков: финансовая устойчивость, доходность, деловая активность, долговая нагрузка и ликвидный резерв. Такой набор позволяет охватить ключевые параметры, от которых зависит итоговая оценка предприятия со стороны инвестора, не перегружая исследование избыточным количеством коэффициентов [3; 4; 7].

Использование компактной системы показателей оправдано еще и тем, что абсолютные величины не всегда дают корректное представление о реальном положении компании. Рост выручки или активов может сопровождаться ослаблением автономии, ухудшением долгового профиля и снижением ликвидного запаса. Поэтому более содержательный вывод достигается только при совместном анализе нескольких взаимосвязанных показателей [4; 7].

Информационная база и объект исследования

В качестве объекта исследования выбрано ПАО «Магнит». Выбор данной компании обусловлен тем, что она относится к числу крупнейших российских розничных сетей, регулярно раскрывает финансовые результаты и позволяет проследить соотношение между масштабом бизнеса, прибыльностью и долговой нагрузкой в динамике [9; 10; 11].

Информационной базой исследования послужили годовые отчеты ПАО «Магнит» за 2022, 2023 и 2024 годы, а также публикации, посвященные методическим вопросам оценки инвестиционной привлекательности и финансового состояния предприятия. По данным отчетности выручка компании выросла с 2 352,0 млрд руб. в 2022 году до 3 043,4 млрд руб. в 2024 году, EBITDA в 2024 году составила 171,9 млрд руб., чистая прибыль снизилась до 50,0 млрд руб., а показатель Net Debt / EBITDA достиг 1,5х [9; 10; 11].

Таблица 2.
Исходные показатели ПАО «Магнит» за 2022-2024 гг.

Показатель	2022	2023	2024
Выручка, млрд руб.	2 352,0	2 544,7	3 043,4
EBITDA, млрд руб.	160,5	165,4	171,9
Чистая прибыль, млрд руб.	34,1	66,1	50,0
Net Debt / EBITDA, раз	2,1	1,0	1,5
Активы, млрд руб.	1 396,0	1 429,5	1 563,9
Собственный капитал, млрд руб.	207,4	158,5	181,3
Денежные средства, млрд руб.	314,9	236,3	159,5

Источник: составлено автором по данным годовых отчетов ПАО «Магнит» [9; 10; 11].

Расчет и оценка ключевых коэффициентов

На основе исходных данных были рассчитаны показатели, характеризующие финансовую устойчивость, доходность, деловую активность, долговую нагрузку и ликвидный резерв предприятия. Полученные коэффициенты позволяют перейти от описания абсолютных

величин к более предметной оценке финансового состояния компании [9; 10; 11].

Таблица 3.
Расчет ключевых коэффициентов финансового состояния ПАО «Магнит»

Показатель	2022	2023	2024	Комментарий
Коэффициент автономии	0,149	0,111	0,116	На протяжении всего периода остается низким
Рентабельность продаж, %	1,45	2,60	1,64	После заметного роста в 2023 г. в 2024 г. произошло снижение
Рентабельность активов, %	2,44	4,62	3,20	Показатель выше уровня 2022 г., но ниже результата 2023 г.
Оборачиваемость активов, раз	1,68	1,78	1,95	Наблюдается устойчивая положительная динамика
Net Debt / EBITDA, раз	2,1	1,0	1,5	После улучшения в 2023 г. долговая нагрузка вновь возросла
Денежное покрытие долга	0,75	0,59	0,39	Запас ликвидности последовательно сокращается

Источник: расчеты автора по данным официальной отчетности компании [9; 10; 11].

Анализ результатов исследования

Результаты расчетов показывают, что в 2022-2024 гг. ПАО «Магнит» сохраняло высокий масштаб деятельности и демонстрировало положительную динамику выручки. Рост оборота и повышение оборачиваемости активов указывают на интенсивное использование ресурсной базы и подтверждают сильные позиции бизнеса на рынке [9; 10; 11].

Вместе с тем положительная динамика не была одинаково выражена по всем направлениям. Наиболее благоприятным для компании оказался 2023 год, когда существенно выросла чистая прибыль, улучшились показатели рентабельности и снизился уровень долговой нагрузки. В 2024 году ситуация стала менее однозначной: несмотря на дальнейший рост выручки и увеличение EBITDA, чистая прибыль сократилась, а показатель Net Debt / EBITDA вновь ухудшился [9; 10; 11].

Особого внимания заслуживают коэффициент автономии и денежное покрытие долга. Низкий уровень автономии на всем исследуемом интервале указывает на значительную зависимость компании от заемных источников финансирования, а снижение денежного покрытия долга свидетельствует о сокращении ликвидного запаса. В результате сильные операционные

характеристики соседствуют с ограничениями по финансовой устойчивости [9; 10; 11].

Таким образом, применительно к ПАО «Магнит» инвестиционная привлекательность может быть оценена как средняя: компания демонстрирует сильные показатели масштаба бизнеса и деловой активности, однако ее положение сдерживается особенностями структуры капитала и менее устойчивой динамикой долговых показателей [4; 7; 9; 10; 11].

Таблица 4.
Итоговая качественная оценка инвестиционной привлекательности ПАО «Магнит»

Критерий	Оценка	Обоснование
Масштаб бизнеса	Высокая	Компания демонстрирует устойчивый рост выручки
Деловая активность	Высокая	Оборачиваемость активов имеет положительную динамику
Прибыльность	Средняя	Компания прибыльна, однако динамика финансового результата нестабильна
Финансовая устойчивость	Ниже средней	Коэффициент автономии остается на низком уровне
Долговая нагрузка	Средняя	Показатель Net Debt / EBITDA остается контролируемым, но ухудшился в 2024 г.
Итоговая инвестиционная привлекательность	Средняя	Сильные операционные результаты ограничиваются особенностями структуры капитала и долговой нагрузкой

Источник: составлено автором на основе [4; 7; 9; 10; 11].

Направления повышения инвестиционной привлекательности предприятия

Проведенное исследование позволяет обозначить несколько направлений, способных повысить инвестиционную привлекательность предприятия. Прежде всего речь идет об укреплении финансовой устойчивости через более сбалансированную структуру капитала. Для инвестора важен не только масштаб бизнеса, но и степень зависимости компании от заемного финансирования [3; 6; 7].

Не менее значимыми направлениями остаются контроль долговой нагрузки, поддержание маржинальности бизнеса и сохранение приемлемого запаса ликвидности. Рост выручки сам по себе не усиливает позицию компании в глазах инвесторов, если он не сопровождается достаточным уровнем прибыли и устойчивой способностью обслуживать обязательства [3; 5; 6].

Дополнительное значение имеет качество раскрытия отчетной информации. Полнота и сопоставимость данных снижают неопределенность для потенциального инвестора и позволяют более корректно интерпретировать показатели финансового состояния предприятия [5; 8].

Заключение

Проведенное исследование подтвердило, что финансовое состояние предприятия выступает одной из основных предпосылок его инвестиционной привлекательности. В современных условиях оценка перспектив объекта инвестирования не может строиться на одном показателе, будь то прибыль, выручка или уровень рентабельности.

Практическая апробация предложенного подхода на материалах ПАО «Магнит» показала, что компания обладает значительным масштабом бизнеса, сохраняет положительные финансовые результаты и демонстрирует рост эффективности использования активов. Вместе с тем ее инвестиционная привлекательность нельзя признать безусловно высокой, поскольку она ограничивается низким уровнем автономии, сокращением денежного покрытия долга и ухудшением отдельных долговых параметров в 2024 году.

Следовательно, инвестиционная привлекательность предприятия должна оцениваться как результат согласованного состояния ключевых финансовых параметров, а не как прямое следствие одного сильного показателя.

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К ВОПРОСУ ОБ ОПРЕДЕЛЕНИИ ПОНЯТИЯ «КОРРУПЦИИ»

Аннотация. *Одним из самых негативных социально-политических явлений современного государства является коррупция. Коррупция поражает государственный механизм, снижает эффективность функций государства, приводит к утрате вере людей в обществе. В статье приводится краткий обзор определений "коррупции". На основе анализа научной литературы автор представил свое, авторское определение коррупции.*

Ключевые слова: *коррупция, должностное лицо, полномочия, права человека*

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ON THE DEFINITION OF "CORRUPTION"

Abstract. *Corruption is one of the most negative socio-political phenomena in a modern state. Corruption undermines the state mechanism, reduces the effectiveness of state functions, and leads to a loss of public confidence. This article provides a brief overview of definitions of "corruption." Based on an analysis of the scientific literature, the author presents his own definition of corruption.*

Keywords: *corruption, official, authority, human rights*

Коррупция стала важным фактором стагнации экономики, превратилась в серьезную угрозу верховенству закона, демократическим преобразованиям и правам человека, привела к тяжелейшим социальным последствиям, подрывает доверие к властным структурам, ведет к деградации социума, политических и социальных отношений, наносит урон имиджу и престижу страны в международном сообществе. Среди разрушительных процессов коррозия. национальной государственности коррупция занимает одно из основных мест. Коррупция - крайне опасное социальное явление, оказывающее весьма негативное воздействие на государство, общество, его граждан, на правовой порядок, социальную стабильность и национальную безопасность.

Для того, чтобы эффективно вести борьбу с коррупцией следует определиться с понятием «коррупция», раскрыть его научное, политическое содержание, а также его признаки. Поэтому мы настоящее исследование начинаем с раскрытия понятия «коррупция», его анализа и определения его признаков.

Сам термин “коррупция” происходит от латинского слова “corruptio”, что означает «порча» и означает подкуп чиновников, политиков, хищение ими государственных средств, их связь с криминальными структурами, которая наносит вред государству. В справочной литературе обычно выделяются две составляющие понятия «коррупция»: 1) разложение экономической и политической систем в государстве, выражающееся в продажности должностных лиц и общественных деятелей; 2) преступление, выражающееся в использовании должностным лицом прав, предоставляемых ему по должности, в целях личного обогащения [1]. В энциклопедическом словаре Брокгауза и Эфрона понятие «коррупция» непосредственно связано со словом «карьера» от французского «carriere» [2].

В литературе имеется разные трактовки «коррупции». Большинство авторов трактуют это явление более широко, считая, что в ее основе лежит должностное злоупотребление [3].

В общественно-социальном значении коррупция является антисоциальным поведением должностных лиц, у которых имеется доступ к общественным ресурсам в связи с со своим статусом или фактическим положением, использующие для извлечения выгоды в личных, узкогрупповых или корпоративных целях [4]. При этом ряд авторов совершенно справедливо полагают, что наиболее опасна коррупция в государственном аппарате, которая, широко разрастается, охватывая не только весь государственный аппарат, но и все структуры общества, искажая нормальные, здоровые взаимоотношения общественной жизни и починяя эти взаимоотношения узкокорыстным целям. Коррупция представляет собой системное комплексное явление, которое стремится «встроиться» во все сферы общественной жизни, деформируя легитимные способы осуществления социально-экономических и политико-правовых взаимоотношений социальных субъектов. Поэтому основная задача антикоррупционной политики состоит в том, чтобы добиться снижения коррупции до такого уровня, чтобы она не могла представлять угрозу национальной безопасности и оказывать значительное влияние на функционирование основных сфер жизнедеятельности общества [5,6,7].

Одним из самых опасных сторон коррупции является то, что в результате этого негативного явления наносятся урон по правам человека и государство отдаляется от правового государства. А учитывая, что в ст.1 Конституции Республики Узбекистан провозглашено: «Узбекистан — суверенное, демократическое, правовое, социальное и светское государство с республиканской формой правления», построение правового государства имеет для нашей страны очень важное стратегическое значение. Очевидно, в

мире не существует в настоящее время эталона правового государства, однако есть принципы, без которых построение правового государства просто невозможно. Основополагающие принципы правового государства следующие: во-первых, конституционная реализация разделение законодательной, исполнительной и судебной ветвей власти и системы сдержек и противовесов между ними; во-вторых, принцип приоритетности прав человека, в соответствии с котором в государстве действует эффективный механизм защиты прав человека; в-третьих, принцип равенство всех перед законом. Поэтому мы согласны с мнением, что коррупция – это, особо опасное деяние против, прежде всего, против конституционных прав и свобод граждан, подрывающий основы государства и права. Социальными основами коррупции является противоречие между частными интересами должностного лица и публичными интересами общества, которые и подрывают конституционный строй [8].

Одним из самых негативных сторон коррупции является нарушение прав человека и тем самым подрыв веры в политический строй государства. Как отмечает академик А.Х.Саидов, прежде всего, в результате коррупции общество лишается необходимых финансовых ресурсов, которые могли бы использоваться для общественно полезных целей в образовании, социальной поддержки населения, образования. При этом, ученый подчеркивает: «Коррупция является самым большим препятствием на пути реализации личных, политических, социальных, экономических и культурных прав человека» [9].

Международное сообщество проблемы коррупции всегда держала в центре внимания. Характеризуя коррупцию как одной из самых негативных проблем современности, Генеральный секретарь ООН Антониу Гутерриш отмечал: «Коррупция – это самое подлое, преступное и аморальное предательство общественного доверия. Она особенно губительна во время кризисов, подобных пандемиям». Организация Объеденных Наций приняла ряд международных документов универсального характера в борьбе с коррупцией. Среди них такие значимые для международного сообщества документы как Декларация о борьбе с коррупцией и взяточничеством в международных торговых операциях от 1996 г., Международный Кодекс этического поведения государственных должностных лиц от 1996 г., Конвенция против транснациональной организованной преступности от 2000 г., Конвенция против коррупции в 2003 г. и другие. Так, в ст. 7 Кодекса поведения должностных лиц по поддержанию правопорядка, принятом Генеральной Ассамблеей ООН 17 декабря в 1978 г. определено, что понятие коррупции охватывает совершение или не совершение какого-либо действия при исполнении обязанностей или по причине этих обязанностей в результате требуемых или принятых подарков [10].

На основе анализа научной литературы и рассмотрения вышеуказанных признаков коррупции, мы представляем следующее определение. Коррупция – не законная трансформация должностным лицом

или лицами своих полномочий, наделенных государством, обществом для реализации функций государства, решения общественных задач, достижения стратегических целей в материальные и нематериальные блага для удовлетворения интересов своих или группы людей, которая сопровождается антисоциальными последствиями.

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К ВОПРОСУ ПРИМЕНЕНИЯ БЕСПИЛОТНЫХ ЛЕТАТЕЛЬНЫХ АППАРАТОВ В НАРОДНОМ ХОЗЯЙСТВЕ: РЕГИОНАЛЬНЫЙ АСПЕКТ И ЭКОНОМИЧЕСКАЯ ЭФФЕКТИВНОСТЬ В УСЛОВИЯХ ЦЕНТРАЛЬНОЙ АЗИИ

Аннотация. *В статье исследуется потенциал интеграции беспилотных авиационных систем (БАС) в ключевые сектора экономики стран Центральной Азии. Особое внимание уделено эксплуатации техники в условиях высокогорья и аридного климата. Проведен сравнительный анализ моделей производства РФ и КНР. Сформулированы рекомендации по гармонизации нормативно-правовой базы и рассчитаны показатели экономической эффективности внедрения БПЛА в энергетике и сельском хозяйстве.*

Ключевые слова: *БПЛА, Центральная Азия, народное хозяйство, экономическая эффективность, нормативно-правовое регулирование, DJI, Геоскан, ZALA, мониторинг, агродроны.*

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ON THE USE OF UNMANNED AERIAL VEHICLES IN THE NATIONAL ECONOMY: A REGIONAL ASPECT AND ECONOMIC EFFICIENCY IN CENTRAL ASIA

Abstract. *This article examines the potential for integrating unmanned aerial systems (UAS) into key economic sectors in Central Asian countries. Particular attention is paid to the operation of these systems in high-altitude and arid climates. A comparative analysis of production models in Russia and China is provided. Recommendations for harmonizing regulatory frameworks are formulated, and the economic efficiency indicators for UAV implementation in the energy and agricultural sectors are calculated.*

Keywords: *UAVs, Central Asia, national economy, economic efficiency, regulatory framework, DJI, Geoscan, ZALA, monitoring, agricultural drones.*

Современный этап развития производительных сил в странах Центральной Азии (Казахстан, Узбекистан, Кыргызстан, Таджикистан, Туркменистан) характеризуется острой необходимостью цифровизации труднодоступных сегментов экономики. Сложный рельеф, включающий горные системы Тянь-Шаня и Памира, а также обширные пустынные территории Кызылкума и Каракума, накладывает существенные ограничения на использование традиционных методов мониторинга и логистики. В данных условиях беспилотные летательные аппараты (БПЛА) перестают быть вспомогательным инструментом и становятся критически важным звеном производственных цепочек.

Актуальность темы обусловлена поиском путей снижения операционных затрат (OPEX) при сохранении высокой точности данных в горнодобывающей промышленности, энергетике и сельском хозяйстве. Целью данной работы является комплексный анализ применимости БАС российского и китайского производства в специфических условиях региона с обоснованием экономической целесообразности.

Итак, рассмотрим специфику эксплуатации БПЛА в природно-климатических условиях региона. Применение БПЛА в Центральной Азии сталкивается с тремя фундаментальными вызовами:

1. Разреженная атмосфера высокогорья. На высотах более 3000 метров над уровнем моря стандартные винтомоторные группы теряют до 35% тяги. Это требует использования БПЛА с высокой удельной мощностью и адаптивными алгоритмами управления [1].

2. Экстремальные температурные градиенты. В летние месяцы температура в пустынных зонах достигает +50°C, что вызывает перегрев видеопередатчиков и быструю деградацию Li-Po аккумуляторов [2].

3. Абразивный износ. Мелкодисперсная пыль и песок агрессивно воздействуют на подшипники двигателей и оптику [2].

Для решения этих задач наиболее эффективными признаны российские платформы (ZALA, Геоскан), обладающие защищенными корпусами, и китайские промышленные решения (DJI Enterprise), предлагающие лучшие сенсорные системы.

Китайские системы (DJI, XAG) доминируют в сельском хозяйстве (модели Agras T40/T50). Их преимущество – в интеграции с облачными сервисами и простоте управления. Например, в условиях Узбекистана использование агродронов позволяет сократить расход воды при поливе и опрыскивании на 90%, что в денежном эквиваленте при цене воды в $0,05/куб.м. дает экономию в $12–15 на гектар за сезон.

Российские комплексы (ZALA) доминируют в мониторинге линейной инфраструктуры (газопроводы Узбекистана и Туркменистана), так как их планер устойчив к сильным боковым ветрам в пустыне. Модели самолетного типа покрывают за один вылет до 100-150 км трассы, что невозможно для коптеров. Их программное обеспечение (например, Metashape) является мировым стандартом для создания ортофотопланов в горнодобыче.

Прикладной анализ моделей производства РФ и КНР представлен в таблице 1.

Таблица 1.
Сравнительная характеристика БПЛА производства РФ и КНР.

Характеристика	DJI Matrice 350 RTK (КНР)	Геоскан 201 (РФ)
Тип конструкции	Квадрокоптер	Самолет
Время полета	55 мин	180 мин
Радиус действия	до 20 км	до 100 км
Устойчивость к ветру	до 12 м/с	до 15 м/с
Темп. режим	-20°С до +50°С	-40°С до +40°С
Сфера применения	Детальная инспекция объектов	Площадное картографирование

Необходимо отметить, что нормативно-правовое поле региона неоднородно, это является ключевым фактором, влияющим на окупаемость инвестиций.

К примеру, в Казахстане наиболее прогрессивное законодательство в регионе. Внедрена цифровая регистрация через Авиационную администрацию Казахстана. Легализация полетов в режиме BVLOS (Beyond Visual Line of Sight) позволяет крупным нефтегазовым компаниям (например, «КазМунайГаз») легально использовать российские аппараты ZALA 421-16E для патрулирования магистральных трубопроводов протяженностью в тысячи километров [3].

В Узбекистане после периода жестких ограничений перешли к либерализации. До недавнего времени использование БПЛА в Узбекистане было крайне ограниченным. Однако Постановления Президента и Кабинета Министров (в частности, №631) открыли рынок для нужд сельского хозяйства и кадастра. Ключевым аспектом здесь является разрешение временного ввоза агродронов и специализированных геодезических комплексов под государственные и корпоративные проекты. Однако, имеется барьер: необходимость ежегодного продления разрешений на использование радиочастот (2,4 ГГц и 5,8 ГГц) в Государственной инспекции по надзору за информатизацией и телекоммуникациями. Ожидание разрешений может занимать от 30 до 60 дней, что создает

финансовые риски в размере $3000-5000 недополученной прибыли на один борт в месяц из-за простоя [4].

В Кыргызстане и Таджикистане основной упор сделан на мониторинг ЧС (оползни, прорывы озер), т.е. гуманитарное и экологическое применение. БПЛА активно используются для мониторинга высокогорных озер и ледников. Законодательство находится в стадии активной адаптации под международные стандарты ICAO. Основной риск здесь – отсутствие четких регламентов по страхованию ответственности перед третьими лицами, что затрудняет привлечение иностранных инвестиций в дроно-порты.

Произведем расчет экономической эффективности (ROI и NPV). Для оценки целесообразности внедрения БПЛА воспользуемся методом сравнения с традиционными способами выполнения работ. Основным показателем целесообразности является срок окупаемости (PBP) и чистый дисконтированный доход (NPV) [5].

Рассмотрим смоделированную ситуацию на примере инспекции ЛЭП в горном районе Таджикистана – внедрение БПЛА для мониторинга 500 км ЛЭП. Традиционный метод включает пеший обход бригадой из 4 человек или использование вертолета Ми-8.

Стоимость часа вертолета: $3500. Для инспекции 500 км требуется около 15 летных часов: $52500.

Стоимость комплекса БПЛА (CAPEX): $80000 (единовременно).

Операционные расходы на вылет (OPEX): $1200 (зарплата пилотов, ГСМ для авто, амортизация).

Экономия за один цикл: $52500 – $1200 = $51300.

Срок окупаемости (PBP): $80000 / $51300 ≈ 1,56 цикла (инспекции). Учитывая, что по регламенту инспекция проводится 4 раза в год, инвестиции окупаются менее чем за 6 месяцев.

Перейдем к расчету чистой приведенной стоимости (NPV). Для трехлетнего горизонта планирования при ставке дисконтирования 12%:

$$NPV = \sum_{t=1}^{n} \frac{CF_t}{(1+r)^t} - IC \qquad (1)$$

где IC = $80 000, FC (ежегодная экономия) = $205200.

За 3 года эксплуатации NPV составит более $ 410000, что подтверждает сверхвысокую эффективность проекта.

Рассматривая данный регион необходимо отметить проблемы кадрового потенциала и сервисной инфраструктуры. Эксплуатация БПЛА в горах и пустынях требует квалификации оператора и инженера по обслуживанию. К тому же в пустынях Кызылкум песок работает как абразив, уничтожая подшипники электромоторов китайских потребительских дронов за 20-30 вылетов. В свою очередь Российские промышленные системы (Геоскан 701) имеют лучшую защищенность узлов, но требуют специализированного сервиса.

Технологический суверенитет региона невозможен без локализации сервиса. В Ташкенте и Алматы активно создаются обучающие центры. Стоимость подготовки одного инженера-пилота варьируется от $1500 до $2500. Главная проблема в регионе – дефицит квалифицированных операторов, умеющих работать с данными лидарного сканирования и отсутствие складов запчастей для специфических «пустынных» фильтров и усиленных подшипников, что увеличивает время ремонта до 45 дней.

Таким образом, обобщая вышеизложенное можно сделать вывод, что применение БПЛА в народном хозяйстве Центральной Азии является экономически оправданным и стратегически необходимым шагом.

В сельском хозяйстве основной эффект достигается за счет экономии дефицитных водных ресурсов и дорогостоящих химикатов (до $15/га).

В промышленности и энергетике БПЛА российского производства показывают лучшие результаты по дальности и отказоустойчивости в суровых климатических условиях.

Главным барьером остается нормативная база, требующая упрощения процедур получения разрешений на полеты, особенно в трансграничных зонах.

Для условий Центральной Азии оптимальным решением является использование гибридного парка БПЛА: китайских моделей для точечных аграрных задач и российских комплексов для масштабного мониторинга инфраструктуры. Гармонизация законодательства и создание региональных сервисных хабов – необходимые условия для полноценного внедрения беспилотных технологий в народное хозяйство.

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ФОРМИРОВАНИЕ ПРОФЕССИОНАЛЬНОЙ КОМПЕТЕНТНОСТИ БУДУЩИХ МЕДИЦИНСКИХ РАБОТНИКОВ В УСЛОВИЯХ КОЛЛЕДЖА

Аннотация: *в статье рассматривается проблема формирования профессиональной компетентности будущих медицинских работников в условиях среднего профессионального образования. Раскрывается сущность профессиональной компетентности медицинского работника, ее структура (профессиональные знания, умения, личностные качества, ценностные ориентации). Анализируются факторы, влияющие на эффективность профессиональной подготовки в медицинском колледже. Представлены результаты диагностики уровня сформированности профессиональной компетентности у студентов медицинского колледжа и предложены направления ее совершенствования в образовательном процессе.*

Ключевые слова: *профессиональная компетентность, медицинские работники, медицинский колледж, среднее профессиональное образование, практико-ориентированное обучение, клинические дисциплины.*

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FORMATION OF PROFESSIONAL COMPETENCE OF FUTURE MEDICAL WORKERS IN COLLEGE CONDITIONS

Abstract. *The article examines the problem of forming professional competence of future medical workers in the conditions of secondary vocational education. The essence of professional competence of a medical worker, its*

structure (professional knowledge, skills, personal qualities, value orientations) are revealed. The factors influencing the effectiveness of professional training in a medical college are analyzed. The results of diagnostics of the level of formation of professional competence among medical college students are presented and directions for its improvement in the educational process are proposed.

Keywords: *professional competence, medical workers, medical college, secondary vocational education, practice-oriented training, clinical disciplines.*

Современная система среднего профессионального медицинского образования находится в стадии активного реформирования. Требования к выпускникам медицинских колледжей существенно возросли: сегодняшний медицинский работник должен не только владеть теоретическими знаниями и практическими умениями, но и обладать развитыми личностными качествами, быть готовым к принятию ответственных решений, эффективной коммуникации с пациентами и коллегами, непрерывному профессиональному саморазвитию. В связи с этим проблема формирования профессиональной компетентности будущих медицинских работников в условиях колледжа приобретает особую актуальность. Именно в период обучения в медицинском колледже закладываются основы профессиональной компетентности, которая в дальнейшем определяет успешность и качество профессиональной деятельности выпускника.

Профессиональная компетентность медицинского работника представляет собой интегративное качество личности, включающее систему профессиональных знаний, умений, навыков, личностных качеств и ценностных ориентаций, обеспечивающих способность эффективно выполнять профессиональные обязанности, принимать обоснованные решения в стандартных и нестандартных ситуациях, нести ответственность за результаты своей деятельности. В структуре профессиональной компетентности будущего медицинского работника можно выделить следующие компоненты. Когнитивный компонент включает знание теоретических основ профессиональной деятельности (анатомия, физиология, патология, фармакология, клинические дисциплины), понимание этиологических и патогенетических механизмов заболеваний, знание стандартов оказания медицинской помощи. Деятельностный компонент предполагает владение практическими умениями и навыками (проведение медицинских манипуляций, оказание неотложной помощи, работа с медицинской документацией, использование медицинского оборудования). Коммуникативный компонент включает умение эффективно взаимодействовать с пациентами и их родственниками, соблюдать медицинскую этику и деонтологию, работать в команде, разрешать конфликтные ситуации. Личностный компонент предполагает наличие профессионально важных качеств (ответственность, эмпатия, стрессоустойчивость, аккуратность, дисциплинированность, стремление к саморазвитию). Ценностно-мотивационный компонент включает осознание

ценности человеческой жизни, гуманное отношение к пациенту, мотивацию к качественному выполнению профессиональных обязанностей, стремление к профессиональному росту.

Формирование профессиональной компетентности будущих медицинских работников в условиях колледжа сталкивается с рядом трудностей. Среди них: разрыв между теоретической подготовкой и практической деятельностью (студенты часто испытывают затруднения при переносе теоретических знаний в практическую плоскость); недостаточная клиническая база для отработки практических навыков; ограниченные возможности для индивидуальной работы со студентами; высокая учебная нагрузка, приводящая к переутомлению; психологические барьеры при общении с пациентами (страх, неуверенность). Вместе с тем, существуют и позитивные факторы: внедрение симуляционных технологий, развитие практико-ориентированного обучения, использование активных методов обучения, усиление воспитательной работы.

Для диагностики уровня сформированности профессиональной компетентности у студентов медицинского колледжа было проведено исследование на базе ГБПОУ «Армавирский медицинский колледж». В нем приняли участие 60 студентов третьего-четвертого курсов по специальностям «Лечебное дело» и «Сестринское дело». Использовались следующие методики: тестирование теоретических знаний по клиническим дисциплинам; оценка практических умений (выполнение манипуляций на фантомах); опросник для выявления профессионально важных качеств; методика диагностики коммуникативных способностей; анкетирование для изучения мотивации и ценностных ориентаций; экспертная оценка преподавателей.

Результаты исследования показали следующее. Высокий уровень сформированности профессиональной компетентности выявлен у 20% студентов. Они демонстрируют глубокие теоретические знания, уверенное владение практическими навыками, высокий уровень коммуникативных способностей, развитые профессионально важные качества, устойчивую мотивацию. Средний уровень выявлен у 48% студентов. Они имеют достаточный уровень знаний и умений, но испытывают трудности в нестандартных ситуациях, недостаточно уверены в коммуникации с пациентами, мотивация ситуативна. Низкий уровень выявлен у 32% студентов. Они демонстрируют фрагментарные знания, неуверенное владение практическими навыками, трудности в общении, низкую мотивацию, недостаточное понимание ценностных аспектов профессии.

На основе полученных результатов были определены направления формирования профессиональной компетентности будущих медицинских работников. Первое направление – совершенствование теоретической подготовки через интеграцию клинических дисциплин, использование проблемного обучения, разбор клинических случаев. Второе направление – усиление практической подготовки через увеличение доли симуляционного

обучения, отработку навыков на фантомах и муляжах, проведение производственной практики в лечебно-профилактических учреждениях. Третье направление – развитие коммуникативной компетентности через тренинги общения, ролевые игры, анализ сложных ситуаций взаимодействия с пациентами. Четвертое направление – формирование профессионально важных качеств и ценностных ориентаций через воспитательную работу, личный пример преподавателей, анализ этических дилемм.

Реализация данных направлений позволит повысить качество профессиональной подготовки будущих медицинских работников.

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СОВЕРШЕНСТВОВАНИЕ УПРАВЛЕНИЯ КОНФЛИКТАМИ И СТРЕССАМИ В ОРГАНИЗАЦИЯХ СФЕРЫ УСЛУГ

Аннотация: *современные организации, работающие в сфере услуг, сталкиваются с множеством вызовов, среди которых высокая конкуренция, быстро меняющиеся условия рынка и растущие ожидания клиентов. В таких условиях особое внимание необходимо уделять управлению человеческими ресурсами, поскольку именно профессионализм и внутренняя мотивация сотрудников определяют качество предоставляемых услуг.*

Ключевые слова: *теоретические подходы к совершенствованию управления конфликтами и стрессами в организациях сферы услуг, человеческие ресурсы, мотивация сотрудников, современные организации*

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IMPROVING CONFLICT AND STRESS MANAGEMENT IN SERVICE SECTOR ORGANIZATIONS

Abstract: *Modern organizations working in the service sector face many challenges, including high competition, rapidly changing market conditions and growing customer expectations. In such circumstances, special attention should be paid to human resource management, since it is the professionalism and internal motivation of employees that determine the quality of services provided.*

Keywords: *theoretical approaches to improving conflict and stress management in service organizations, human resources, employee motivation, modern organizations.*

Современная индустрия услуг демонстрирует стремительный рост, где конкурентное преимущество определяется не только качеством предоставляемых сервисов, но и качеством межличностного взаимодействия между персоналом и клиентами. Постоянное психологическое напряжение, испытываемое как рядовыми сотрудниками, так и руководителями в сфере услуг, напрямую связано со спецификой их деятельности и является одной из главных причин деструктивных конфликтных и стрессовых ситуаций.[54]

В сфере услуг понятие конфликт понимается как столкновение противоположно направленных целей, интересов, позиций мнений или взглядов субъектов взаимодействия. Выделяют несколько типов конфликтов: межличностные, внутриличностные, конфликты между личностью и группой, межгрупповые. Для сферы услуг играют немаловажную роль конфликты между гостями и персоналом, которые возникают из-за особенностей взаимодействия в сервисе и могут проходить через определенные этапы развития.

Профессиональный стресс – это сложный многомерный феномен, проявляющийся в физиологических и психологических реакциях на сложные рабочие моменты. Стресс-факторы классифицированы на организационные и психосоциальные, а их управление предполагает целенаправленное воздействие на эти факторы с целью предотвращения их негативных последствий.

Управление конфликтами в сервисных организациях требует комплексного подхода, сочетающего структурные и межличностные методы. Выделяются несколько ключевых технологий разрешения конфликтов (см. рисунок 1)

[54] Глущенко М.Е. Управление конфликтами с клиентами в сфере сервиса // Инновационная экономика: информация, аналитика, прогнозы. – 2025. - № 7. – С. 226-233

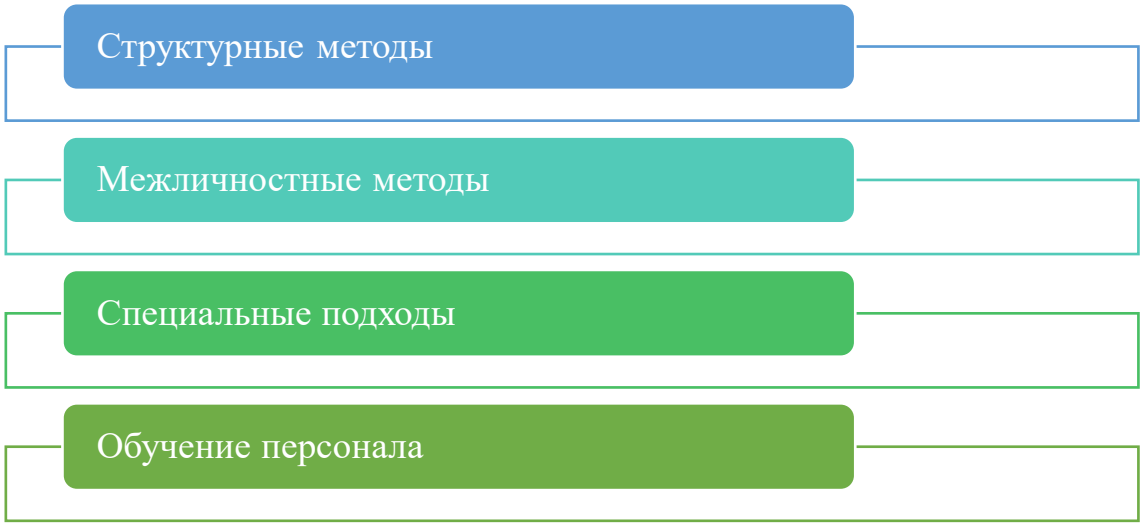

Рисунок 1 – Методы управления конфликтами в сфере услуг

Стресс-менеджмент является неотъемлемой частью современной системы управления персоналом сферы услуг.[55] Он реализуется на двух уровнях: организационном (изменение условий труда, оптимизация рабочих процессов, совершенствование корпоративной культуры) и индивидуальном (развитие стрессоустойчивости, обучение техникам саморегуляции, формирование адаптивных стратегий совладающего поведения).

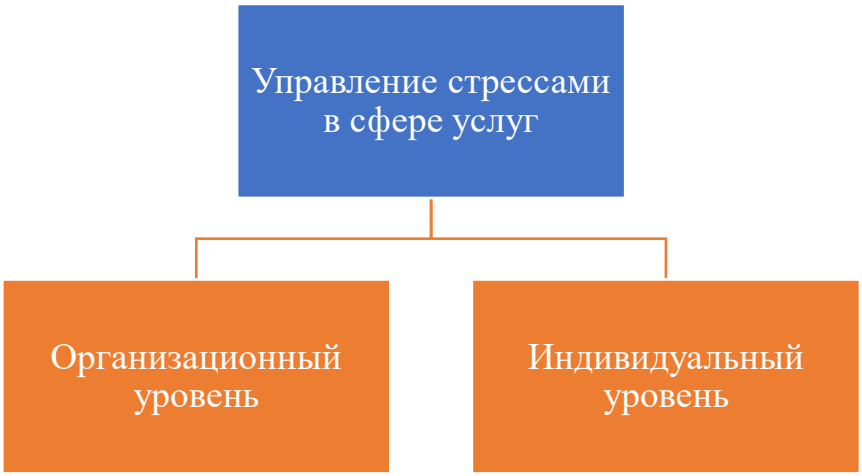

Рисунок 2 – Управление стрессами в сфере услуг

Организационный уровень ориентирован на устранение или минимизацию стресс-факторов, связанных с условиями труда, организационными процессами и корпоративной средой. Задача этого уровня – создать такую рабочую среду, в которой вероятность возникновения стресса у сотрудников была бы минимальной.

[55] Соловова Н.В., Калмыкова О.Ю. Стратегии развития стрессоустойчивого поведения персонала организации : учеб. Пособие. – Самара: Изд-во Самар. ун-та, 2024

Индивидуальный уровень предполагает развитие у сотрудника способности распознавать собственные стрессовые состояния, своевременно реагировать на них и применять техники саморегуляции. Даже в самой благоприятной организационной среде полностью исключить стресс невозможно, поэтому личная стрессоустойчивость сотрудника является важным ресурсом.

Анализ текущего состояния проблемы позволяет выделить несколько основных направлений совершенствования системы управления конфликтами и стрессами в организациях сферы услуг (см. таблицу 1)

Таблица 1.

Пути совершенствования управления конфликтами и стрессами

Направление	Описание направления совершенствования
Интеграция и системность	Переход от разрозненных мероприятий по разрешению отдельных конфликтов и снятию симптомов стресса к формированию целостной, интегрированной системы управления, охватывающей все уровни организации. Такая система должна включать в себя подсистемы диагностики, профилактики, оперативного реагирования и постконфликтного анализа
Развитие стресс-компетентности руководителей	Ключевую роль в профилактике конфликтов и стрессов играют линейные руководители. Способность своевременно диагностировать факторы повышения уровня профессионального стресса персонала и реализовывать кадровые мероприятия профилактической работы – важные компоненты их управленческой квалификации. В связи с этим необходимо систематическое обучение руководителей навыкам конфликт-менеджмента, управления стрессом и создания психологически безопасной среды.
Внедрение технологий профилактики	Предполагает внедрение систем стресс-мониторинга, регулярную оценку кадровых рисков, а также разработку и реализацию превентивных программ, направленных на снижение влияния стресс-факторов. Использование математических моделей прогнозирования влияния стресса на удовлетворенность трудом может стать эффективным инструментом проактивного управления.
Развитие эмоционального интеллекта как ключевой компетенции	В эпоху, когда продукты и услуги теряют уникальность, именно качество общения выходит на первое место. Поэтому развитие эмоционального интеллекта должно стать приоритетом в обучении и развитии всего персонала. Это позволит им не только эффективно гасить конфликты, но и повышать лояльность клиентов, предотвращая их возникновение.

Таким образом, совершенствование конфликтам и стрессами в организациях сферы услуг является актуальной и многогранной задачей, требующей системного подхода. Специфика сервисной деятельности, связанная с высокой интенсивностью межличностных коммуникаций и значительными эмоциональными нагрузками, делает персонал этих

организаций особенно уязвимым к негативным последствиям конфликтов и стрессов.

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ЗЕЛЁНАЯ ЭКОНОМИКА КАК ФАКТОР УСТОЙЧИВОГО РАЗВИТИЯ ПРЕДПРИЯТИЙ РЕСПУБЛИКИ УЗБЕКИСТАН

Аннотация: *В работе исследуются теоретические и практические аспекты обеспечения экономической устойчивости хозяйствующих субъектов в условиях формирования зелёной экономики. Особое внимание уделяется анализу ESG-подхода как инструмента интеграции экологических, социальных и управленческих факторов в корпоративную деятельность. Рассматривается влияние внедрения ресурсосберегающих технологий на показатели эффективности предприятий. На примере Республики Узбекистан выявлены ключевые ограничения развития зелёных стратегий и предложены направления их преодоления.*

Ключевые слова: *устойчивое развитие, зелёная экономика, корпоративное управление, энергоэффективность, ресурсная оптимизация.*

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THE GREEN ECONOMY AS A DRIVER OF SUSTAINABLE DEVELOPMENT OF ENTERPRISES IN THE REPUBLIC OF UZBEKISTAN

Abstract: *This paper examines the theoretical and practical aspects of ensuring the economic sustainability of business entities in the context of the transition to a green economy. Particular attention is paid to the analysis of the ESG approach as a tool for integrating environmental, social, and governance factors into corporate activities. The study explores the impact of resource-efficient technologies on enterprise performance indicators. Using the case of the Republic of Uzbekistan, key constraints to the development of green strategies are identified, and directions for overcoming them are proposed.*

Keywords: *sustainable development, green economy, corporate governance, energy efficiency, resource optimization.*

Современный этап развития мировой экономики характеризуется усилением экологических вызовов и необходимостью поиска новых моделей роста. Экстенсивное использование природных ресурсов постепенно уступает место концепциям, ориентированным на рациональное природопользование и снижение антропогенной нагрузки. В этих условиях особую значимость приобретает переход к принципам зелёной экономики, предполагающим согласование экономических интересов с экологическими ограничениями.

Экономическая устойчивость предприятия представляет собой комплексную характеристику, отражающую его способность поддерживать равновесное состояние и обеспечивать развитие при воздействии внешних и внутренних факторов неопределённости.

В отличие от традиционных подходов, акцентирующих внимание преимущественно на финансовых показателях, современные концепции рассматривают устойчивость как многофакторную категорию, включающую:

производственную эффективность;
инновационную активность;
институциональную гибкость;
качество управления ресурсами.

В данном контексте ESG-подход приобретает особое значение, так как позволяет оценивать деятельность предприятия с учётом экологических и социальных рисков.

Корпоративные зелёные стратегии следует рассматривать как системный механизм трансформации бизнес-моделей в направлении устойчивого развития. Их реализация ориентирована на минимизацию негативного воздействия на окружающую среду при одновременном повышении экономической эффективности. Ключевыми направлениями выступают:

внедрение технологий с низким уровнем углеродных выбросов;
повышение энергоэффективности производственных процессов;
переход к принципам замкнутого цикла производства;
оптимизация использования сырьевых ресурсов.

Особое значение имеет отказ от линейной модели «производство–потребление–утилизация» в пользу циркулярной экономики.

Несмотря на наличие инвестиционного барьера на начальном этапе, внедрение экологически ориентированных технологий обеспечивает долгосрочные экономические выгоды.

Практика показывает, что предприятия, реализующие зелёные стратегии: сокращают операционные издержки, повышают устойчивость к

внешним шокам, улучшают доступ к инвестиционным ресурсам, усиливают конкурентные позиции на рынке.

Таким образом, экологизация бизнеса становится фактором не только социальной ответственности, но и экономической целесообразности. В Республике Узбекистан формирование зелёной экономики закреплено в качестве приоритетного направления государственной политики. Реализация стратегических программ направлена на повышение энергоэффективности и расширение использования возобновляемых источников энергии. В настоящее время доля ископаемого топлива в выработке электроэнергии в стране составляет около 70%, а возобновляемые источники обеспечивают 25-30% от общего потребления.

К основным факторам, сдерживающим развитие зелёных стратегий, относятся: ограниченный доступ к финансовым ресурсам, технологическая отсталость отдельных отраслей, недостаточный уровень подготовки специалистов, слабая мотивация бизнеса к экологической модернизации.

С целью активизации процессов внедрения зелёных стратегий целесообразно:

совершенствовать механизмы государственного стимулирования;
развивать систему налоговых преференций;
привлекать международные инвестиции;
модернизировать образовательные программы;
внедрять цифровые решения в управление ресурсами.

Проведённый анализ позволяет сделать вывод о том, что корпоративные зелёные стратегии выступают важнейшим фактором повышения экономической устойчивости предприятий. Их внедрение обеспечивает не только экологический эффект, но и способствует росту эффективности хозяйственной деятельности. В условиях трансформации экономики Узбекистана развитие зелёных подходов становится стратегически значимым направлением.

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ОЦЕНКА УСПЕВАЕМОСТИ СТУДЕНТОВ В СИМУЛЯЦИОННОМ ОБУЧЕНИИ В СРАВНЕНИИ С ПРОБЛЕМНО-ОРИЕНТИРОВАННЫМ ОБУЧЕНИЕМ

Аннотация: *в статье представлены результаты сравнительного исследования успеваемости 125 студентов третьего курса Ферганского медицинского института общественного здоровья, обучавшихся по методикам симуляционного (SBL) и проблемно-ориентированного (PBL) обучения. Установлено статистически значимое превосходство SBL в отношении формирования клинических навыков, коммуникативной компетенции и клинического принятия решений. Итоговый балл OSCE в группе SBL составил 85,0 ± 4,7 против 77,9 ± 5,5 в группе PBL (p < 0,001). Полученные данные обосновывают целесообразность расширения применения симуляционных технологий в учебном процессе медицинских вузов.*

Ключевые слова: *симуляционное обучение, проблемно-ориентированное обучение, медицинское образование, оценка компетенций, OSCE, клинические навыки.*

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ASSESSMENT OF STUDENTS' PERFORMANCE IN SIMULATION-BASED LEARNING VERSUS PROBLEM-BASED LEARNING

Abstract: *the article presents the results of a comparative study of the academic performance of 125 third-year students at the Fergana Medical Institute of Public Health who were trained using simulation-based learning (SBL) and problem-based learning (PBL). A statistically significant superiority of SBL was established with regard to the development of clinical skills, communication competence, and clinical decision-making. The final OSCE score in the SBL group was 85.0 ± 4.7 compared with 77.9 ± 5.5 in the PBL group (p < 0.001). The obtained data justify the expanded use of simulation technologies in the educational process of medical universities.*

Keywords: *simulation-based learning, problem-based learning, medical education, competency assessment, OSCE, clinical skills.*

Введение

Современное медицинское образование ориентировано на формирование у будущих врачей комплекса профессиональных компетенций, обеспечивающих безопасность пациента и высокое качество оказания медицинской помощи. В последние десятилетия всё большее внимание уделяется активным методам обучения, среди которых ведущие позиции занимают проблемно-ориентированное обучение (Problem-Based Learning, PBL) и симуляционное обучение (Simulation-Based Learning, SBL). Обе методики опираются на принципы конструктивизма и активного вовлечения обучающегося, однако принципиально различаются по способу предъявления клинической задачи и характеру обратной связи [1, 3].

PBL предполагает работу малых групп с бумажными или электронными клиническими случаями, формируя навыки самостоятельного поиска информации, критического мышления и командного взаимодействия. SBL, в свою очередь, воспроизводит клиническую ситуацию в условиях, максимально приближённых к реальной практике, с использованием стандартизированных пациентов, манекенов-симуляторов и виртуальных сред [2, 4]. Сравнительная эффективность данных методик в отношении итоговой успеваемости студентов остаётся предметом научной дискуссии: ряд исследований свидетельствует о превосходстве SBL при формировании клинических и процедурных навыков, тогда как для усвоения теоретического материала различия между методиками оказываются менее выраженными [5, 6].

В Республике Узбекистан внедрение симуляционных технологий в медицинское образование активно развивается в рамках реформы отрасли, однако научных работ, сопоставляющих эффективность SBL и PBL на национальных выборках студентов, публикуется недостаточно. Настоящая работа направлена на восполнение данного пробела.

Цель исследования — провести сравнительную оценку успеваемости студентов-медиков при применении симуляционного и проблемно-ориентированного методов обучения.

Материалы и методы

Исследование проведено на базе Ферганского медицинского института общественного здоровья (ФМИОЗ) в течение 2024–2025 учебного года. В открытое проспективное сравнительное исследование включены 125 студентов III курса лечебного факультета, обучающихся по дисциплине «Пропедевтика внутренних болезней». Методом простой рандомизации (с использованием генератора случайных чисел) студенты были распределены на две группы: основную (SBL-группа, n = 63) и группу сравнения (PBL-группа, n = 62). Критериями включения служили: обучение на III курсе, успешное завершение предыдущего семестра, письменное информированное

согласие. Критериями исключения являлись: академический отпуск, перевод из другого вуза в текущем семестре.

Программа SBL включала 12 аудиторных занятий (по 4 академических часа) с использованием манекенов высокой реалистичности (SimMan), стандартизированных пациентов и задач по клиническому разбору в симуляционном центре. Программа PBL предусматривала аналогичное количество занятий с работой в малых группах (6–8 человек) над бумажными клиническими случаями по семи-ступенчатой Маастрихтской схеме. Общий объём учебных часов и перечень осваиваемых компетенций в группах были идентичны.

Итоговая оценка успеваемости осуществлялась по стобалльной шкале в четырёх доменах: теоретические знания (письменное тестирование, 50 заданий в формате MCQ), клинические навыки (OSCE — 6 станций), коммуникативные навыки (шкала Calgary–Cambridge), клиническое принятие решений (краткий клинический экзамен mini-CEX). Интегральный балл OSCE рассчитывался как средневзвешенное значение указанных доменов.

Статистический анализ выполнен в программной среде IBM SPSS Statistics 26.0. Количественные данные представлены в виде M ± SD (при нормальном распределении, подтверждённом критерием Шапиро–Уилка). Сравнение групп по количественным переменным проводилось с применением t-критерия Стьюдента для независимых выборок, по качественным — с помощью критерия χ^2. Различия считали статистически значимыми при $p < 0,05$.

Результаты и обсуждение

Исходные демографические характеристики сравниваемых групп были сопоставимы. Средний возраст в SBL-группе составил 20,4 ± 1,3 года, в PBL-группе — 20,6 ± 1,4 года ($t = 0,82$; $p = 0,414$). Распределение по полу также не имело значимых межгрупповых различий ($\chi^2 = 0,08$; $p = 0,782$). Таким образом, группы были однородны по ключевым исходным параметрам, что обеспечивает сопоставимость последующих результатов.

Основные показатели успеваемости в обеих группах представлены в таблице 1.

Таблица 1.
Сравнительная характеристика успеваемости студентов SBL- и PBL-групп (M ± SD)

Показатель	SBL (n=63) M±SD	PBL (n=62) M±SD	t / χ^2	p-value
Средний возраст, лет	20,4 ± 1,3	20,6 ± 1,4	t=0,82	0,414
Пол (жен./муж.), n	38 / 25	36 / 26	χ^2=0,08	0,782
Теоретические знания, балл	82,4 ± 5,1	79,8 ± 5,6	t=2,71	0,008
Клинические навыки, балл	87,6 ± 4,8	74,3 ± 6,2	t=13,41	<0,001
Коммуникативные навыки, балл	85,2 ± 5,4	80,1 ± 5,9	t=5,04	<0,001
Клиническое принятие решений, балл	84,9 ± 5,0	77,5 ± 5,8	t=7,62	<0,001
Итоговый балл OSCE	**85,0 ± 4,7**	**77,9 ± 5,5**	**t=7,75**	**<0,001**

Анализ представленных данных показал, что средний балл по разделу теоретических знаний в SBL-группе был выше, чем в PBL-группе (82,4 ± 5,1 против 79,8 ± 5,6), различия статистически значимы, но клинически умеренны (t = 2,71; p = 0,008). Наиболее выраженное превосходство SBL отмечено в области клинических навыков: 87,6 ± 4,8 против 74,3 ± 6,2 балла (разница — 13,3 балла; t = 13,41; p < 0,001). Данный результат согласуется с данными зарубежных исследований, в которых подчёркивается, что симуляционное обучение обеспечивает статистически значимый прирост клинической компетентности за счёт многократного повторения практических действий с немедленной обратной связью [4, 6].

В домене коммуникативных навыков средний балл в SBL-группе составил 85,2 ± 5,4 против 80,1 ± 5,9 в PBL-группе (t = 5,04; p < 0,001), что, по-видимому, обусловлено работой со стандартизированными пациентами. В сфере клинического принятия решений преимущество также оказалось на стороне SBL: 84,9 ± 5,0 против 77,5 ± 5,8 балла (t = 7,62; p < 0,001). Интегральный балл OSCE в SBL-группе достиг 85,0 ± 4,7, что значимо превышает показатель PBL-группы — 77,9 ± 5,5 (t = 7,75; p < 0,001). Относительный прирост успеваемости в пользу SBL составил 9,1 %.

Графическое представление сравнительных данных по всем доменам оценки приведено на рисунке 1. Диаграмма наглядно демонстрирует превосходство SBL во всех изучаемых областях, при этом наибольшая разница отмечена в клинических навыках и принятии клинических решений.

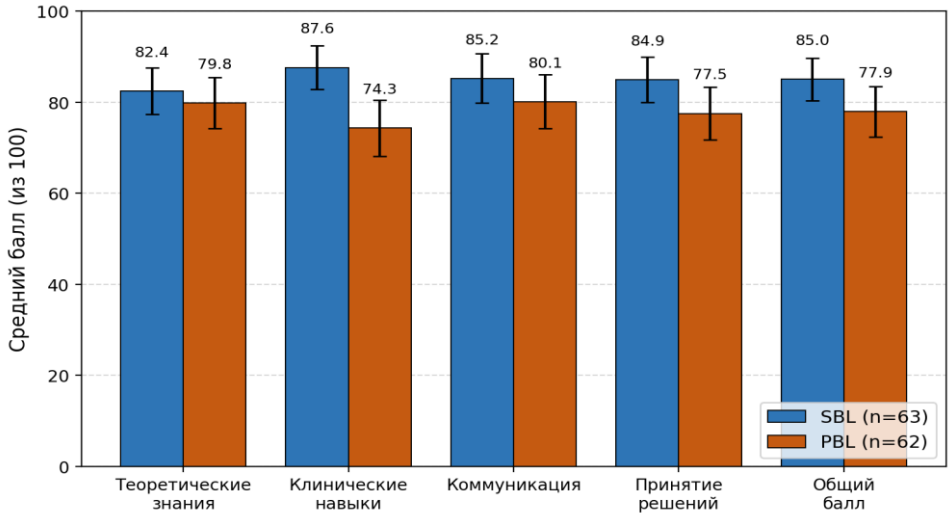

Рисунок 1 — Сравнение средних баллов студентов SBL- и PBL-групп по доменам оценки (M ± SD), n = 125

Полученные результаты согласуются с метаанализами последних лет, в которых продемонстрировано, что симуляционное обучение особенно эффективно для формирования процедурных и поведенческих компетенций, тогда как в усвоении теоретических знаний преимущество SBL менее выражено [1, 5]. Вместе с тем необходимо учитывать, что симуляционные технологии требуют существенных финансовых вложений и подготовленных инструкторов, в связи с чем целесообразно интегрированное применение SBL и PBL в рамках гибридных образовательных моделей.

Выводы

1. Симуляционное обучение студентов-медиков III курса ФМИОЗ продемонстрировало статистически значимое превосходство над проблемно-ориентированным обучением по всем изучаемым доменам оценки ($p < 0,05$), с наибольшим эффектом в области клинических навыков и принятия клинических решений.

2. Интегральный балл OSCE в группе SBL (85,0 ± 4,7) был значимо выше, чем в группе PBL (77,9 ± 5,5), что соответствует относительному приросту успеваемости на 9,1 %.

3. Полученные результаты обосновывают целесообразность расширения использования симуляционных технологий в учебных программах медицинских вузов Узбекистана при сохранении проблемно-ориентированного подхода как инструмента развития клинического мышления.

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ТЕНДЕНЦИИ РАЗВИТИЯ БЕСПИЛОТНЫХ ЛЕТАТЕЛЬНЫХ АППАРАТОВ В СТРАНАХ ЦЕНТРАЛЬНОЙ АЗИИ И В АЗЕРБАЙДЖАНЕ: СРАВНИТЕЛЬНЫЙ АНАЛИЗ И ПЕРСПЕКТИВЫ

Аннотация. *В данной статье рассматривается динамика формирования рынка и производственных мощностей беспилотных летательных аппаратов (БПЛА) в Каспийско-Центрально-Азиатском регионе. Проводится сравнительный анализ стратегий Азербайджана, Казахстана, Узбекистана, Кыргызстана и Таджикистана. Исследование выявляет переход стран от прямого импорта к локализации производства и созданию национальных регуляторных баз. Особое внимание уделяется влиянию технологических векторов Турции, Китая и Ирана на региональную безопасность и экономику.*

Ключевые слова: *беспилотные летательные аппараты (БПЛА), беспилотные авиационные системы (БАС), военно-техническое сотрудничество, локализация производства.*

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TRENDS IN THE DEVELOPMENT OF UNMANNED AERIAL VEHICLES IN THE COUNTRIES OF CENTRAL ASIA AND AZERBAIJAN: COMPARATIVE ANALYSIS AND PROSPECTS

Abstract. *This article examines the dynamics of the unmanned aerial vehicle (UAV) market and production capacity in the Caspian-Central Asian region. A comparative analysis of the strategies of Azerbaijan, Kazakhstan, Uzbekistan, Kyrgyzstan, and Tajikistan is provided. The study highlights the countries' transition from direct imports to localized production and the creation of national regulatory frameworks. Particular attention is paid to the impact of the technological trends of Turkey, China, and Iran on regional security and the economy.*

Key words: *unmanned aerial vehicles (UAVs), unmanned aircraft systems (UAS), military-technical cooperation, localization of production.*

В середине 2020-х годов беспилотные авиационные системы (БАС) окончательно трансформировались из вспомогательного средства разведки в

ключевой элемент национальной мощи и цифровой экономики. Для государств Центральной Азии и Азербайджана данный вопрос приобрел критическую значимость по нескольким причинам. Во-первых, сложный рельеф и протяженность границ требуют высокотехнологичных решений для мониторинга. Во-вторых, «эффект второй карабахской войны» продемонстрировал радикальное изменение характера современных конфликтов, где БПЛА стали доминирующим инструментом. В-третьих, аграрный и энергетический секторы региона нуждаются в роботизации для повышения глобальной конкурентоспособности.

Несмотря на активное внедрение БПЛА, в регионе наблюдается диспропорция между закупками зарубежных технологий и развитием собственной научно-инженерной базы. Также сохраняется нормативный вакуум в вопросах интеграции беспилотников в общее воздушное пространство, что сдерживает коммерческий сектор.

К 2026 году БПЛА перестали быть исключительно инструментом разведки, превратившись в основу цифровой трансформации региона. Для стран Центральной Азии (ЦА) и Азербайджана развитие этого сектора продиктовано такими факторами, как безопасность, экономика и технологический суверенитет.

Безопасность обуславливается необходимостью контроля протяженных границ в условиях меняющихся угроз. Экономика же – оптимизацией сельского хозяйства (основа ВВП многих стран региона) и мониторингом добывающей инфраструктуры. Технологический суверенитет в свою очередь характеризуется переходом от импорта к лицензионной сборке и собственным разработкам.

Рассмотрим стратегию Азербайджана в области локализации производства, интеграции БПЛА в гражданский сектор и укрепления оборонного потенциала. Азербайджан занимает уникальное положение, имея успешный опыт применения БПЛА в современных конфликтах. К 2025-2026 годам стратегия Баку эволюционировала от закупок к созданию научно-производственных кластеров. Подписание протоколов о намерениях с компанией Baykar (производитель Bayraktar TB2/TB3 и Akinci) заложило фундамент для совместного производства. Помимо ударных систем, Азербайджан активно внедряет дроны-камикадзе (барражирующие боеприпасы) и разведывательные комплексы собственной сборки [1].

Что касается Казахстана, то здесь наблюдается системный подход и гражданская концепция. В июне 2025 года Казахстан утвердил Концепцию развития гражданской беспилотной авиации до 2031 года. Это отличает РК от соседей: упор делается на законодательное регулирование и интеграцию в общее воздушное пространство. На вооружении МЧС РК находится около 191 БПЛА, из которых более 130 оснащены функциями искусственного интеллекта для поиска людей и мониторинга паводков. Министр обороны Казахстана подтвердил планы по локализации тактических дронов Bayraktar.

В Туркестанской области запускаются линии по выпуску сельскохозяйственных дронов [2].

В Узбекистане за последние два года началась форсированная индустриализация. Страна демонстрирует высокие темпы роста в сфере «экономики дронов». В августе 2025 года официально стартовали процессы серийного производства БПЛА на базе созданных ранее технологических парков. Узбекистан лидирует в регионе по плотности использования дронов-опрыскивателей на гектар хлопка и плодоовощных культур. Открыты специализированные кафедры в авиационных и технических вузах для подготовки операторов и инженеров БПЛА [3].

Сравнение подходов к развитию отрасли в Азербайджане, Казахстан и Узбекистане представлено в таблице 1.

В то время как Азербайджан фокусируется на «высокой авиации» (MALE-класс), Казахстан делает ставку на мультироторные системы для нужд гражданской защиты. Узбекистан же выбирает путь массовой цифровизации фермерства. Общим трендом является «тюркский вектор» – доминирующее влияние турецких технологий, которые рассматриваются как стандарт качества и совместимости в регионе.

Таблица 1.
Сравнительная оценка моделей развития

Параметр	Азербайджан	Казахстан	Узбекистан
Приоритет	Оборона и безопасность	Регулирование и мониторинг	Сельское хозяйство и промышленность
Главный партнер	Турция, Израиль	Турция, Китай	Китай, Турция
Статус производства	Совместное производство (Baykar)	Лицензионная сборка и агродроны	Собственные разработки и сборка

Развитие беспилотных летательных аппаратов в Кыргызстане и Таджикистане больше походит на гонку вооружений и сохранение баланса сил.

Эти страны региона демонстрируют уникальные модели развития БПЛА-флота [4].

Кыргызстан стал первой страной ОДКБ, открыто закупившей Bayraktar TB2, а позже Akinci и Anka. Для Бишкека БПЛА – это инструмент компенсации численного превосходства соседей и контроля границ в Баткенской области.

Таджикистан выбрал иной вектор, открыв в 2022 году совместно с Ираном завод по производству дронов Ababil-2. Это стратегический шаг, направленный на получение дешевых разведывательных мощностей.

Таджикская модель опирается на иранские технологии, которые дешевле в производстве и обслуживании, чем турецкие аналоги

Рассмотрим сравнительные характеристики БПЛА в регионе.

В 2024-2026 годах технический ландшафт региона определяется конкуренцией между турецкими, китайскими и иранскими платформами.

Класс MALE (Medium-Altitude Long-Endurance):

Bayraktar TB2 (Турция) стал стандартом для Азербайджана, Кыргызстана и Туркменистана. Техническое преимущество заключается в помехоустойчивых каналах связи и интеграции с высокоточными боеприпасами MAM-L;

Wing Loong II (Китай) используется Казахстаном и Узбекистаном. Превосходит TB2 по грузоподъемности (до 480 кг), но уступает в гибкости программного обеспечения для сетецентрических операций;

Akinci (Турция): тяжелый ударный БПЛА, принятый на вооружение Азербайджаном. Его особенность – радар с АФАР, позволяющий работать как по наземным, так и по воздушным целям.

Тактический и малый уровень:

Orlan-10 (Россия) сохраняет присутствие в Казахстане и Таджикистане благодаря неприхотливости, хотя морально устаревает на фоне цифровых западных аналогов;

локальные разработки – Узбекистан активно развивает линейку «Лочин» (сокол) – мультироторные и фиксированные крылья для мониторинга и разведки.

В рассматриваемом регионе преобладают Турецкий и Иранский векторы военно-технического сотрудничества [5].

Турция (Baykar, TUSAŞ) предлагает формат «под ключ»: поставка, обучение, сервисные центры. В Казахстане и Азербайджане Турция переходит к модели Joint Venture (совместные предприятия), что включает передачу технологий (ToT) для локального производства корпусов и сборки электроники.

Иран фокусируется на асимметричных решениях. Иранские БПЛА (семейства Shahed и Mohajer) привлекают Таджикистан простотой конструкции. Военно-техническое сотрудничество здесь строится на идеологической и культурной близости, а также на возможности производства в условиях санкционного давления.

Таким образом, турецкая модель (Азербайджан, Казахстан, Кыргызстан) характеризуется глубоким обучением персонала и созданием сервисных хабов, а иранская модель (Таджикистан) ориентирована на максимально дешевое производство и асимметричное сдерживание.

Основным толчком к развитию беспилотных систем является экономическая составляющая их применения в нефтегазовом секторе и сельском хозяйстве. Экономическая выгода от БПЛА в регионе рассматривается через призму снижения операционных затрат (OPEX).

К примеру, в нефтегазовом секторе (Азербайджан и Казахстан) стоимость вертолетного патрулирования 100 км трубопровода составляет примерно 3000-5000 долларов США за вылет. Использование БПЛА типа *VTOL* (вертикальный взлет и посадка) снижает эти затраты до 200-400 долларов США, обеспечивая при этом более высокое разрешение тепловизионной съемки для обнаружения утечек.

В сельском хозяйстве (Узбекистан) – внедрение агродронов для десикации хлопка позволяет экономить до 30% химикатов за счет точечного распыления. При средней стоимости дрона-опрыскивателя в 12000-15000 долларов США, срок окупаемости (ROI) в крупных кластерах составляет 1,5 сезона.

Несмотря на единое стремление к экономической эффективности законодательные базы стран региона, регламентирующие использование БПЛА в народном хозяйстве, имеют существенные различия: Казахстан движется в сторону европейских стандартов безопасности полетов, создавая цифровую экосистему мониторинга, а Узбекистан делает упор на либерализацию ввоза и использования БПЛА для бизнеса, чтобы стимулировать экономический рост (таблица 2). В этой связи возникает необходимость гармонизации правил полетов между странами для развития трансграничных логистических коридоров.

Таблица 2.

Сравнение регуляторных режимов (по состоянию на 2025-2026 гг.)

Критерий	Казахстан	Узбекистан
Регистрация	Обязательна для БПЛА свыше 250 г через портал «Авиационной администрации».	Обязательна. Процедура упрощена для агрокластеров через Агентство «Узавиация».
Сертификация типа	Требуется для коммерческой эксплуатации (строгие нормы).	Требуется, но есть льготы для ввоза компонентов для местной сборки.
Полеты в городах	Ограничены зонами (U-Space внедряется в Астане/Алматы).	Разрешены по разовым заявкам, жесткий контроль со стороны Службы государственной безопасности

Быстрые темпы развития беспилотных авиационных систем не исключают наличия вызовов и барьеров. К ним можно отнести кибербезопасность и кадровый голод. К примеру: в 2025 году участились дискуссии об уязвимости БПЛА к перехвату управления, а также наблюдается острый дефицит специалистов по обслуживанию двигателей и ПО для БПЛА.

Сравнительный анализ показывает, что регион разделился на «технологических операторов» (Казахстан, Узбекистан) и «военных интеграторов» (Азербайджан, Кыргызстан).

Казахстан демонстрирует наиболее зрелый подход к безопасности полетов, что делает его потенциальным хабом для международной сертификации БПЛА в ЦА.

Узбекистан лидирует в темпах внедрения БПЛА в малый и средний бизнес.

Азербайджан фактически задает стандарты боевого применения, на которые ориентируются соседи.

Главным вызовом остается зависимость от импорта микроэлектроники и двигателей. Даже при наличии «собственного производства», страны региона на 80-90% зависят от цепочек поставок из КНР и стран НАТО.

Подводя итог, можно сделать вывод, что тенденции 2026 года подтверждают – БПЛА стали фундаментом суверенитета в Центральной Азии и Азербайджане. Прогнозируется дальнейшая милитаризация региона через насыщение границ барражирующими боеприпасами, при одновременном бурном росте гражданских сервисов в сфере доставки и экологического мониторинга. Успех отрасли будет зависеть от способности стран гармонизировать законодательство и создать единый рынок авиационных услуг. Развитие БПЛА в Центральной Азии и Азербайджане к 2026 году перешло из стадии «экспериментов» в стадию «промышленной эксплуатации». Азербайджан остается эталоном в военном сегменте, Казахстан – в вопросах госрегулирования, а Узбекистан – в коммерческом использовании. Будущее региона связано с созданием единой экосистемы мониторинга Каспия и границ ЦА, где беспилотники станут основным связующим звеном.

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НАЛОГОВАЯ ПОЛИТИКА: ОСНОВНОЙ ФАКТОР ПОВЫШЕНИЯ НАЛОГОВОГО ПОТЕНЦИАЛА

Аннотация: *В данной статье приведены подходы по изучению налогового потенциала хозяйствующих субъектов. В современных условиях увеличение налогового потенциала хозяйствующих субъектов является одним из приоритетных направлений реформирования налоговой системы, что требует применения и развития наиболее эффективного инструментария его оценки. В работе дана подробная характеристика различных подходов к определению термина налогового потенциала, проанализировано влияние источников информации на достоверность определения налогового потенциала, разработаны основные пути повышения налогового потенциала хозяйствующих субъектов. Данный подход рассмотрен с одной стороны в интересах хозяйствующих субъектов и с другой в аспекте государства. Сделан вывод о реализация мероприятий по его повышению налогового потенциала которые в целом будут способствовать повышению социально-финансового состояния хозяйствующих субъектов, которое в конечном аспекте играют ключевую роль в повышении макроэкономических показателях.*

Ключевые слова: *налоговый потенциал, стратегия, налоговая политика источники доходов, налогооблагаемая база, налоговые поступления, финансовое состояние, факторы, методика определения, интерес методы оценки.*

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TAX POLICY: THE MAIN FACTOR IN INCREASING TAX POTENTIAL

Abstract: *This article presents approaches to studying the tax potential of business entities. In modern conditions, increasing the tax potential of business entities is one of the priority areas for reforming the tax system, which requires the use and development of the most effective tools for its assessment. The work provides a detailed description of various approaches to defining the term tax potential, analyzes the influence of information sources on the reliability of determining tax potential, and develops the main ways to increase the tax potential of business entities. This approach is considered on the one hand in the*

interests of business entities and on the other in the aspect of the state. A conclusion is made about the implementation of measures to increase its tax potential, which in general will contribute to improving the socio-financial condition of business entities, which ultimately plays a key role in improving macroeconomic indicators.

Key words: *tax potential, strategy, tax policy, sources of income, tax base, tax revenues, financial condition, factors, determination methodology, interest assessment methods.*

На различных этапах развития экономики основополагающим звеном в производственной сфере выступают организации, которую в системе экономических отношений принято понимать, как хозяйствующие субъекты экономики. Переход хозяйствующих субъектов к концепции устойчивого развития необходим для успешного развития региональной экономики и в целом страны. При этом Налоговая политика государства должен быть направлен на социально-экономическое страны (регионов, предприятий, организаций в целом хозяйствующих субъектов, а также физических лиц) для создания благоприятного экономического потенциала которая является основой повышения налогооблагаемой базы хозяйствующих субъектов. Стратегия обеспечения устойчивости имеет огромное значение для состояния страны в целом. Это связано с тем, что новые экономические направления и задачи выдвинули на первый план решения задач для устойчивого развития хозяйствующих субъектов и их возможные способности противостоять к неблагоприятным воздействиям внешней среды, что вызывает необходимость увеличение фактора надежности каждой отдельной организации. Результаты их деятельности напрямую влияют на налоговый потенциал хозяйствующего субъекта, с другой стороны, на макроэкономические показатели страны.

В развитии и совершенствовании социально-экономической состоянияии в Узбекистане ведутся ряд мероприятий, в котором до 2030 года по увеличит объема экономики в 2 раза и вхождение в ряд государств с доходами выше среднего. Для решения этих задач по Указу Президента Республики Узбекистан принята Стратегия “Узбекистане 2030”.

Во втором направлении Указа Президента Республики Узбекистан, от 11.09.2023 г. № УП-158 «О стратегии «Узбекистан -2030»» «обеспечение благосостояния населения путем устойчивого экономического роста»

В стратегии определены основные направления и цели их достижения. В частности во втором направлении “Обеспечение благосостояния населения путем устойчивого экономического роста ” определены цели как “повышение до 2030 года объема экономики в 2 раза и вхождение в ряд государств с доходами выше среднего; обеспечение фискальной стабильности и эффективное управление государственными обязательствами; эффективное использование местной сырьевой базы и развитие основанной на передовых технологиях промышленности; развитие

«драйверных» отраслей промышленности и полное задействование промышленного потенциала регионов.; переход к зеленой экономике, кардинальное повышение показателей использования возобновляемой энергии как ее основы; бесперебойное обеспечение отраслей экономики и населения необходимыми энергоресурсами; углубление интеграции Республики Узбекистан в глобальные транспортно-логистические сети и повышение потенциала национальной транспортной системы»[1] Выполнение и ддостижение этих задач и целей конкретно влияют на дальнейшего финансового состояния и повышения налогового потенциала хозяйствующих субъектов, регионов и государства.

Нужно особо отметить, что ведение целенаправленной налоговой политики в хозяйствующем субъекте и в целом государстве а также, стратегический подход к решению задач налогового администрирования по пополнению государственного так и местных бюджетов, укрепление ее налогового потенциала хозяйствующих субъектов и государства определяет необходимость пересмотра подхода к выбору новых подходов, обеспечения устойчивости государственного бюджета и напрямую взаимосвязана изучением налогового потенциала хозяйствующих субъектов.

При этом следует рассмотреть экономическую сущность налоговой политики.

По мнению В.Г. Панскова — «Налоговая политика представляет собой совокупность экономических, финансовых и правовых мер государства по формированию налоговой системы страны в целях обеспечения финансовых потребностей государства, отдельных социальных групп общества, а также развития экономики страны за счёт перераспределения финансовых ресурсов» [2].

Очень убедительной выглядит логика последовательного рассмотрения философского, лингвистического и экономического смысла категорий, предложенная А.Э. Сердюковым, Е.С. Вылковой и А.Л. Тарасевичем, авторами учебника —Налоги и налогообложение [3]. После проведенного исследования эти авторы пришли к следующему мнению что под формулировкой государственной налоговой политики понимается «деятельность органов государственной власти и государственного управления, осуществляемая в рамках общей экономической стратегии государства по комплексному решению вопросов налогообложения с учётом интересов и целей конкретного государства на соответствующем этапе его исторического развития» [3]

При этом нужно отметить что, налоговый механизм подразумевает управление налоговой системой, а концепция государственной деятельности не является основным элементом налоговой политики государства. По мнению учёных С.В. Барулина, А.В. Макрушина, В.А. Тимошенко «налоговая политика —представляет собой комплекс стратегических и тактических мероприятий в области управления налоговым процессом, проводимых государством в составе общей экономической политики и

направленных на максимально возможную реализацию фискальной, регулирующей и контрольной функции налогов в целях достижения определенного, на данном этапе, экономически и социально значимого результата (эффекта) [4]. По поводу этого определения можно сказать, что, во-первых, оно является избыточным (в части функций налогов), и, во-вторых, к налоговой политике относятся не только различные мероприятия, но и идеи, принципы, теории.

Как отмечают авторы статьи «Сущность и элементы налоговой политики» В.Н. Едронов и Н.Н. Мамыкин подходят к определению понятия - налоговая политика следующим образом: —совокупность правовых, экономических и организационных мер субъекта налоговой политики по регулированию налоговых отношений. [5]

По нашему мнению, при решении стратегических задач по налоговому администрированию задач, например, прогнозирования налоговых поступлений, определения недоплат налогов и др. необходимо знание возможностей предприятий по уплате налогов. При этом нужно использовать ряд методов прогнозирования как экономико-математические методы моделирования, которые основаны на показателях налоговых отчетностей и анализа налоговых поступлений по видам налогов.

При изучении вопроса «Как повысит налоговый потенциал хозяйствующего субъекта?», по нашему мнению, следует рассматривать с одной стороны в интересах хозяйствующих субъектов и с другой стороны государства.

Однако достижение устойчивого роста на основе реальной реструктуризации методов регулирования доходной базы государственного бюджета и повышения налогового потенциала хозяйствующих субъектов сдерживается одним из важнейших ограничителей обеспечения экономического роста и развития - финансовыми ресурсами, при этом оно достигается при помощи целенаправленной налоговой политики. Особенно остро нехватка финансовых ресурсов ощущается на региональном уровне, поскольку, с одной стороны, имели место негативные тенденции и проблемы развития отдельных звеньев местного бюджета страны на фоне усиления экономических, социальных, демографических и экологических диспропорций. С другой стороны, регионы оказались втянутыми в конкурентную борьбу за привлечение финансовых ресурсов в виде налогов и бюджетных средств. В этой связи при ведении налоговой политики целесообразно учитывать не только поиск эффективных методов финансовых, налоговых отношений, но и условия, механизмы и инструменты, с помощью которых эти факторы и подходы по решению задач могут быть комбинированы и наиболее эффективно использованы, т.е. следует учитывать, систематически анализировать факторы роста и развития налогового потенциала, увеличения налогооблагаемой базы хозяйствующих субъектов позволяющий обеспечить своевременного выполнения налоговых

обязательств. Вместе с этим создать благоприятную климат, атмосферу, стимул отвечающим интересам хозяйствующих субъектов.

В процессе изучения современных теоретических и нормативно-правовых основ, а также сложившейся практики формирования налогового потенциала имеет широкое толкование.

В экономическом аспекте привлечения дополнительных резервов роста налоговых и неналоговых доходов а также изыскания это вопрос не только дополнительного формирования местных бюджетов, это еще и вопрос формирования современного правового пространства на примере местного и зарубежного опыта и практических подходов, условий для развития бизнеса и реализации различных социально-ориентированных региональных стратегических программ, разработки «дорожных карт» . По мнению Е. Н Лавренчук «для предприятия оценка налогового потенциала связана с налогоспособностью и может быть определена как потенциал с учетом эффективных налоговых усилий при оптимальном соотношении темпов экономического роста предприятия и выполнения обязательств перед бюджетом.

На налоговый потенциал организации будут воздействовать различные потенциалы: производственный; ресурсный; трудовой; финансовый; инвестиционный; инновационный» [6].

Исходя из мнений автора можно сделать вывод что создания налогового потенциала хозяйствующего субъекта имеет широкий спектр обсуждения и решения правовых и организационных вопросов. Вместе с этим по на основе изучения этих потенциалов следует обратит особое внимание на факторы которое непосредственно влияют на повышение налогового потенциала хозяйствующих субъектов. К таким факторам можно отнести как доходы хозяйствующих субъектов, его активы, использование налоговых льгот и вычетов, эффективное прогнозирование уплаты налогов а также, «технологии; уровень квалификации персонала; качество производимой продукции; качественные характеристики основных средств; ценовая политика; качество продукции; ввеличина собственного капитала» [6]. Если обратит внимание что каждый потенциал и факторы взаимосвязаны между собой и в конечном итоге целенаправленное организация производства, подбор квалифицированных кадров, привлечение инвестиций и других финансовых ресурсов отражаются в финансовом состянии хозяйствующих субъектов и расширяют спектр налогооблагаюмой базы, повышают налоговый потенциал субъекта.

В заключении по нашему мнению налоговая политика – это совокупность мер и регуляций, которые государство принимает в сфере налогообложения для достижения определенных экономических целей в частности налогового потенциала региона и в общем государства. Она играет важную роль в развитии экономики по нескольким направлениям:

1. Финансирование государственных расходов: целенаправленное ведения налоговой политики являются основным источником формирования

доходов государства. Они используются для финансирования различных государственных программ и проектов, таких как социальное обеспечение, образование, здравоохранение, инфраструктура и т.д. Эффективная налоговая политика позволяет правительству получать достаточные средства для реализации своих задач и обеспечить стабильность экономики.

2. Регулирование социального и экономического неравенства: налоговая политика может использоваться для снижения социального и экономического неравенства в обществе. Прогрессивные налоговые ставки, т.е. увеличение ставки налога с ростом доходов, позволяют редистрибутировать доходы в пользу менее обеспеченных слоев населения.

3. Стимулирование экономического роста и инвестиций: налоговая политика может создавать стимулы для экономического роста и инвестиций. Снижение налоговых ставок для предприятий и индивидуальных предпринимателей, освобождение от налогов на инвестиции или научно-исследовательскую деятельность могут привлечь больше инвестиций и способствовать развитию новых технологий и инноваций.

4. Регулирование спроса и потребления: налоговая политика может использоваться для регулирования уровня потребления и спроса на определенные товары и услуги. Например, повышение ставки налога на товары, которые считаются вредными для здоровья (табак, алкоголь), может снизить их потребление и способствовать здоровому образу жизни.

5. Привлечение и удержание квалифицированных кадров: налоговая политика также может играть роль в привлечении и удержании квалифицированных кадров. Система налогообложения может быть одним из факторов, влияющих на решение людей о переезде или остаться в стране для работы.

В целом, налоговая политика имеет огромное значение для развития экономики. Ее эффективное использование может способствовать устойчивому экономическому росту, справедливому распределению доходов и стимулированию инвестиций. Однако, неэффективное использование налоговых инструментов или чрезмерная налоговая нагрузка может препятствовать развитию экономики и инвестиций.

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КИБЕРТЕРРОРИЗМ КАК НОВАЯ ФОРМА ТЕРРОРИСТИЧЕСКОЙ УГРОЗЫ: УГОЛОВНО-ПРАВОВАЯ ОЦЕНКА

Аннотация. *В условиях цифровой трансформации общества кибертерроризм становится одной из наиболее опасных форм преступной деятельности. Глобализация информационных сетей, зависимость критически важных объектов инфраструктуры от цифровых технологий создают новые возможности для реализации террористических замыслов. Цель статьи — проанализировать сущность кибертерроризма как угрозы и рассмотреть его уголовно-правовую оценку в российском законодательстве.*

Ключевые слова. *Кибертерроризм, признаки кибертерроризма, киберпреступления, кибертеррористические угрозы, виды атак.*

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CYBERTERRORISM AS A NEW FORM OF TERRORIST THREAT: CRIMINAL LAW ASSESSMENT

Abstract. *In the context of the digital transformation of society, cyberterrorism is becoming one of the most dangerous forms of criminal activity. The globalization of information networks and the dependence of critical infrastructure on digital technologies create new opportunities for terrorist plots. The purpose of this article is to analyze the essence of cyberterrorism as a threat and to consider its criminal legal assessment in Russian legislation.*

Keywords. *Cyberterrorism, signs of cyberterrorism, cybercrimes, cyberterrorist threats, types of attacks.*

Кибертерроризм — это использование информационных технологий для осуществления террористических актов, направленных на дестабилизацию общества, причинение вреда жизни и здоровью людей либо существенного материального ущерба [5].

Среди ключевого признака кибертерроризма можно выделить следующие: политическая, идеологическая или религиозная мотивация — действия совершаются с целью воздействия на органы власти или международные организации; использование компьютерных технологий — атаки на информационные системы, сети, базы данных; публичность и устрашение — демонстрация возможностей для запугивания общества; целенаправленность на критически важные объекты — энергетика, транспорт, финансы, здравоохранение.

Ключевое отличие кибертеррорима от других видов киберпреступлений, в том числе кибермошенничества, состоит в наличие террористического мотива и нацеленности на создание общественно опасных последствий.

Основные виды атак, в первую очередь это DDoS-атаки на государственные ресурсы, финансовые учреждения и СМИ. Взлом и дефейс веб-сайтов с размещением террористических призывов. Распространение вредоносного ПО для вывода из строя инфраструктуры. Кибератаки на промышленные системы (SCADA), управляющие энергосетями, водоснабжением и т.д. также можно выделить использование соцсетей для координации террористических групп и вербовки других лиц.

Основная проблема области уголовной ответственности за преступления, связанные с кибертерроризмом, связана с тем, что российское законодательство не содержит отдельной статьи за кибертерроризм, но предусматривает ответственность за смежные составы [4].

Во-первых, это статья 205 Уголовного Кодекса Российской Федерации «Террористический акт» — охватывает кибератаки, если они создают угрозу гибели людей, значительного имущественного ущерба или иных тяжких последствий [1].

Во-вторых, статья 273 Уголовного Кодекса Российской Федерации «Создание, использование и распространение вредоносных программ» — применяется при разработке и применении вирусов для атак на критическую инфраструктуру [1].

В-третьих, статья 274 Уголовного Кодекса Российской Федерации «Нарушение правил эксплуатации ЭВМ» — ответственность за неправомерный доступ к информации, повлёкший уничтожение, блокирование, модификацию или копирование данных [1].

А также, статья 205.2 Уголовного Кодекса Российской Федерации «Публичные призывы к терроризму» — распространяется на онлайн-пропаганду [1].

Так же имеется проблема в области квалификации таких преступлений, в первую очередь, это связано с тем что в законодательстве

нет четкого определения понятия «кибертерроризма», что затрудняет отнесение конкретных деяний к этой категории преступлений. Именно поэтому возникаю трудности доказывания — анонимность в сети, трансграничный характер атак; недостаточная детализация норм, то есть отсутствие чётких критериев отнесения кибератаки к террористическому акту; необходимость международного сотрудничества, так как преступники часто действуют за рубежом [7].

Для решения всех вышеперечисленных проблем и повышения эффективности противодействия кибертерроризму необходимо:

1. ввести в Уголовный Кодекс Российской Федерации отдельную статью «Кибертерроризм» с чётким определением состава преступления и санкциями;
2. укрепить международное взаимодействие через создание единой базы данных киберугроз и координацию правоохранительных органов;
3. развивать технические меры защиты — внедрение систем обнаружения вторжений, криптографической защиты;
4. повысить квалификацию следователей в сфере киберпреступлений, путем проведения лекций;
5. усилить превентивную работу — мониторинг соцсетей, просвещение пользователей о киберугрозах.

Кибертерроризм представляет собой серьёзную угрозу национальной безопасности, требующую комплексного подхода. Совершенствование уголовного законодательства, развитие международного сотрудничества и внедрение передовых технологий защиты — ключевые условия для минимизации рисков. Дальнейшие исследования в этой области должны быть направлены на разработку унифицированных правовых механизмов противодействия кибертерроризму на глобальном уровне [4].

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ЭКОЛОГО-БИОЛОГИЧЕСКИЕ ОСОБЕННОСТИ НЕКОТОРЫХ ВИДОВ РОДА *DELPHINIUM* В СЕВЕРО-ЗАПАДНОМ КЫЗЫЛКУМЕ

Аннотация: *В статье представлены результаты комплексного изучения эколого-биологических и морфологических особенностей некоторых видов рода Delphinium, произрастающих в условиях Северо-Западного Кызылкума. Рассмотрены их распространение, экологическая приуроченность, морфологическая структура и особенности онтогенеза в условиях резко континентального и аридного климата. Установлено, что исследуемые виды обладают выраженными ксерофитными адаптациями, включающими редукцию листовой поверхности, развитие глубокой корневой системы и сокращение вегетационного периода. Выявлена высокая экологическая пластичность, позволяющая им существовать в условиях дефицита влаги и экстремальных температур. Полученные данные имеют значение для ботанического мониторинга, сохранения биоразнообразия и оценки состояния пустынных экосистем.*

Ключевые слова: *Delphinium, Кызылкум, экология растений, ксерофиты, онтогенез, адаптация, пустынная флора.*

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ECOLOGICAL AND BIOLOGICAL FEATURES OF SOME SPECIES OF THE GENUS *DELPHINIUM* IN THE NORTH-WESTERN KYZYLKUM

Abstract*: The article presents the results of a comprehensive study of the ecological, biological, and morphological characteristics of several species of the genus* Delphinium *growing under the conditions of the Northwestern Kyzylkum. Their distribution, ecological confinement, morphological structure, and features of ontogenesis under sharply continental and arid climate conditions are examined. It has been established that the studied species exhibit pronounced xerophytic adaptations, including reduction of leaf surface, development of a deep root system, and a shortened vegetation period. High ecological plasticity has been revealed, enabling them to survive under conditions of moisture deficit and*

extreme temperatures. The obtained data are important for botanical monitoring, biodiversity conservation, and assessment of the state of desert ecosystems.

Key words: Delphinium*, Kyzylkum, plant ecology, xerophytes, ontogenesis, adaptation, desert flora.*

Введение

Род *Delphinium* L. (семейство Ranunculaceae) включает многолетние и однолетние травянистые растения, отличающиеся высоким морфологическим разнообразием и широким ареалом распространения в умеренных и горных регионах Евразии. Многие виды рода являются важными компонентами природных экосистем, а также обладают декоративной и экологической ценностью. Однако в условиях пустынных территорий Центральной Азии, включая Северо-Западный Кызылкум, представители рода встречаются ограниченно и характеризуются специфическими адаптационными механизмами.

Северо-Западный Кызылкум представляет собой аридную территорию с резко континентальным климатом, где наблюдаются высокие летние температуры, значительные суточные колебания, дефицит атмосферных осадков и бедные песчаные почвы. Эти факторы формируют жесткие условия для существования растений и определяют особенности их морфологии, физиологии и жизненного цикла. Несмотря на это, отдельные виды *Delphinium* успешно адаптируются к данным условиям, формируя устойчивые популяции в локальных экологических нишах.

Целью настоящего исследования является выявление эколого-биологических особенностей некоторых видов рода *Delphinium* в условиях Северо-Западного Кызылкума, а также анализ их адаптационных механизмов к аридной среде.

Материалы и методы

Исследования проводились в природных условиях Северо-Западного Кызылкума в период активной вегетации растений. Объектами исследования являлись популяции видов рода *Delphinium*, произрастающие на песчаных и песчано-щебнистых участках, а также в понижениях рельефа с временным увлажнением. Методика включала маршрутные обследования, геоботанические описания, фенологические наблюдения и морфометрический анализ растений. Изучались основные морфологические параметры: высота растений, степень рассеченности листьев, развитие корневой системы, структура соцветий, сроки прохождения фенологических фаз (вегетация, бутонизация, цветение, плодоношение). Экологические условия местообитаний оценивались по типу почв, уровню увлажнения и температурному режиму.

Результаты и обсуждение

Анализ полученных данных показал, что виды рода *Delphinium* в условиях Северо-Западного Кызылкума характеризуются выраженными ксероморфными признаками, направленными на снижение потерь влаги и

повышение устойчивости к засухе. У растений формируется мощная стержневая корневая система, проникающая в более глубокие горизонты почвы, что обеспечивает доступ к остаточной влаге и повышает выживаемость в засушливые периоды. Надземная часть растений варьирует по высоте в зависимости от условий увлажнения и составляет в среднем от 25 до 80 см, при этом в наиболее аридных условиях наблюдается уменьшение размеров и упрощение морфологической структуры.

Листья у исследуемых видов глубоко рассеченные, что значительно снижает площадь испарения и является важным адаптивным признаком к засушливому климату. Стебли прямостоячие, сравнительно прочные, что позволяет растениям сохранять устойчивость в условиях ветровой нагрузки и песчаных бурь. Вегетационный период относительно короткий и синхронизирован с весенним увлажнением почвы, что позволяет растениям завершить жизненный цикл до наступления летнего максимума засухи.

Фенологические наблюдения показали, что цветение происходит преимущественно в весенний период, когда наблюдаются наиболее благоприятные условия по температуре и влажности. Плодоношение характеризуется формированием многосемянных листовок, что обеспечивает высокую потенциальную репродуктивную способность. Однако фактическая успешность семенного возобновления зависит от погодных условий конкретного года.

Экологический анализ показал, что виды *Delphinium* приурочены к участкам с временным или локальным увлажнением, таким как понижения рельефа, окраины песчаных массивов и участки с более плотными почвами. Это свидетельствует о их экологической нишевой специализации и ограниченной, но устойчивой адаптации к пустынным условиям. Наблюдаемая вариабельность морфологических признаков указывает на высокую внутривидовую пластичность, что является важным фактором выживания в нестабильной среде.

Заключение

Проведённые исследования позволили установить, что виды рода *Delphinium* в условиях Северо-Западного Кызылкума обладают выраженными адаптационными механизмами, обеспечивающими их существование в экстремальных аридных условиях. Основными адаптациями являются развитие глубокой корневой системы, редукция листовой поверхности, сокращение вегетационного периода и синхронизация жизненного цикла с весенним увлажнением. Полученные результаты расширяют представления об эколого-биологических особенностях пустынных популяций рода *Delphinium* и могут быть использованы для дальнейших исследований биоразнообразия, мониторинга природных экосистем и разработки мероприятий по сохранению редких и уязвимых видов флоры Кызылкума.

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ЛЕЧЕБНО-ПРОФИЛАКТИЧЕСКОЕ ВЛИЯНИЕ ЛИПАМИДА НА ФУНКЦИОНАЛЬНОЕ СОСТОЯНИЕ ПЕЧЕНИ И КЛИНИЧЕСКОЕ ТЕЧЕНИЕ ЦИРРОЗОВ И ХРОНИЧЕСКИХ ГЕПАТИТОВ

Аннотация: *В настоящем исследовании изучено лечебно-профилактическое влияние липамида на функциональное состояние печени и особенности клинического течения циррозов и хронических гепатитов. Проведён анализ клинико-биохимических показателей позволил установить, что применение липамида способствует улучшению функции печени, нормализации основных биохимических параметров и снижению выраженности клинических проявлений заболевания. Полученные результаты свидетельствуют о перспективности использования липамида в составе комплексной терапии хронических заболеваний печени и обосновывают его клиническую эффективность.*

Ключевые слова: *липамид, печень, функция печени, цирроз печени, хронический гепатит, гепатопротекторы, клиническое течение, биохимические показатели, лечение, профилактика, комплексная терапия.*

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THERAPEUTIC AND PROPHYLACTIC EFFECT OF LIPAMIDE ON THE FUNCTIONAL STATE OF THE LIVER AND THE CLINICAL COURSE OF CIRRHOSIS AND CHRONIC HEPATITIS

Abstract: *The present study investigates the therapeutic and prophylactic effect of lipamide on the functional state of the liver and the clinical course of cirrhosis and chronic hepatitis. An analysis of clinical and biochemical parameters demonstrated that the use of lipamide contributes to the improvement of liver function, normalization of key biochemical indicators, and reduction in the severity of clinical manifestations of the disease. The obtained results indicate the potential of lipamide as a component of комплексной терапии chronic liver diseases and substantiate its clinical efficacy.*

Keywords: *lipamide, liver, liver function, liver cirrhosis, chronic hepatitis, hepatoprotectors, clinical course, biochemical parameters, treatment, prevention, combination therapy.*

Ввдение

Цирроз печени (ЦП) и его лечение относятся к сложным проблемам современной гепатологии. Тяжелое течение болезни, в большинстве случаев безуспешность лечения, неблагоприятный прогноз, ставят это заболевание в ряд наиболее актуальных проблем современной медицины [1,2]. Хронические диффузные заболевания печени занимают одно из ведущих мест в структуре заболеваний органов пищеварения и являются актуальной эпидемиологической, социальной и клинической проблемой современного здравоохранения [5,6]. В организме человека амид липоевой кислоты образуется из липоевой кислоты под влиянием ферментов. Липамид является коэнзимом, активно участвующим в окислительном декарбоксилировании пировиноградной, а кетоглютаровой и других а - кислот. В крови больных хроническими заболеваниями печени содержание липоевой кислоты и её амида понижено. Рядом авторов [3,4] установлено благоприятное действие липамида на функциональное состояние печени и клиническое течение хронических гепатитов и циррозов. Однако, имеющиеся исследования произведены на небольшом и клинически разнородном материале [7]. Амид липоевой кислоты зачастую применялся одновременно с другими лекарственными веществами.

Цель исследования

Изучить непосредственные и отдаленные результаты влияние липамида на функциональное состояние печени и клиническое течение циррозов и хронических гепатитов.

Материалы и методы исследования

Липамид применен нами у 95 больных циррозом печени (у 75 - портальным, у 12 - билиарным, у 8 -пост некротическим) и 42 больных хроническим гепатитом. Гепатоцеллюлярная недостаточность легкой степени имелась у 15 человек, средней - у 118 и тяжёлой у четырёх. Значительно выраженный асцит имелся у двух больных, средней степени - то же у двух и малой - У 10. Все больные в прошлом переболели болезнью Боткина. Гепатоцеллюлярная недостаточность легкой степени имелась у 30 больных хроническим гепатитом и средней степени - у 12. Жалобы и объективные данные больных соответствовали степени гепатоцеллюлярной недостаточности и портальной гипертензии. Все больные получали только один испытуемый препарат в таблетках по 25 мг 2 раза в день на протяжении 20 дней одновременно с диетой № 5 клиники лечебного питания.

Результаты исследования

Наблюдение за клиническими показателями осуществлялось ежедневно, а функциональные пробы печени проводились на десятый и

двадцатый день. По окончании курса лечения у больных значительно улучшилось самочувствие, уменьшился кожный зуд, менее выраженной стала желтушность. Одновременно имело место побледнение и уменьшение в размерах телеангиэктазий. Значительно уменьшались или прекращались головные боли. Сокращались в размерах увеличенные печень и селезёнка (в большей степени у больных хроническим гепатитом). Одновременно прекращались явления геморрагического диатеза, уменьшалась отлаженность языка и исчезал печеночный запах изо рта. Также улучшалось и функциональное состояние печени. Это выражалось в статистически достоверном снижении в сыворотке крови уровней билирубина, ~L-глобулинов, a_2 - глобулинов (при хронических гепатитах), а также - укорочении гепаринового времени. Что же касается количества альбуминов, протромбина, суммарного холина, сывороточной холинэстеразы, общего белка (при циррозах), то они повышались. Возрастала также антитоксическая функция печени. Отмечалась и нормализация уровня общего холестерина. Кроме того, имела место благоприятная динамика уробилина, уробилиногена и билирубина мочи. Повышался суточный диурез. Следует отметить, что благоприятная динамика вышеперечисленных клинических показателей и функциональных проб печени отмечалась уже к 10 дню. Лишь у больной портальным циррозом печени в конечной дистрофической стадии и больной портальным циррозом, который сопровождался тяжёлой гепатоцеллюлярной недостаточностью и выраженным асцитом, применение липамида не оказало благоприятного воздействия. Через 20 дней после окончания приема амида липоевой кислоты было обследовано 42 больных и отмечено частичное уменьшение благоприятного эффекта, что мы объяснили сохранившейся активностью или новой вспышкой патологического процесса. Для дальнейшего подтверждения благоприятного влияния липамида на функциональные пробы печени (и исключения воздействия таких факторов, как диета, стационарный режим и психотерапевтическое влияние) было изучено влияние липамида в остром исследовании на уровень суммарного холина и холинэстеразы сыворотки крови. У 21 больного циррозом и хроническим гепатитом исследовалось содержание суммарного холина, холинэстеразы и амида, липоевой кислоты до дачи липамида, а также через 2 и 24 часа после однократного приема per os 50 мг препарата. Амид липоевой кислоты определялся методом тонкослойной хроматографии. Как показало исследование, уровень холина через 2 часа повысился в среднем с 0,22 до 0,25 мг%± 0,0014 (P <0,001), а холинэстеразы, в среднем- с 11,04 до 12,1 мг/мл/час ±0,15 (P<0,001). Через 24 часа произошло понижение уровней холина до 0,23 мг% ±0,003(P<0,001), а холинэстеразы-до 11,6 мг/мл/час ±0,14 (P<0,001). Итак, данные острого наблюдения подтверждают благоприятное действие липамида на функциональные пробы печени.

Содержание липамида в сыворотке крови также увеличилось через 2 часа с 7,2 мкг/мл до 10,6±0,28 (P<0,001) и снизилось через 24 часа до исходных цифр, M = 7,9±0,22 (P<0,001).

Данные контрольного исследования 42 больных хроническим гепатитом и циррозами, получавших наряду с диетой № 5 клиники лечебного питания в течение 20 дней лишь микстуру Лашкевича, показали отсутствие в этой группе благоприятного эффекта и таким образом подтвердили положительное влияние липамида на клинические проявления и функциональное состояние печени.

Вывод

У больных хроническим гепатитом и циррозом печени с лёгкой и средней степенью гепатоцеллюлярной недостаточности, липамид в дозе 50 мг в сутки (по 25 мг 2 раза), примененный в течение 20 дней, оказывает благоприятное влияние на клиническое течение заболевания и функциональное состояние печени. Отсутствие побочных явлений, и положительное влияние липамида на клинические проявления и функциональные пробы печени позволяют рекомендовать препарат для лечения хронических гепатитов и циррозов печени. Однако курс лечения должен длиться не менее 20 дней.

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ОСНОВНЫЕ ТЕОРЕТИЧЕСКИЕ ПОДХОДЫ К ОРГАНИЗАЦИОННОЙ КУЛЬТУРЕ

Аннотация: *в настоящей статье рассматриваются основные теоретические подходы к изучению организационной культуры в современной управленческой науке. Раскрывается понятие организационной культуры, анализируются структурно-функциональный, системный, символический подходы, а также теории уровней организационной культуры (Э. Шейн), распределения власти (Ч. Ханди) и конкурирующих ценностей (К. Камерон и Р. Куинн).*

Ключевые слова: *организационная культура, теоретические подходы, структурно-функциональный подход, системный подход, символический подход, уровни организационной культуры, распределение власти, конкурирующие ценности.*

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BASIC THEORETICAL APPROACHES TO ORGANIZATIONAL CULTURE

Abstract: *This article discusses the main theoretical approaches to the study of organizational culture in modern management science. The concept of organizational culture is revealed, structural-functional, systemic, symbolic approaches are analyzed, as well as theories of levels of organizational culture (E. Shane), distribution of power (C. Handi) and competing values (K. Cameron and R. Quinn).*

Key words: *organizational culture, theoretical approaches, structural-functional approach, systemic approach, symbolic approach, levels of organizational culture, distribution of power, and competing values.*

Организационная культура является одним из основных понятий современного менеджмента, организационного поведения и управления персоналом. Интерес к феномену организационной культуры возник в 1970–1980-х годах в связи с осознанием того, что формальные структуры, процедуры и системы управления не в полной мере объясняют различия в эффективности организаций. С тех пор организационная культура прочно вошла в понятийный аппарат управленческих наук, а количество теоретических подходов к ее изучению продолжает расти.

Многогранность феномена организационной культуры породила множество ее определений. В современной науке отсутствует единое общепринятое определение, однако можно выделить несколько наиболее авторитетных трактовок.

Так, например, Эдгар Шейн, один из наиболее признанных исследователей организационной культуры, определяет ее следующим образом: «Организационная культура – это паттерн коллективных базовых представлений, обретаемых группой при разрешении проблем адаптации к внешней среде и внутренней интеграции, который доказал свою эффективность и поэтому рассматривается как ценность и передается новым членам группы в качестве правильной системы восприятия, мышления и отношения к указанным проблемам».[56] Главная идея Шейна заключается в том, что культура – это глубинный, часто неосознаваемый слой представлений, который определяет поведение членов организации.

Ким Камерон и Роберт Куинн, авторы известной модели конкурирующих ценностей, предлагают следующее определение: «Организационная культура – это набор ценностей, норм, установок и артефактов, которые определяют характер деятельности организации и которые разделяются большинством ее членов».[57] В их понимании культура поддается диагностике и целенаправленному изменению, что важно для практики организационного развития.

Владимир Абрамович Спивак, автор ряда работ по организационной культуре в России, определяет ее как «систему материальных и духовных ценностей, проявлений, взаимодействующих между собой, присущих данной компании, отражающих ее индивидуальность и восприятие себя и других в социуме, проявляющихся в поведении, взаимодействии, восприятии себя и окружающей среды». [58] В этом определении подчеркивается как

[56] Шейн Э. Организационная культура и лидерство / пер. с англ. — СПб.: Питер, 2002. — С. 36.

[57] Камерон К., Куинн Р. Диагностика и изменение организационной культуры / пер. с англ. — СПб.: Питер, 2001. — С. 30.

[58] Спивак В.А. Организационная культура. — СПб.: Нева, 2001. — С. 24.

материальная, так и духовная составляющие культуры, а также ее роль в формировании идентичности организации.

Обобщая приведенные определения, можно сказать, что организационная культура – это сложное, многомерное явление, включающее ценности, нормы, представления, артефакты и паттерны поведения, которые разделяются членами организации, придают ей уникальность и влияют на ее эффективность.

В зависимости от того, какой аспект организационной культуры выходит на первый план, какие методы исследования применяются и какие практические задачи решаются, выделяют несколько теоретических подходов. Рассмотрим наиболее влиятельные из них.

Рисунок 1 – Основные теоретические подходы к организационной культуре

1. Структурно-функциональный подход.

Структурно-функциональный подход рассматривает организационную культуру как подсистему организации, выполняющую определенные функции по отношению к ней как к целостной системе. В рамках этого подхода культура анализируется через ее структуру (совокупность элементов – ценностей, норм, артефактов) и функции (интегративная, адаптивная, нормативно-регулирующая, охранная, замещающая формальных отношений и др.). Основной вопрос, на который отвечает структурно-функциональный подход: как культура способствует выживанию, стабильности и эффективности организации?

2. Системный подход.

Системный подход рассматривает организационную культуру как неотъемлемый элемент организации как открытой социально-экономической системы. Культура при этом не просто одна из подсистем, а связующее звено, пронизывающее все остальные подсистемы (производственную, финансовую, управленческую, кадровую). Организационная культура, с позиций системного подхода, выполняет роль интегратора, обеспечивающего целостность организации и ее адаптацию к изменениям внешней среды. Кроме того, культура сама является системой, элементы которой (ценности, нормы, ритуалы, символы) находятся во взаимосвязи и взаимозависимости. Системный подход подчеркивает, что изменение одного элемента культуры неизбежно влечет за собой изменения других элементов.

3. Символический подход.

Символический подход, иногда называемый культурно-символическим, фокусируется на том, как члены организации создают, интерпретируют и используют символы (истории, мифы, ритуалы, церемонии, язык, артефакты) для конструирования социальной реальности. В отличие от структурно-функционального и системного подходов, которые рассматривают культуру как объективную данность, символический подход подчеркивает ее субъективную, смыслопорождающую природу. Организация, с этой точки зрения, - это не столько рациональная структура, сколько совокупность значений, разделяемых ее членами. Основная задача исследователя – понять, какие смыслы вкладывают люди в свои действия и символы.

4. Теория уровней организационной культуры.

Модель Эдгара Шейна является одной из наиболее известных и цитируемых в организационной психологии. Шейн предлагает рассматривать организационную культуру на трех уровнях, которые различаются по степени доступности для внешнего наблюдения и осознания самими членами организации (см. рисунок 2)..

Рисунок 2 – Теория уровней организационной культуры Э. Шейна

Первый, поверхностный уровень – это артефакты. К ним относятся видимые элементы культуры: архитектура зданий, дизайн офисов, одежда сотрудников, логотипы, слоганы, публичные документы, ритуалы и церемонии, язык общения. Артефакты легко наблюдать, но трудно интерпретировать, поскольку за одним и тем же артефактом могут стоять разные глубинные представления.

Второй, подповерхностный уровень – провозглашаемые ценности. Это стратегии, цели, философия организации, которые декларируются руководством и считаются важными для компании. Провозглашаемые ценности могут быть зафиксированы в миссии, кодексе корпоративной этики, выступлениях лидеров. Однако они не всегда соответствуют реальному поведению.

Третий, глубинный уровень – базовые представления (неосознаваемые, принимаемые на веру). Это наиболее фундаментальные, часто невербализуемые и неосознаваемые представления о природе человека, времени, пространстве, истине, человеческих отношениях. Базовые представления являются «культурным ДНК» организации; они формируются в процессе преодоления трудностей и передаются новым членам как единственно правильный способ восприятия реальности. Изменение базовых представлений – самый сложный и болезненный процесс.

Модель Шейна ценна тем, что она показывает неоднородность культуры, предупреждает об опасности поверхностных интерпретаций и задает вектор для культурной диагностики: от артефактов – к ценностям – к базовым представлениям.

5. Теория распределения власти.

Чарльз Ханди, британский исследователь менеджмента, предложил типологию организационной культуры, основанную на распределении власти и связанных с этим способах координации и контроля. В его модели выделяются четыре типа культуры.

Культура власти характеризуется централизацией власти в руках одного лидера или небольшой группы. Управление осуществляется через личные распоряжения и контроль. Организация напоминает паутину с центром в виде источника власти. Такая культура характерна для небольших предпринимательских структур и организаций в условиях кризиса. Достоинство – скорость принятия решений; недостаток – зависимость от личности лидера.

Ролевая культура базируется на четком распределении ролей, формальных процедурах и правилах. Власть определяется должностью, а не личностью. Организация работает как механизм или бюрократия. Такая культура характерна для государственных учреждений и крупных корпораций. Достоинство – стабильность и предсказуемость; недостаток – низкая гибкость и инновационность.

Культура задачи ориентирована на решение конкретных проблем и достижение целей. Власть принадлежит тем, кто обладает экспертизой и может решить задачу, независимо от должности. Организация строится вокруг проектов и матричных структур. Такая культура эффективна в динамичной среде, где требуется высокая адаптивность.

Культура личности – наименее распространенный тип, при котором индивиды рассматриваются как центр системы, а организация служит средством для реализации их личных целей. Власть принадлежит личности, а не структуре. Такая культура встречается в адвокатских конторах, творческих союзах, медицинских практиках.

Теория Ханди полезна для диагностики культуры, прогнозирования реакций на изменения и разработки стратегий развития.

6. Теория конкурирующих ценностей (К. Камерон и Р. Куинн).

Модель конкурирующих ценностей Ким Камерона и Роберта Куинна – один из наиболее популярных и эмпирически обоснованных подходов к диагностике и изменению организационной культуры. Модель построена на двух измерениях, которые образуют четыре квадранта.

Первое измерение отражает фокус организации: внутренний (ориентация на внутриорганизационные процессы, интеграцию и единство) против внешнего (ориентация на внешнюю среду, конкуренцию и дифференциацию).

Второе измерение отражает предпочтения в отношении структуры управления: гибкость, индивидуальность и спонтанность против стабильности, контроля и порядка.

Пересечение этих двух измерений дает четыре типа организационной культуры.

Клановая культура (внутренний фокус + гибкость) ориентирована на участие, сплоченность, развитие человеческих ресурсов, наставничество. Лидеры выступают в роли воспитателей и родителей. Успех связывается с удовлетворенностью сотрудников и заботой о людях.

Адхократическая культура (внешний фокус + гибкость) ориентирована на инновации, предпринимательство, творчество, принятие риска. Лидеры – новаторы и визионеры. Успех связывается с созданием новых продуктов и услуг.

Рыночная культура (внешний фокус + контроль) ориентирована на конкуренцию, достижение целей, результативность, агрессивность на рынке. Лидеры – жесткие конкуренты. Успех связывается с долей рынка и прибылью.

Бюрократическая (иерархическая) культура (внутренний фокус + контроль) ориентирована на стабильность, формальные правила, предсказуемость, эффективность процессов. Лидеры – координаторы и администраторы. Успех связывается с надежностью и бесперебойностью работы.

Модель конкурирующих ценностей особенно ценна тем, что она не только описывает типы культуры, но и позволяет их измерять (с помощью методики OCAI), сопоставлять текущую и желаемую культуру, а также разрабатывать стратегии целенаправленного культурного изменения.

Проведенный анализ показывает, что организационная культура является сложным и многомерным феноменом, что отражается в разнообразии теоретических подходов к ее изучению. Структурно-функциональный подход акцентирует внимание на структуре культуры и ее функциях в организации; системный подход рассматривает культуру как интегративный элемент открытой социально-экономической системы; символический подход подчеркивает смыслопорождающую природу культуры, ее субъективное измерение. Теория уровней Э. Шейна предлагает инструмент для глубинной диагностики культуры, различая артефакты, провозглашаемые ценности и базовые представления. Теория распределения власти Ч. Ханди связывает тип культуры с источниками власти и способами координации. Наконец, модель конкурирующих ценностей К. Камерона и Р. Куинна предоставляет практический инструмент для измерения и целенаправленного изменения культуры.

Каждый из рассмотренных подходов имеет свои достоинства и ограничения, поэтому для полноценного понимания организационной культуры в конкретной организации целесообразно использовать интегративный подход, сочетающий элементы разных теорий.

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КОМПЛЕКСНАЯ БОРЬБА С БПЛА ЗЕНИТНО-РАКЕТНЫМИ КОМПЛЕКСАМИ С ИСПОЛЬЗОВАНИЕМ СРЕДСТВ РЭБ

Аннотация. *В данной статье исследуется актуальная проблема повышения эффективности противовоздушной обороны в условиях массового применения беспилотных летательных аппаратов (БПЛА) и барражирующих боеприпасов. Автором обосновывается необходимость интеграции зенитно-ракетных комплексов (ЗРК) и средств радиоэлектронной борьбы (РЭБ) в единый автоматизированный контур управления. Проведен анализ ключевых проблем обнаружения малоразмерных целей и защиты самих систем ПВО от дронов-камикадзе. В работе представлены конкретные алгоритмы распределения целей, основанные на критериях экономической целесообразности и тактической приоритетности. Описаны преимущества совместного применения огневых и функциональных методов поражения, позволяющие минимизировать расход боекомплекта и повысить живучесть обороняемых объектов.*

Ключевые слова: *БПЛА, ЗРК, РЭБ, автоматизированные системы управления, барражирующие боеприпасы, противовоздушная оборона, радиоэлектронное подавление.*

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COMPREHENSIVE ANTI-UAV WARFARE USING ANTI-AIRCRAFT MISSILE SYSTEMS AND ELECTRONIC WARFARE EQUIPMENT

Abstract. *This article explores the current problem of increasing the effectiveness of air defense in the context of the widespread use of unmanned aerial vehicles (UAVs) and loitering munitions. The author substantiates the need to integrate anti-aircraft missile systems (SAMs) and electronic warfare systems (EWS) into a unified automated control loop. The article analyzes the key challenges of detecting small-sized targets and protecting air defense systems themselves from kamikaze drones. The paper presents specific algorithms for target allocation based on economic feasibility and tactical priority criteria. The*

advantages of the combined use of fire and functional methods of destruction are described, which allow to minimize the consumption of ammunition and increase the survivability of the defended object.

Keywords: *UAV, SAM, EW, automated control systems, loitering ammunition, air defense, electronic jamming.*

Массовое применение БПЛА различных классов – от малых разведывательных дронов до тяжелых ударных платформ – коренным образом изменило характер боевых действий. Традиционные средства ПВО, ориентированные на борьбу с пилотируемой авиацией, сталкиваются с рядом трудностей при обнаружении и поражении целей с малой эффективной площадью рассеяния (ЭПР) и низкой тепловой заметностью. В этой связи критическую важность приобретает разработка комплексных методов борьбы, объединяющих огневое поражение (ЗРК) и функциональное подавление (РЭБ).

Основные сложности при использовании только огневых средств (ЗРК) включают [1]:

экономическую нецелесообразность – стоимость зенитной управляемой ракеты часто в десятки раз превышает стоимость малоразмерного дрона;

ограниченность боекомплекта – при атаках «роем» БПЛА запаса ракет ЗРК может быть недостаточно для отражения всех угроз;

сложность обнаружения – малые высоты и малая скорость полета затрудняют работу РЛС обнаружения.

Рассмотрим преимущества совместного применения ЗРК и средств РЭБ [2].

Интеграция средств РЭБ в систему ПВО позволяет реализовать эшелонированную защиту и обеспечивает следующие преимущества:

1. Экономическая эффективность и сохранение ресурса. Средства РЭБ могут эффективно выводить из строя коммерческие и FPV-дроны путем подавления каналов управления и спутниковой навигации, не расходуя дорогостоящие ракеты ЗРК.

2. Эшелонирование обороны:

дальний рубеж – ЗРК средней и большой дальности уничтожают крупные разведывательные и ударные БПЛА;

ближний рубеж – средства РЭБ создают «защитные купола» над объектами, подавляя малые дроны, прорвавшиеся через зону ПВО.

3. Повышение вероятности обнаружения. Средства радиотехнической разведки (РТР), входящие в состав комплексов РЭБ, способны обнаруживать БПЛА по излучению их бортовых систем (радиолинии управления, передача видеосигнала). Это позволяет выдавать целеуказание ЗРК даже в условиях, когда РЛС не видит цель из-за ее малой заметности.

4. Противодействие «роям» БПЛА. В то время как ЗРК ведет огонь по приоритетным целям, средства РЭБ могут одновременно воздействовать

на группу аппаратов, осуществляя широкополосное заградительное помеховое воздействие.

5. Взаимное прикрытие. ЗРК защищает позиции РЭБ от высокоточного оружия и авиации противника, в то время как РЭБ прикрывает ЗРК от атак дронов-камикадзе, нацеленных на РЛС комплекса.

Для реализации преимуществ необходимо создание единой автоматизированной системы управления (АСУ), способной в режиме реального времени распределять цели между огневыми и радиоэлектронными средствами. Это исключит дублирование задач и предотвратит электромагнитную несовместимость средств РЭБ с собственными радарами ПВО [3].

Рассмотрим алгоритмические основы распределения целей в интегрированных системах «ЗРК-РЭБ», которые включают в себя [4]:

алгоритм на основе классификации целей и «стоимостного порога»;

алгоритм «Эшелонированной селекции» (Sequential Filtering);

алгоритм приоритетности по вектору угрозы (Threat Evaluation);

кооперативный алгоритм «Анти-рой»;

иерархический алгоритм предотвращения конфликтов.

В современных АСУ ПВО распределение целей между огневыми средствами (ЗРК) и средствами функционального подавления (РЭБ) базируется на динамическом программировании и многокритериальной оптимизации. Основная задача алгоритма – минимизировать вероятность прорыва обороны при рациональном расходовании дорогостоящего боекомплекта ЗУР.

Алгоритм на основе классификации целей и «стоимостного порога». Этот метод разделяет поток целей по их физическим и тактическим характеристикам:

Логика – система идентифицирует тип БПЛА. Если цель классифицируется как «малоразмерный коммерческий дрон» или «FPV-камикадзе», алгоритм присваивает ей низкий приоритет для ЗРК и передает целеуказание на станцию РЭБ.

Критерий передачи на ЗРК – если средство РЭБ не подтверждает прекращение полета цели (цель продолжает движение по инерциальной системе навигации или с использованием ИИ-автозахвата), алгоритм автоматически переводит цель в категорию «огневое поражение» при достижении ею критического рубежа (например, 1-2 км от объекта).

Алгоритм «Эшелонированной селекции» (Sequential Filtering). Алгоритм работает по принципу последовательного фильтра:

Зона РТР (Радиотехнической разведки) – система РЭБ обнаруживает радиоизлучение БПЛА на дистанции 10-20 км.

Попытка подавления – на дистанции 7-10 км включается направленное помеховое воздействие на каналы управления и GPS/ГЛОНАСС.

Оценка эффективности – если телеметрия цели (скорость, курс) не меняется в течение нескольких секунд, алгоритм делает вывод о помехоустойчивости аппарата.

Целеуказание ЗРК – данные о координатах цели, полученные от пеленгаторов РЭБ, передаются в ЗРК для немедленного пуска ракеты или задействования зенитной артиллерии.

Алгоритм приоритетности по вектору угрозы (Threat Evaluation). Работа данного алгоритма основывается на математической модели, которая вычисляет индекс опасности (I_d) для каждой цели:

$$I_d = \frac{V \cdot K}{D \cdot T} \quad (1)$$

где:

V – скорость;

K – коэффициент типа нагрузки;

D – дистанция;

T – время до подлета.

Если I_d – высокий (например, тяжелый ударный БПЛА типа MQ-9 или Bayraktar), то назначается только ЗРК. РЭБ работает в режиме постановки помех бортовой РЛС БПЛА для снижения точности его оружия. Если же I_d – средний или низкий (роуминг-разведчики), то назначаются средствам РЭБ, чтобы не демаскировать позицию ЗРК излучением РЛС наведения.

Кооперативный алгоритм «Анти-рой». При обнаружении групповой цели (более 5-10 объектов) алгоритм переходит в режим коллективной обороны:

РЭБ переключается из режима «узкого луча» в режим «заградительной помехи» (создание купола), чтобы внести хаос в координацию группы.

ЗРК получает команду на уничтожение только «лидеров» – аппаратов, несущих ретрансляторы или основные модули навигации, по которым ориентируются остальные члены «роя».

Иерархический алгоритм предотвращения конфликтов. В работе этого алгоритма одной из важнейших функций АСУ является исключение электромагнитной несовместимости (ЭМН). Алгоритм блокирует работу станций РЭБ в узком секторе (по азимуту и частоте), в котором в данный момент работает ГСН (головка самонаведения) выпущенной зенитной ракеты, чтобы помеха не «ослепила» собственную ракету.

Рассмотрим проблематику борьбы с БПЛА в современной сетецентрической войне. Эффективность традиционных систем противовоздушной обороны при столкновении с массовым применением беспилотных летательных аппаратов существенно снижается. Это обусловлено рядом фундаментальных факторов, которые можно классифицировать по следующим направлениям [5]:

Радиолокационная и тепловая малозаметность. Большинство современных БПЛА малого и среднего классов (типа «крыло» или

мультироторного типа) изготавливаются из композитных материалов, радиопрозрачных пластиков и углеволокна. В этой связи они имеют низкую эффективную площадь рассеяния (ЭПР). ЭПР таких аппаратов может составлять менее 0,01-0,1 м², что делает их трудноразличимыми на фоне подстилающей поверхности, осадков или птиц. Кроме этого, использование электрических бесколлекторных двигателей вместо ДВС сводит к минимуму тепловое излучение. Это делает практически невозможным захват цели головками самонаведения (ГСН) ракет с инфракрасным каналом (например, систем типа «Игла» или «Стингер»).

Малые высоты и профиль полета. БПЛА способны совершать полет на сверхмалых высотах (от 10 до 50 метров), используя складки рельефа местности и застройку для скрытного подхода к цели. Нахождение цели ниже линии радиолокационного горизонта ограничивает дальность обнаружения наземными РЛС всего несколькими километрами, что критически сокращает время на принятие решения и реакцию комплекса ПВО. Многие разведывательные дроны обладают низкой скоростью полета (60-100 км/ч). Алгоритмы селекции движущихся целей (СДЦ) в старых РЛС часто отсеивают такие объекты как помехи от наземных предметов или растительности.

Экономическая асимметрия («стоимость-эффективность»). Одной из главных проблем является радикальный дисбаланс стоимости средств нападения и средств защиты. Использование зенитной управляемой ракеты (ЗУР), стоимость которой исчисляется сотнями тысяч или миллионами долларов, для уничтожения коммерческого дрона или FPV-камикадзе стоимостью в 500-1000 долларов ведет к быстрому экономическому истощению обороняющейся стороны. Это вынуждает ПВО «экономить» боезапас, пропуская второстепенные цели, которые, тем не менее, могут выполнять функцию целеуказания для артиллерии.

Проблема перенасыщения канальности (Атака «роем»). Классические ЗРК имеют ограниченную многоканальность по цели (способность одновременно обстреливать определенное количество объектов). При тактике применения «роя» (одновременная атака десятками дешевых БПЛА) система ПВО неизбежно сталкивается с дефицитом целевых каналов и расходом возимого боекомплекта. После отстрела всех ракет комплекс становится уязвимым на время перезарядки, которое может занимать от 15 до 30 минут.

Идентификация «свой-чужой». В условиях массового насыщения войск собственными дронами (разведка, корректировка) возникает острая проблема идентификации целей. Малые БПЛА часто не оснащаются громоздкими ответчиками системы государственного опознавания. Это создает риск «дружественного огня» или заставляет расчеты ПВО медлить с открытием огня до визуального подтверждения типа аппарата.

Помехоустойчивость и автономность. Современные военные БПЛА используют помехозащищенные каналы связи с ППРЧ (псевдослучайная

перестройка рабочей частоты) и инерциальные навигационные системы, дополненные алгоритмами машинного зрения (автономный захват цели). Это снижает эффективность простых систем РЭБ («глушилок») и требует высокоточного интеллектуального подавления в связке с физическим уничтожением наиболее опасных единиц.

Таким образом, комплексный подход, сочетающий огневую мощь ЗРК и гибкость средств РЭБ, является единственным эффективным способом противодействия современным угрозам со стороны БПЛА. Такое взаимодействие не только повышает выживаемость войск и объектов, но и оптимизирует материальные затраты на оборону, обеспечивая надежную защиту во всем диапазоне высот и скоростей применения беспилотной авиации.

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ВОПРОСЫ СОВЕРШЕНСТВОВАНИЯ ГОСУДАРСТВЕННОЙ ИНВЕСТИЦИОННОЙ ПОЛИТИКИ (НА ПРИМЕРЕ РЕСПУБЛИКИ УЗБЕКИСТАН)

Аннотация: *В статье рассматриваются теоретические и практические аспекты совершенствования государственной инвестиционной политики в условиях структурной трансформации экономики Республики Узбекистан. Раскрывается экономическая сущность государственной инвестиционной политики, анализируются основные институциональные и организационно-экономические проблемы её реализации. Особое внимание уделяется оценке существующих механизмов государственного регулирования инвестиционной деятельности, а также изучению международного опыта формирования эффективного инвестиционного климата. На основе проведённого анализа обосновываются приоритетные направления совершенствования государственной инвестиционной политики, направленные на повышение инвестиционной активности, улучшение качества инвестиционных потоков и обеспечение устойчивого экономического роста.*

Ключевые слова: *государственная инвестиционная политика, инвестиционный климат, экономическое развитие, государственное регулирование, инвестиционные риски, Узбекистан.*

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ISSUES OF IMPROVING STATE INVESTMENT POLICY (ON THE EXAMPLE OF THE REPUBLIC OF UZBEKISTAN)

Abstract: *The article examines theoretical and applied aspects of improving state investment policy in the context of structural transformation of the economy of the Republic of Uzbekistan. The economic essence of state investment policy is revealed, and key institutional and organizational problems of its implementation are analyzed. Special attention is paid to assessing existing mechanisms of state regulation of investment activity and studying international experience in forming an effective investment environment. Based on the analysis, priority directions for improving state investment policy are substantiated, aimed at increasing investment activity, improving the quality of investment flows, and ensuring sustainable economic growth..*

Key words: *state investment policy, investment climate, economic development, state regulation, investment risks, Uzbekistan.*

Инвестиции являются одним из важнейших факторов устойчивого экономического роста и структурной модернизации национальной экономики. В условиях глобализации, цифровизации и усиления международной конкуренции роль государства в формировании благоприятной инвестиционной среды существенно возрастает. Государственная инвестиционная политика становится важнейшим инструментом воздействия на экономическую динамику, обеспечивая концентрацию ресурсов в приоритетных отраслях и регионах.

Основным документом, регулирующим эту сферу, является **Закон Республики Узбекистан «Об инвестициях и инвестиционной деятельности» № ЗРУ-598 от 25.12.2019 г.** Он устанавливает правовые основы для местных и иностранных инвесторов, гарантирует защиту прав, предусматривает льготы и определяет принципы инвестиционной деятельности, включая 10-летнюю защиту от ухудшения условий. [1]

Целью статьи является разработка научно обоснованных рекомендаций по совершенствованию государственной инвестиционной политики Республики Узбекистан с учётом современных экономических вызовов и международного опыта.

При изучении инвестиционной политики мы хотели определить сущность самой термина «инвестиция».

Инвестиции — материальные и нематериальные блага и права на них, в том числе права на объекты интеллектуальной собственности, а также реинвестиции, вкладываемые инвестором на условиях несения рисков в объекты социальной сферы, предпринимательской, научной и других видов деятельности в целях получения прибыли.[1]

По мнению К. Х. Абдурахманова “Инвестиции — важный капитал, запускающий и обеспечивающий развитие экономики любой страны, поскольку она напрямую зависит от потока вложений.” [2]

Государственная инвестиционная политика представляет собой совокупность целей, принципов и инструментов государственного воздействия на инвестиционные процессы в национальной экономике. Её основная задача заключается в создании условий для мобилизации внутренних и внешних инвестиционных ресурсов, их эффективного распределения и использования.

С теоретической точки зрения инвестиционная политика государства базируется на положениях кейнсианской, институциональной и неоклассической экономических теорий. Кейнсианский подход подчёркивает активную роль государства в стимулировании инвестиционного спроса, институциональный — значение качества институтов и прав собственности, а неоклассический — необходимость макроэкономической стабильности и конкурентных рынков. [6, 7]

По мнению М.А. Бозоровой и С.А. Камиловой инвестиционная политика выполняет:

- Регулирующую функцию — формирование правил игры для всех участников рынка;
- Стимулирующую — через систему льгот и налоговых преференций;
- Стабилизирующую — обеспечивая предсказуемость и защиту прав инвесторов;
- Координирующую — объединяя усилия различных государственных структур. [5]

Поддерживая мнений и взглядов мнениям авторов функций инвестиционной политики можно сделать вывод что, к основным функциям государственной инвестиционной политики можно отнести следующие функции:

- формирование стратегических приоритетов инвестиционного развития;
- регулирование инвестиционных потоков;
- снижение инвестиционных рисков;
- стимулирование частных и иностранных инвестиций.

По данным Национального комитета по статистике республики Узбекистан, «для развития экономики и социальной сферы в январе-декабре 2025 года за счет всех источников финансирования было освоено 591,1 трлн сумов инвестиций в основной капитал. Этот показатель увеличился на 10,5 % по сравнению с 2024 годом.

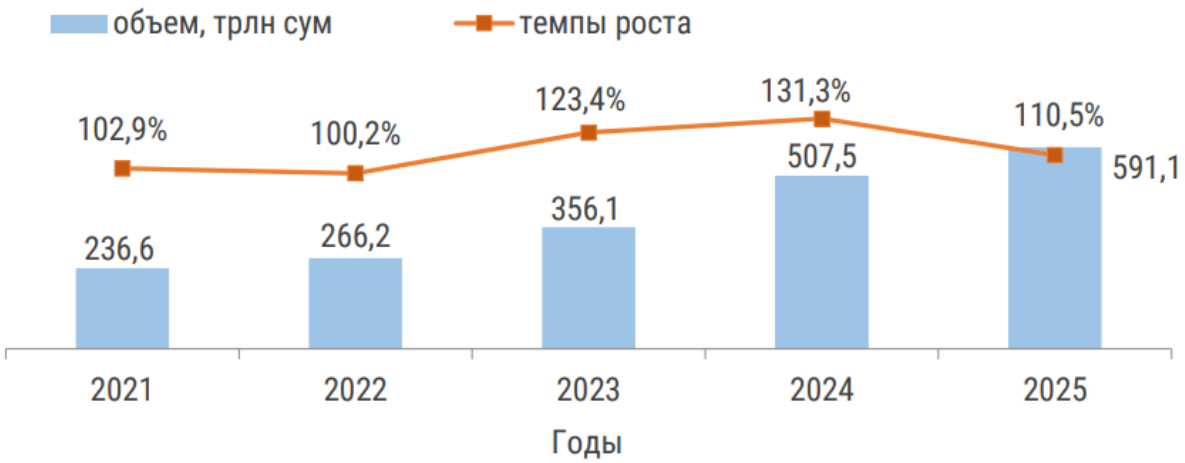

Рисунок 1. Динамика объема и темпов роста инвестиций в Республики Узбекистан в 2021-2025 годы в основной капитал[3]**.**

Если обратить внимание на иностранные инвестиции и кредиты в основной капитал, направленные на создание новых основных фондов в 2025 году, составили 33,5 млрд долларов США или 422,1 трлн сумов. В частности, иностранные инвестиции и кредиты в основной капитал по видам экономической деятельности составили следующие результаты:

Обрабатывающая промышленность - 33,2 %; электроснабжение, газоснабжение - 17,1 %; горнодобывающая промышленность - 11,9 %; сельское хозяйство - 9.2 %; водоснабжение и канализация - 2,1 %; строительство - 6,1 %; Транспортировка и хранение - 5,3 %; информация и связь - 1,5 %; здравоохранение - 1,7 %; другие виды деятельности - 11,9 %.» [4]

По данным (рисунок 2) можно сделать вывод что в структуре инвестиций в основной капитал по видам экономической деятельности превалирует обрабатывающая промышленность. В результате крупных инвестиционных проектов в данной отрасли было освоено 160,5 трлн сум, или 27,2 % от общего объема инвестиций в основной капитал.

В данной позиции нужно обратить особое внимание на инвестиционную политику. В настоящее время в Республики Узбекистан вопросы совершенствования государственной инвестиционной политики приобретают особую актуальность в контексте проводимых экономических реформ, направленных на либерализацию экономики, развитие частного сектора и интеграцию в мировое хозяйство.

	Объем, в млрд сум	в % к итогу	
		2024 г.	2025 г.
Инвестиции в основной капитал – всего	**591 141,0**	**100,0**	**100,0**
в том числе:			
сельское, лесное и рыбное хозяйство	51 181,1	5,1	8,7
горнодобывающая промышленность	58 807,9	12,2	9,9
обрабатывающая промышленность	160 526,9	27,0	27,2
электроснабжение, подача газа, пара и кондиционирование воздуха	78 345,3	14,4	13,3
водоснабжение, канализация, сбор и утилизация отходов	13 614,8	1,4	2,3
строительство	42 191,6	8,0	7,1
оптовая и розничная торговля	23 213,5	5,3	3,9
перевозка и хранение	35 155,0	4,9	5,9
услуги по проживанию и питанию	8 774,8	0,9	1,5
информация и связь	10 199,2	3,3	1,7
финансовая и страховая деятельность	7 049,9	1,2	1,2
профессиональная, научная и техническая деятельность	7 719,9	1,2	1,3
образование	11 308,7	1,9	1,9
здравоохранение	11 704,0	2,2	2,0
искусство, развлечения и отдых	2 291,1	0,9	0,4
кроме всех видов деятельности: инвестиции в жилищное строительство	46 632,1	5,6	7,9
прочие виды деятельности	22 425,2	4,5	3,8

Рисунок 2. Освоение инвестиций в основной капитал по видам экономической деятельности за январь-декабрь 2025 года.[3]

По мнению авторов статьи «Инвестиционная политика Государства: приоритеты и результаты» М.А. Бозоровой и С.А. Камиловой по ведению инвестиционной политики предлагаются ряд направлений, среди которых особое внимание уделяются к инструментам инвестиционной политики. По их мнению, «Инструменты инвестиционной политики: Инструментальный арсенал инвестиционной политики Узбекистана включает в себя:

✓ Налоговые стимулы: освобождение от налога на прибыль, льготы по НДС, налоговые каникулы в СЭЗ;

✓ Финансовые гарантии: государственные гарантии возврата инвестиций, механизм государственно-частного партнёрства (ГЧП);

✓ Создание институтов поддержки: Агентство по привлечению инвестиций, торгово-промышленные палаты, СЭЗ;

✓ Упрощение процедур: регистрация компаний в режиме «одного окна», цифровые платформы;

Правовые меры: законы «Об инвестициях», «О свободных экономических зонах», международные соглашения о защите инвестиций.» [5]

Эффективность инвестиционной политики во многом определяется согласованностью фискальной, промышленной, инновационной и региональной политики государства.

Несмотря на активизацию инвестиционной деятельности в последние годы, реализация государственной инвестиционной политики в Узбекистане сталкивается с рядом проблем.

Во-первых, сохраняются институциональные ограничения, связанные с совершенствованием нормативно-правовой базы.

Во-вторых, наблюдается неравномерность распределения инвестиций по отраслям и регионам, что снижает эффект от реализуемых инвестиционных программ.

Во-третьих, значительную роль играют инвестиционные риски, включая макроэкономические, валютные и правовые риски.

В-четвёртых, недостаточная координация между органами государственного управления приводит к дублированию функций и снижению эффективности инвестиционного регулирования.

Вышеизложенные проблемы ограничивают потенциал инвестиционного роста и требуют комплексного пересмотра подходов к формированию государственной инвестиционной политики.

Международная практика показывает, что эффективная государственная инвестиционная политика основывается на институциональной устойчивости, прозрачности регулирования и активном использовании механизмов государственно-частного партнёрства.

В развитых и развивающихся странах важную роль играют специализированные инвестиционные агентства, стратегическое планирование и цифровые инструменты сопровождения инвесторов. Рекомендации таких международных организаций, как Всемирный банк и

ОЭСР, акцентируют внимание на необходимости улучшения инвестиционного климата, защиты прав инвесторов и повышения качества институтов.

Особое значение имеет переход от количественного наращивания инвестиций к повышению их качества и эффективности, что обеспечивает долгосрочную устойчивость экономического развития.

С учётом выявленных проблем и международного опыта представляется целесообразным выделить следующие направления совершенствования государственной инвестиционной политики Республики Узбекистан:

1. **Укрепление институциональной среды** за счёт повышения прозрачности регулирования и стабильности инвестиционного законодательства.
2. **Развитие стратегического инвестиционного планирования**, ориентированного на приоритетные отрасли и регионы.
3. **Совершенствование механизмов государственно-частного партнёрства** и проектного финансирования.
4. **Цифровизация инвестиционного управления**, включая внедрение электронных платформ сопровождения инвесторов.
5. **Снижение инвестиционных рисков** через развитие финансовых гарантий и страховых инструментов.

Реализация указанных направлений позволит повысить инвестиционную привлекательность национальной экономики и обеспечить устойчивый экономический рост.

В заключении нужно отметить что государственная инвестиционная политика является ключевым инструментом экономического развития Республики Узбекистан. Проведённый анализ показал, что дальнейшее совершенствование инвестиционной политики требует комплексного подхода, основанного на институциональных реформах, стратегическом планировании и активном использовании современных механизмов регулирования.

Реализация предложенных рекомендаций будет способствовать повышению эффективности инвестиционных процессов, улучшению качества инвестиционных потоков и укреплению конкурентоспособности национальной экономики.

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АВТОНОМНАЯ АФФЕРЕНТНАЯ ИННЕРВАЦИЯ ИНТРАОРГАННЫХ КРОВЕНОСНЫХ СОСУДОВ КИШЕЧНИКА МЛЕКОПИТАЮЩИХ

Аннотация. *В эксперименте исследовано автономная афферентная иннервация интраорганных кровеносных сосудов кишечника у кошки. Выявление нервных элементов интраорганных кровеносных сосудов кишечника проводилось импрегнацией по методу Бильшовского-Грос, Кампосу и Рассказовой, а ядра клеток окрашивались квасцовым кармином.*

Сенсорная иннервация микроциркуляторного кровеносного русла кишечника млекопитающих осуществляется не только со стороны центральных афферентных нейронов спинномозговых узлов, но и за счет периферических вегетативных чувствительных нейронов интрамуральных ганглиев. Клетки II типа Догеля берут на себя значительную долю нагрузки по сбору сенсорной информации в тканях кишечника млекопитающих.

Ключевые слова:*эксперимент, кошка, методы Бильшовского-Грос, Кампосу и Рассказовой, интраорганных кровеносных сосудов, кишечник, клеток II типа Догеля.*

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AUTONOMOUS AFFERENT INNERVATION OF INTRAMURAL BLOOD VESSELS IN THE MAMMALIAN INTESTINE

Abstract. *In the experiment, the autonomous afferent innervation of intramural blood vessels of the intestine was investigated in cats. The detection of nerve elements in the intramural blood vessels of the intestine was performed by silver impregnation using the Bielschowsky-Gros, Campos, and Rasskazova methods, while the cell nuclei were counterstained with alum carmine.*

Sensory innervation of the microcirculatory bloodstream in the mammalian intestine is carried out not only by central afferent neurons of the spinal ganglia but also by peripheral autonomic sensory neurons of the intramural ganglia. Dogiel type II cells assume a significant share of the load in collecting sensory information from the tissues of the mammalian intestine.

Keywords: *experiment, cat, Bielschowsky-Gros method, Campos method, Rasskazova method, intramural blood vessels, intestine, Dogiel type II cells*

Ввдение

Проблема афферентной иннервации микроциркуляторного кровеносного русла внутренних органов одна из актуальных в современной нейробиологии и ангиологии. Разработка этой проблемы идет преимущественно по линии изучения морфологии сосудистых рецепторов центрального происхождения, несущих основную ответственность за афферентную импульсацию [1,2]. Однако в составе интрамуральных сплетений внутренних органов имеются нейроны, образующие в совокупности собственную систему афферентации, морфология которой разработана слабо [3,4]. Особый интерес представляет вопрос об участии клеток II типа Догеля в чувствительной иннервации интраорганных кровеносных и лимфатических сосудов, поскольку он мало изучено [5,6]. Лишь отдельные авторы описывают контакты дендритов периферических чувствительных нейронов с кровеносными сосудами.

Цель исследования

Изучить автономная афферентная иннервация интраорганных кровеносных сосудов кишечника у кошки.

Материалы и методы исследования

В нашем исследовании применялась выявление нервных элементов интраорганных кровеносных сосудов кишечника проводилось импрегнацией по методу Бильшовского-Грос, Кампосу и Рассказовой, а ядра клеток окрашивались квасцовым кармином.

Результаты исследования

При изучении структуры клеток 11 типа Догеля интрамуральных ганглиев кишечника кошки получено прямое морфологическое доказательство их рецепторной природы. Таким доказательством является обнаружение у вегетативных нейронов дендритов с типичными рецепторными окончаниями. В межмышечном сплетении кишечника кошки обнаружены чувствительные нейроны уни, би и мультиполярной формы, значительное количество которых снабжено короткими дендритами с отчетливо выраженными афферентными приборами чаще всего сосудисто-тканевого типа. Обращает на себя внимание поливалентность этих окончаний. Такие короткие рецепторные отростки вблизи перикариона многократно дихотомически делятся, образуя сложную сеть претерминалей и терминалей, которые заканчиваются обилием разнообразных концевых приборов на различных тканевых структурах: интраганглионарно - на проходящих нервных волокнах, соседних нейронах 1 и 11 типа Догеля экстраганглионарно - в соединительной ткани, гладких мышцах, на лимфатических и кровеносных капиллярах, артериолах венулах. Интерес представляет нижний мультиполярный нейрон. От его овального тела отходит пять дендритов, два из которых являются длинными и покидают пределы ганглия. Два других отростка относятся к коротким дендритам и отходят от поверхности тела нейрона. Особо обращает на себя внимание дендрит, начинающийся узким конусом у края ядра. Указанный отросток,

причудливо извиваясь, следует в составе пучка нервных волокон и на некотором расстоянии от тела клетки дает короткую веточку, оканчивающуюся фибриллярной бляшкой правильной формы на элементах глии. Несколько дальше отросток делает петлю и покидает пределы нервного пучка, направляясь в сторону сети кровеносных сосудов, расположенных в просвете петли сплетения. Следуя в соединительной ткани, дендрит по ходу трихотомически делится, образуя три самостоятельные системы терминалей, каждая из которых имеет отношение к различным субстратам иннервации. Ближняя к пери- кариону веточка стелется по поверхности артериолы, образуя на ней большое количество мельчайших колечек. Отдельные тонкие терминали достигают параллельно идущей рядом венулы и иннервируют ее. Другая ветвь оканчивается множеством морфологически разнообразных концевых структур в участке соединительной ткани, ограниченном изгибом венулы. Третья, наиболее тонкая ветвь простирается на значительное расстояние и достигает капилляра, на поверхности которого заканчивается нежнейшими колечками. Таким образом, налицо поливалентность выявленного рецепторного кустика сосудисто-тканевого типа, иннервирующего одновременно глиальную и соединительную ткани, артериолу, венулу и капилляр. Чаще всего местные рецепторы такого типа осуществляют экстраганглионарную афферентацию. Чувствительные окончания местного значения выявляются в сплетениях подвздошной кишки гораздо чаще и полнее, чем в других отделах тонкой кишки. Терминали различной величины в виде бляшек и колечек заканчиваются на поверхности венулы и в соединительной ткани. Приводящее волокно имеет свойственный коротким дендритам сложный извитой ход. Нередко на интраорганных сосудах толстой кишки кошки выявляются синаптические аппараты без видимой связи с вегетативными нейронами. Они имеют самую разнообразную форму и размеры. Это или довольно крупные чечевицеобразные бляшки, лежащие в сосудистой петле, или совершенно круглые с ровными контурами структуры, плотно прилегающие к сосуду и окруженные светлой зоной перифибриллярного вещества. Недостаточно полная импрегнация структуры местных рецепторов часто приводит к тому, что из всей сложной системы терминалей чувствительного окончания выявляются только отдельные, самые крупные концевые аппараты без видимой связи с интрамуральными нейронами.

Вывод

Таким образом, сенсорная иннервация микроциркуляторного кровеносного русла кишечника млекопитающих осуществляется не только со стороны центральных афферентных нейронов спинномозговых узлов, но и за счет периферических вегетативных чувствительных нейронов интрамуральных ганглиев. Клетки II типа Догеля берут на себя значительную долю нагрузки по сбору сенсорной информации в тканях кишечника млекопитающих. Не исключено даже, что они несут основную

часть нагрузки по рецепции, обеспечивая вместе с клетками I типа Догеля автономию этого отдела пищеварительного тракта.

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ТЕОРЕТИЧЕСКИЕ ОСНОВЫ СТИМУЛИРОВАНИЯ И МОТИВАЦИИ ТРУДА В ТРАНСНАЦИОНАЛЬНЫХ КОРПОРАЦИЯХ

Аннотация. *В статье рассматриваются основные теоретические подходы к анализу стимулирования и мотивации труда в транснациональных корпорациях. Актуальность исследования обусловлена необходимостью комплексного осмысления факторов, определяющих эффективность систем стимулирования в условиях международной корпоративной среды. Особое внимание уделяется содержательным и процессуальным теориям мотивации, институциональному подходу, а также кросс-культурным концепциям, позволяющим учитывать влияние национальных особенностей на восприятие стимулов и управленческих практик. На основе проведённого теоретического обзора обосновано, что применение универсальных моделей стимулирования в транснациональных корпорациях имеет ограниченный характер, поскольку мотивация работников формируется под воздействием совокупности внутренних, организационных и внешнесредовых факторов. В качестве результата исследования предложена интегрированная аналитическая рамка «потребности — процессы — институты — культура», которая может быть использована для дальнейшего сравнительного анализа систем стимулирования труда в международных компаниях.*

Ключевые слова: *Мотивация Труда, Стимулирование Труда, Транснациональные Корпорации, Кросс-Культурный Подход, Институциональный Подход*

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THEORETICAL FOUNDATIONS OF LABOR INCENTIVES AND WORK MOTIVATION IN TRANSNATIONAL CORPORATIONS

Abstract. *This article examines the main theoretical approaches to the analysis of labor stimulation and work motivation in transnational corporations. The relevance of the study is обусловед by the need for a comprehensive understanding of the factors that determine the effectiveness of incentive systems in an international corporate environment. Particular attention is paid to content and process theories of motivation, the institutional approach, and cross-cultural*

concepts, which make it possible to take into account the influence of national characteristics on the perception of incentives and managerial practices. Based on the theoretical review, it is argued that the application of universal incentive models in transnational corporations is limited, since employee motivation is shaped by a combination of internal, organizational, and external environmental factors. As a result of the study, an integrated analytical framework, "needs – processes – institutions – culture," is proposed, which can be used for further comparative analysis of labor incentive systems in international companies.

Keywords: *Work Motivation, Labor Incentives, Transnational Corporations, Cross-Cultural Approach, Institutional Approach*

Введение

В условиях глобализации мировой экономики и расширения международной деятельности компаний вопросы стимулирования и мотивации труда приобретают особую научную и практическую значимость. Для транснациональных корпораций эффективная организация трудовой мотивации выступает не только инструментом повышения производительности труда, но и важнейшим фактором обеспечения организационной устойчивости, удержания персонала, снижения внутрикорпоративных конфликтов и адаптации управленческих практик к различным национальным условиям. Особую актуальность данная проблематика приобретает в деятельности транснациональных корпораций, функционирующих одновременно в нескольких институциональных и культурных средах, где универсальные подходы к стимулированию труда нередко оказываются недостаточно результативными.

Актуальность исследования обусловлена тем, что современные системы стимулирования труда формируются под воздействием не только внутренних организационных факторов, но и более широкого комплекса условий, включающего структуру потребностей работников, особенности восприятия справедливости вознаграждения, специфику национального трудового законодательства, влияние профсоюзных институтов, а также культурные различия в отношении к лидерству, ответственности, коллективному взаимодействию и признанию. В этой связи анализ мотивации труда в транснациональных корпорациях требует комплексного междисциплинарного подхода, сочетающего положения классических теорий мотивации, институционального анализа и кросс-культурных концепций.

Степень научной разработанности проблемы свидетельствует о наличии значительного массива исследований, посвящённых как содержательным и процессуальным теориям мотивации, так и институциональным и культурным факторам управления персоналом. Вместе с тем в современной научной литературе сохраняется определённая фрагментарность в объяснении механизмов стимулирования труда в международной корпоративной среде. Ряд исследований сосредоточен преимущественно на индивидуально-психологических механизмах

мотивации, тогда как другие акцентируют внимание на институциональных ограничениях или культурной специфике. Однако интеграция этих подходов в единую аналитическую рамку, применимую к исследованию транснациональных корпораций, по-прежнему остаётся недостаточно разработанной.

Целью настоящей статьи является систематизация основных теоретических подходов к анализу стимулирования и мотивации труда в транснациональных корпорациях и формирование интегрированной аналитической рамки, позволяющей учитывать взаимосвязь потребностей работников, мотивационных процессов, институциональной среды и культурных различий.

Для достижения поставленной цели решаются следующие задачи: во-первых, рассмотреть содержательные теории мотивации и определить их значение для анализа структуры трудовых потребностей работников; во-вторых, проанализировать процессуальные теории мотивации с точки зрения механизмов связи усилий, результатов и вознаграждения; в-третьих, раскрыть роль институционального подхода в объяснении специфики систем стимулирования труда в международной среде; в-четвёртых, выявить значение кросс-культурных концепций для оценки различий в восприятии стимулов и управленческих практик; в-пятых, обосновать возможность использования интегрированной четырёхмерной рамки «потребности — процессы — институты — культура» для дальнейшего сравнительного анализа. Научная новизна исследования заключается в теоретическом синтезе основных подходов к изучению мотивации и стимулирования труда применительно к транснациональным корпорациям. В статье предлагается комплексная аналитическая рамка, позволяющая преодолеть ограниченность односторонних интерпретаций трудового поведения и рассматривать систему стимулирования как результат взаимодействия индивидуальных, организационных и внешнесредовых факторов.

Теоретическая значимость работы состоит в уточнении исследовательских возможностей классических и современных теорий мотивации в контексте международного управления персоналом. Практическая значимость заключается в возможности использования предложенной рамки при разработке и адаптации систем стимулирования труда в транснациональных корпорациях, действующих в странах с различными институциональными и культурными характеристиками.

Содержательные теории мотивации: объяснение трудового поведения через структуру потребностей

Содержательные теории мотивации сосредоточены на выявлении внутренних потребностей человека, определяющих его трудовое поведение. Их значение для управления персоналом заключается в том, что они позволяют понять, какие именно потребности побуждают работников к труду и каким образом организация может воздействовать на эти потребности через систему стимулирования.

Наиболее известной в данной группе является теория иерархии потребностей А. Маслоу. Согласно данной концепции, поведение человека определяется стремлением к последовательному удовлетворению потребностей различного уровня: от физиологических потребностей и потребности в безопасности до социальных потребностей, потребности в уважении и самореализации. Несмотря на критику данной теории за избыточный универсализм и ограниченную эмпирическую верифицируемость, её значение для анализа трудовой мотивации сохраняется. Прежде всего, она демонстрирует, что работники не представляют собой однородную группу с едиными ожиданиями, а значит, однотипные стимулы не могут быть одинаково эффективными для всех категорий персонала.

С позиции современных подходов к управлению персоналом это означает, что системы стимулирования труда не должны ограничиваться исключительно материальным вознаграждением. Наряду с заработной платой и премированием всё большее значение приобретают нематериальные формы стимулирования, включая признание заслуг, возможности профессионального и карьерного роста, участие в принятии решений, укрепление чувства принадлежности к организации и создание условий для самореализации. Таким образом, содержательные теории формируют важную методологическую основу для понимания того, что структура трудовой мотивации работников является многомерной, а эффективная система стимулирования должна учитывать разнообразие их потребностей.

В отличие от содержательных теорий, процессуальные подходы направлены не столько на выявление самих потребностей, сколько на объяснение того, каким образом эти потребности преобразуются в конкретное трудовое поведение. Центральное место в данной группе занимает теория ожиданий В. Врума, согласно которой мотивация определяется тремя взаимосвязанными элементами: ожиданием того, что усилия приведут к необходимому результату, убеждённостью в том, что достигнутый результат будет вознаграждён, и субъективной ценностью самого вознаграждения для работника.

Практическое значение этой теории состоит в том, что она позволяет объяснить, почему даже значимое вознаграждение не всегда выполняет мотивирующую функцию. Если сотрудник не видит реальной связи между своими усилиями, результатами труда и получаемой наградой, то стимулирующий эффект системы вознаграждения существенно снижается. Следовательно, для организации важно не только предлагать привлекательные формы поощрения, но и обеспечивать прозрачность критериев оценки труда, предсказуемость карьерных решений и доверие работников к системе управления.

Близкой по логике является теория справедливости Дж. Адамса. В её основе лежит положение о том, что работники оценивают не только

абсолютный размер вознаграждения, но и соотносят собственные затраты и полученные результаты с аналогичными показателями других сотрудников. Восприятие несправедливости в распределении оплаты труда, премий, льгот или карьерных возможностей способно вызвать снижение трудовой активности, неудовлетворённость, ослабление организационной приверженности и рост конфликтности. Особое значение данная теория приобретает в крупных и международных организациях, где сотрудники постоянно сопоставляют своё положение с положением различных профессиональных и национальных групп внутри компании.

Интегративный характер носит модель Портера—Лоулера, объединяющая элементы содержательных и процессуальных теорий. В рамках этой модели подчёркивается, что результативность труда определяется не только затраченными усилиями, но и способностями работника, его пониманием собственной роли в организации, а также тем, как он воспринимает справедливость и ценность получаемого вознаграждения. Существенным вкладом данной модели является положение о том, что удовлетворённость трудом выступает не исходной причиной высокой результативности, а её возможным следствием при условии справедливого и значимого вознаграждения. Такой подход позволяет рассматривать мотивацию как сложный динамический процесс, в котором усилия, результаты, способности, организационные условия и характер вознаграждения образуют единую систему взаимосвязей.

Институциональный подход: влияние внешней среды на системы стимулирования труда

При анализе мотивации и стимулирования труда в современных организациях, особенно в транснациональных корпорациях, недостаточно ограничиваться только внутренними потребностями работников и их субъективной оценкой справедливости вознаграждения. Важную роль играет институциональная среда, в рамках которой функционирует организация. Трудовое законодательство, профсоюзные традиции, нормы занятости, практика государственного регулирования, требования локализации персонала и особенности социальной политики государства оказывают прямое влияние на формирование систем стимулирования труда.

Институциональный подход позволяет рассматривать мотивацию не только как результат индивидуальных психологических процессов, но и как производную от внешних правил, ограничений и нормативных ожиданий. Для международных компаний этот аспект имеет особое значение, поскольку их деятельность разворачивается одновременно в нескольких национальных контекстах, каждый из которых предъявляет собственные требования к организации труда и управлению персоналом. В таких условиях стремление к унификации HR-практик неизбежно сталкивается с необходимостью адаптации к локальной институциональной среде.

Современные исследования в области международного управления человеческими ресурсами показывают, что идентичные по форме

инструменты стимулирования могут демонстрировать различную эффективность в зависимости от страны их применения. Это обусловлено тем, что институциональная среда влияет как на допустимые механизмы регулирования трудовых отношений, так и на ожидания работников в отношении справедливой оплаты, социальных гарантий, карьерных перспектив и участия в управлении. Следовательно, системы стимулирования в транснациональных корпорациях необходимо рассматривать не только как элемент корпоративной стратегии, но и как результат постоянной адаптации к внешним институциональным условиям.

Кросс-культурные теории: культурные различия как фактор восприятия стимулов

Ещё одним важным направлением анализа мотивации труда в международной среде являются кросс-культурные подходы. Их значение определяется тем, что одни и те же стимулы могут восприниматься работниками по-разному в зависимости от национально-культурного контекста. К числу наиболее влиятельных концепций в данной области относится модель культурных измерений Г. Хофстеде. Она позволяет сопоставлять страны по таким параметрам, как дистанция власти, индивидуализм и коллективизм, избегание неопределённости, долгосрочная ориентация и ряду других характеристик, влияющих на организационное поведение.

С точки зрения мотивации труда данная модель показывает, что восприятие лидерства, признания, ответственности, вознаграждения и карьерного продвижения не является универсальным. Так, в культурах с выраженной коллективистской ориентацией более значимыми могут выступать групповые формы признания, стабильность внутри коллектива и поддержание гармоничных межличностных отношений. Напротив, в индивидуалистических культурах более высокую роль играют персонализированные стимулы, индивидуальная результативность, личная ответственность и автономия в принятии решений. Следовательно, эффективность стимулирующих мер во многом зависит от того, насколько они соотносятся с культурными ожиданиями работников.

Сходную исследовательскую задачу решает проект GLOBE, в рамках которого была проведена масштабная сравнительная оценка культурных различий, лидерских моделей и организационных практик в различных странах. В отличие от модели Хофстеде, данный подход в большей степени ориентирован на анализ связи между культурными особенностями и управленческой эффективностью. Для исследования систем стимулирования труда в транснациональных корпорациях это особенно важно, поскольку позволяет рассматривать мотивацию не изолированно, а в более широкой системе организационных отношений, включающей стиль руководства, управленческие ожидания, отношение к власти и коллективным нормам. Таким образом, кросс-культурные теории дают возможность глубже понять, почему идентичные HR-инструменты могут приводить к различным

результатам в разных странах и почему универсальные модели стимулирования далеко не всегда оказываются успешными в международной практике.

Теоретический синтез и аналитическая рамка исследования

Проведённый обзор показывает, что ни одна из рассмотренных теорий не способна в полной мере объяснить трудовое поведение работников в современных организациях, особенно в условиях транснациональной деятельности. Содержательные теории раскрывают структуру потребностей работников и помогают выявить разнообразие мотивов трудовой активности. Процессуальные теории объясняют механизмы, посредством которых потребности, ожидания и восприятие справедливости преобразуются в реальные усилия и результаты труда. Институциональный подход демонстрирует, что системы стимулирования формируются под воздействием внешней нормативной и регуляторной среды. Кросс-культурные концепции, в свою очередь, показывают, что восприятие стимулов и управленческих практик зависит от национальных ценностей, социальных норм и культурных моделей поведения.

С учётом цели и задач настоящего исследования в дальнейшем целесообразно использовать интегрированную аналитическую рамку, основанную на четырёх взаимосвязанных измерениях: «потребности — процессы — институты — культура». Измерение «потребности» позволяет анализировать структуру мотивов работников, а также соотношение материальных и нематериальных стимулов. Измерение «процессы» ориентировано на изучение связи между трудовыми усилиями, результативностью, системой вознаграждения и восприятием справедливости. Измерение «институты» позволяет учитывать влияние трудового законодательства, механизмов государственного регулирования, профсоюзных практик и требований локализации персонала. Наконец, измерение «культура» делает возможным выявление различий в восприятии стимулов, лидерства и организационных норм в различных странах.

Именно данная четырёхмерная рамка представляется наиболее продуктивной для последующего сравнительного анализа систем стимулирования труда в китайских энергетических транснациональных корпорациях, функционирующих в Казахстане, Бразилии и Саудовской Аравии. Её использование позволяет перейти от описательного обзора теорий к формированию целостной исследовательской модели, способной объяснить, каким образом внутренние, организационные и внешние факторы совместно определяют специфику мотивации работников в международной корпоративной среде.

Заключение

Проведённый теоретический анализ показал, что стимулирование и мотивация труда в транснациональных корпорациях представляют собой сложный и многоуровневый процесс, который не может быть исчерпывающе объяснён в рамках какого-либо одного подхода. Содержательные теории

позволяют раскрыть структуру потребностей работников и обосновать необходимость сочетания материальных и нематериальных стимулов. Процессуальные теории акцентируют внимание на механизмах связи между усилиями, результатами труда, вознаграждением и восприятием справедливости. В то же время институциональный подход показывает зависимость систем стимулирования от внешней нормативной и регуляторной среды, а кросс-культурные концепции демонстрируют, что эффективность управленческих решений во многом определяется их соответствием национально-культурным особенностям работников. Тем самым подтверждается, что анализ мотивации труда в международной корпоративной среде требует комплексного и междисциплинарного рассмотрения.

В результате исследования обоснована целесообразность использования интегрированной аналитической рамки «потребности — процессы — институты — культура», позволяющей объединить индивидуально-психологические, организационные и внешнесредовые факторы в единой логике анализа. Данная рамка обладает теоретической значимостью, поскольку расширяет возможности системного изучения трудовой мотивации в транснациональных корпорациях, и практической ценностью, так как может быть использована при разработке адаптивных систем стимулирования труда в международных компаниях. Перспективы дальнейших исследований связаны с эмпирической апробацией предложенного подхода на материале конкретных транснациональных корпораций, действующих в различных институциональных и культурных условиях.

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СОВЕРШЕНСТВОВАНИЕ ФИНАНСОВОЙ СИСТЕМЫ НАЦИОНАЛЬНОЙ ЭКОНОМИКИ

Аннотация. *В статье освещены вопросы совершенствования финансовой системы национальной экономики. Открыт годовой план и анализ показателей по объекту практики.*

Ключевые слова: *национальная экономика, финансовая система, банк, технология, трансфер, трансфер технологий, модернизация.*

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IMPROVING THE FINANCIAL SYSTEM OF THE NATIONAL ECONOMY

Abstract. *The article covers issues of improving the financial system of the national economy. The annual plan and the analysis of indicators for the object of practice have been opened.*

Key words: *national economy, financial system, bank, technology, transfer, technology transfer, modernization.*

В развитии национальной экономики международные финансовые отношения являются основным фактором, обеспечивающим рост за счет привлечения инвестиций, финансирования внешней торговли и трансфера технологий. Они важны для модернизации инфраструктуры, промышленности и социальной сферы, привлекая трансфер технологий, кредиты и средства от международных финансовых институтов.

Роль и значение международных финансовых отношений в национальной экономике отражаются в следующем:

Привлечение инвестиций: Привлечение прямых и портфельных инвестиций через международные финансовые рынки позволяет модернизировать национальную экономику и расширять производство.

Обеспечение финансовой стабильности: покрытие дефицита платежного баланса и стабилизация обменного курса за счет международных кредитов и финансовых институтов (Международный валютный фонд, Всемирный банк).

Трансфер технологий: Приток передовых технологий, управленческого опыта и инноваций наряду с иностранным капиталом.

Экономическая интеграция: интеграция национальной экономики в мировую экономическую систему, ускорение международной торговли и финансовых потоков.

Развитие инфраструктуры: Использование международных облигаций и льготных кредитов для финансирования крупных инфраструктурных проектов.

Вкратце, международные финансовые отношения повышают открытость национальной экономики и служат источником необходимых ресурсов для осуществления структурных изменений и достижения устойчивого экономического роста. Сложно представить мир без вмешательства финансового сектора, учитывая его роль и вклад в динамику развития наших обществ. Следовательно, трудно спорить с тем, что его вмешательство и развитие положительно влияют на рост регионов, испытывающих нехватку ресурсов и инвестиций.

Тем не менее, наше исследование стремилось внести свой вклад, рассмотрев вопрос о том, приносит ли дальнейшее совершенствование финансовой системы (о чем свидетельствует увеличение выбранных переменных, характеризующих ее) дополнительную пользу процессу экономической конвергенции от экономики к ее потенциальному уровню производства при уже существующем уровне развития. В этом случае ответ не является однозначным, и, как показано в обширной существующей литературе, возможны различные варианты развития событий.

В экономике необходимо в полной мере обеспечивать функционирование коммерческих банков, чтобы укрепить их роль в рыночной инфраструктуре в соответствии с результатами производства, что, в свою очередь, обеспечивает финансовую систему банков. Первостепенной предпосылкой обеспечения личного дохода коммерческих банков является обеспечение достаточности капитала, обеспечение достижения уровня рентабельности банков, увеличение и улучшение банковской прибыли, а также содействие снижению банковских издержек.

Таким образом, доход и его значение в деятельности коммерческих банков являются важными факторами обеспечения стабильности банковской и финансовой системы нашей республики.

Основой обеспечения финансовой стабильности банка является его капитал и уровень рентабельности банковской деятельности. В рыночной экономике цель каждого коммерческого банка – увеличение дохода и снижение издержек, получение высокой или максимальной прибыли за счет оптимизации.

В случае Южной Европы последствия финансового кризиса неоспоримы, учитывая, что этот кризис зародился в самом финансовом секторе и, таким образом, может объяснить его негативное воздействие.

Партия осуществляла свою финансовую деятельность в соответствии с Законами Республики Узбекистан и Постановлениями Кабинета Министров Республики Узбекистан, своим Уставом и Программой.

Согласно Уставу Демократической партии «Национальное возрождение», источниками финансирования деятельности партии являются средства, выделяемые из государственного бюджета, членские взносы, пожертвования юридических и физических лиц и все прочие доходы, не противоречащие действующему законодательству.

На счета партии в 2025 году поступило 39 миллиардов 481 миллион сумов, из которых 249 000 сумов были получены.

В том числе 23 миллиарда 083 миллиона сумов, 65,1%, на расходы по заработной плате и аналогичным выплатам, а также на отчисления работодателя, 254 286 000 сумов, 0,7%, на командировочные расходы, 6 миллиардов сумов на расходы, связанные с программной деятельностью, 976 миллионов сумов, 19,7%, 807 миллионов 151 тысяча сумов, 2,3%, на расходы по основным средствам, 213 миллионов на стоимость запасов, 771 тысяча сумов, 0,6%, 3 миллиарда 045 миллионов сумов, 8,6%, были потрачены на коммунальные услуги; Прочие расходы составили 1 миллиард 050 миллионов сумов, или 3%. К концу года остаток на счетах партии составил 13 миллиардов 677 миллионов сумов.

Ожидается, что наши общие доходы от финансовой деятельности в 2026 году составят 56 миллиардов 218 миллионов сумов, и эти доходы планируется распределить следующим образом:

из общей суммы средств, выделенных из государственного бюджета:

-75,5% на заработную плату и эквивалентные выплаты сотрудникам всех уровней;

-15,3% на расходы, связанные с командировками, коммунальными услугами, содержанием, арендой и эксплуатацией партийного имущества;

-0,7% на закупку товаров; -4,5% на обучение партийных активистов, коммуникации и прочие расходы, связанные с интернетом;

-4,0% на закупку транспортных средств, мебели и офисного оборудования, а также компьютерной техники.

Планируется выделить 4,0% на закупку транспортных средств, мебели и офисной техники, а также компьютерного оборудования. В 2026 году запланированы следующие расходы, которые будут финансироваться из внебюджетных средств:

- 64,0% на заработную плату, премии, материальное обеспечение и связанные с этим средства сотрудников всех уровней;

- 7,3% на коммунальные услуги, содержание партийного имущества и операционные расходы;

- 9,2% на проведение партийных мероприятий, включая обучение партийных активистов, проведение круглых столов и собраний; - 8,2% на приобретение основных средств, включая автотранспортные средства, офисное оборудование, средства связи, мебель, товары;

- 11,0% выделено на прочие расходы, связанные с реализацией уставной деятельности партии.

Эти показатели были распределены после изучения потребностей центральных, региональных и местных организаций УзМТДП.

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ТУРИСТИЧЕСКИЕ ВОЗМОЖНОСТИ ПРИГРАНИЧНЫХ ТЕРРИТОРИЙ НИЖНЕАМУДАРЬИНСКОГО ЭКОНОМИЧЕСКОГО РЕГИОНА И ПУТИ ИХ РАЗВИТИЯ

Аннотация. *В статье на примере экономического региона Нижнего Аму-Дарьи проанализированы теоретико-методологические основы оценки туристического потенциала приграничных территорий и его развития. Также отмечено, что в регионе существует высокий туристический потенциал, однако недостаток инфраструктуры, экологические проблемы и слабость трансграничного сотрудничества препятствуют его полному раскрытию. На этой основе предложены практические рекомендации по устойчивому развитию туризма.*

Ключевые слова: *туристический потенциал, приграничный туризм, региональная взаимосвязанность, регион Нижнего Аму-Дарьи, трансграничное сотрудничество, экотуризм, туристическая инфраструктура.*

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TOURISM OPPORTUNITIES IN THE BORDER AREAS OF THE LOWER AMUDARYA ECONOMIC REGION AND WAYS OF THEIR DEVELOPMENT

Abstract. *Using the Lower Amu Darya economic region as an example, this article analyzes the theoretical and methodological foundations for assessing the tourism potential of border areas and its development. It also notes that the region possesses significant tourism potential; however, a lack of infrastructure, environmental issues, and weak cross-border cooperation hinder its full development. Based on these findings, practical recommendations for sustainable tourism development are proposed.*

Keywords: *tourism potential, cross-border tourism, regional connectivity, Lower Amu Darya region, cross-border cooperation, ecotourism, tourism infrastructure.*

Введение

В последние годы туристическая отрасль сформировалась как одна из наиболее быстро развивающихся сфер и стала одним из основных факторов, стимулирующих региональный экономический рост. По данным Всемирной туристской организации ООН, обслуживание каждого миллиона туристов способствует созданию напрямую и косвенно сотен рабочих мест. Доходы от туристической деятельности считаются важным источником формирования региональных бюджетов.

В состав экономического региона Нижний Амударья входят Хорезмская область и территории Республики Каракалпакстан, которые обладают уникальным потенциалом для развития туризма благодаря богатому историческому наследию, культурно-историческим объектам, ресурсам экотуризма, а также пограничному географическому положению. Определение, оценка и практическое эффективное развитие этого потенциала требует научно-теоретического и практико-обоснованного подхода. Поэтому формирование метода оценки туристического потенциала приграничных территорий на основе комплексного и научно-методологического подхода является актуальной задачей.

Теоретические основы темы

Сфера туризма считается эффективным механизмом для охраны культурного наследия, сохранения национальных ценностей и их пропаганды среди широкой общественности. В частности, развитие туризма в городах Хива, Бухара и Самарканд стимулирует активизацию работ по сохранению и реставрации исторических объектов. Кроме того, туризм укрепляет культурный обмен и социальную гармонию в обществе, способствует развитию толерантности и сотрудничества между различными народами и культурами, что также способствует повышению уровня жизни местного населения. Вопрос оценки туристического потенциала пограничных территорий сформировался как отдельное направление исследований в международной туристической географии и теории регионального развития. В мировой практике этот вопрос в основном исследуется через индексацию ресурсов, интегрированный геоинформационный анализ, оценку инфраструктурных возможностей, анализ рынка и трансграничной проходимости, а также с использованием моделей SWOT и PESTLE.

В международных научных исследованиях зарубежные авторы - Даллен Дж. Тимоти (2018), С. Майкл Холл (2020) и Г. Ричардс (2017) - оценивают приграничный туризм как «стратегический экономический драйвер, усиливающий региональную взаимосвязь». Приведённые зарубежные научные исследования раскрывают роль приграничного туризма не только как рекреационной деятельности, но и как комплексного экономического механизма, обеспечивающего региональное развитие. В частности, Д. Дж. Тимоти трактует приграничный туризм как средство активизации экономических, культурных и институциональных связей

между регионами, считая его важным фактором, углубляющим процессы интеграции в пограничных территориях. С. М. Холл в своих исследованиях анализирует приграничный туризм в тесной связи с региональным управлением, транспортно-логистическими системами и стратегиями устойчивого развития, научно обосновывая его значение для усиления региональной взаимосвязи. Также Г. Ричардс рассматривает приграничный туризм в рамках концепций креативной экономики и туризма, основанного на опыте, оценивая его как стратегический экономический драйвер, повышающий конкурентоспособность регионов и стимулирующий трансграничное сотрудничество. В целом, подходы этих авторов обосновывают приграничный туризм как важную научную категорию, способствующую укреплению региональной взаимосвязанности, диверсификации экономической активности и устойчивому развитию территорий.

Основная часть

Региональная интерконнективность — это комплексное понятие, отражающее взаимосвязанное и устойчивое развитие экономических, транспортных, инфраструктурных, социальных, культурных и институциональных связей между одним или несколькими регионами. В научных исследованиях это понятие рассматривается как важный фактор, обеспечивающий эффективное движение ресурсов, капитала, населения и потоков информации между регионами. Особенно, процесс развития туризма в приграничных регионах напрямую связан с уровнем региональной интерконнективности, которая формируется через транспортные возможности, институциональное согласование и механизмы трансграничного сотрудничества.

Туристическое развитие приграничных регионов определяется следующими основными факторами: (рис. 1).

Рис. 1. Факторы туристического развития приграничных территорий

В этом смысле, региональная интерконнективность является важным стратегическим условием для активизации туризма в приграничных территориях, диверсификации туристических потоков и обеспечения регионального устойчивого развития.

Развитие туризма в приграничной зоне Каракалпакстан-Казахстан напрямую связано с региональной интерконнективностью и трансграничным сотрудничеством (таблица 1).

Таблица 1

Основные факторы, определяющие развитие туризма в приграничной зоне Каракалпакстан-Казахстан

№	Группа факторов	Содержание и описание	На примере Каракалпакстана и Казахстана
1.	Транспортная и логистическая инфраструктура	Автомобильное, железнодорожное и воздушное сообщение, пограничные пункты	Пограничный пункт Коңырок (Тахиаташ) и автомобильная дорога Нукус–Коңырок увеличивают туристический поток
2.	Пограничные процедуры	Визовый режим, упрощение таможенного и паспортного контроля	Электронная виза и ускоренная регистрация на границе облегчают трансграничные путешествия
3.	Институциональное сотрудничество	Соглашения между соседними государствами и регионами, совместные программы.	Между территориями Каракалпакстана и Казахстана реализуются туристические маршруты и совместные экотуристические проекты
4.	Туристическая инфраструктура		Развитие гостиниц и хостелов в Нукусе и Муйнаке расширяет возможности размещения туристов
5	Культурные и природные ресурсы	Гостиница, хостел, гостевой дом, объекты питания и сервиса	Музей И. В. Савицкого, высохшие участки Аральского моря и казахские побережья Арала дают возможность формирования совместных туристических продуктов
6.	Социально-культурные факторы	Музеи, историческое наследие, природные ландшафты	Культурные сходства каракалпакского и казахского народов облегчают интеграцию в трансграничном туризме
7.	Безопасность и устойчивость	Культурная близость местного населения, традиции и язык	Стабильность в регионе повышает доверие туристов и обеспечивает безопасность для экстремального туризма
8.	Экологическое состояние	Политическая стабильность и общественная безопасность	Контроль экологического воздействия в районе Аральского моря важен для развития экотуризма
9.	Маркетинг и брендинг	Качество природной среды, экологические угрозы	Совместные туристические бренды Каракалпакстана и Казахстана увеличивают известность на международном туристическом рынке Местное население гостей
10.	Участие местного населения	Совместная реклама и трансграничный бренд	На примере Каракалпакстана и Казахстана

Особое значение имеют развитие транспортной и логистической инфраструктуры (Нукус–Казахстан автомобильная дорога, пограничный пункт Конгырок), программы институционального сотрудничества и активное участие местного населения для расширения туристических потоков и обеспечения устойчивости. Наряду с этим, экотуризм в Приаралье

и природные ландшафты на казахстанском побережье дают возможность создавать трансграничные туристические продукты и совместные эко-туристические маршруты. В частности, обеспечение экологической устойчивости, сохранение культурного наследия и повышение благосостояния местного населения можно также отслеживать через систему KPI.

Как известно, Д. Дж. Тимоти является одним из ведущих представителей туристической географии и теории устойчивого туризма, и в своих исследованиях он подчеркивал эффективность таких моделей индексации, как Cross-Border Tourism Index (CBTI) и Regional Tourism Integration Matrix, при оценке приграничных территорий. В отчетах UNWTO и OECD отмечается, что для развития приграничного туризма важны цифровизация, геоаналитические технологии, использование статистики Big Data, а также мониторинг потоков в режиме реального времени на пограничных пунктах. Кроме того, UNEP уделял особое внимание совершенствованию методов устойчивого управления экотуризмом, водными и сухопутными ресурсами и культурными территориями на приграничных территориях

В Центральной Азии по вопросам приграничного туризма были проведены работы такими авторами, как С. Кабиров, А. Алимов, Й. Маматкулов, основанные на методах параметризации и индексации. Они исследовали состояние трансграничной инфраструктуры между Казахстаном, Узбекистаном, Кыргызстаном и Туркменистаном, а также практическую ценность концепций «Один маршрут — два государства», «Silk Road tourism belt» (Туристический пояс Шелкового пути). Особенно потенциал туризма в Хорезмской области и Каракалпакстане в международных исследованиях оценивается как уникальный туристический кластер Центральной Азии благодаря историческому наследию, археологическим курганам, экосистеме Приаралья и этническим туристическим ресурсам. В анализах Inproforum и Программы регионального экономического сотрудничества Центральной Азии (CAREC) этот регион отмечается как важная точка формирования трансграничного туризма.

В последние годы в регионе Нижняя Амударья исследования, направленные на комплексную оценку туристического потенциала, значительно активизировались. В частности, на примере Хорезмской области были проведены научные работы, посвященные анализу Ичан-кала (объект, включенный в Список Всемирного наследия ЮНЕСКО), археологического комплекса Эллик-кала, экотуристических возможностей природных ландшафтов вдоль Амударьи, а также состояния транспортных маршрутов и гостиничной инфраструктуры. Наряду с этим в Республике Каракалпакстан проводились исследования, направленные на изучение Эко-системы Аральской зоны, туристического потенциала города Муйнок, а также туристической привлекательности этнокультурных районов. В

местных научных исследованиях широко применялись методологические подходы, такие как индексирование туристических ресурсов, картографический анализ (ГИС), расчет коэффициентов туристической привлекательности и оценка степени оснащенности инфраструктурой.

В Хорезмской области в 2023–2024 годах количество туристических фирм и организаций увеличилось с 22 до 28. В Республике Каракалпакстан этот показатель, наоборот, снизился с 13 до 9. Кроме того, в эти годы общее число посетителей в Хорезмской области выросло с 480,6 тыс. человек до 497,5 тыс. человек, а в Каракалпакстане — с 9,7 тыс. до 18,4 тыс. человек. К 2025 году увеличилось количество новых туристических объектов и субъектов, предоставляющих услуги — хостелов, гостиниц, турагентств и туроператоров. Эта ситуация свидетельствует о поэтапном развитии инфраструктуры и рынка туристических услуг в регионе. В 2024 году экспортный потенциал туризма Хорезмской области оценивался в 2 млрд долларов США. Однако фактические показатели того года не отражали полного привлекательного потенциала региона. Согласно официальным данным, в Хорезм приехало почти 1,3 млн иностранных туристов, но экспорт туризма не достиг уровня 400 млн долларов. Что касается Республики Каракалпакстан, то в январе-июле 2025 года — 199,3

Согласно данным, в Хорезмской области официально зарегистрировано 263 объекта культурного наследия. В 2025 году был разработан новый трансграничный туристический маршрут по направлению Туркменистан – Хорезм – Каракалпакстан – Казахстан, охватывающий более 15 объектов исторической и экологической значимости и способствующий укреплению межрегионального сотрудничества. Богатая база культурно-исторического наследия и новые трансграничные маршруты позволяют значительно повысить туристический потенциал региона. Особенно ценными эти ресурсы являются при формировании транснациональных туристических кластеров и комплексных маршрутов в приграничных регионах.

Согласно описанию индекса туристического потенциала (TPI) для региона Нижней Амударьи, культурно-исторические, экотуристические и трансграничные возможности региона оцениваются как очень хорошие, однако отмечаются проблемы, связанные с инфраструктурой, экологической устойчивостью и сервисами размещения.

Развивать туристический потенциал региона Нижней Амударьи

S - Сильные стороны	**W - Слабые стороны**
Объекты Всемирного наследия ЮНЕСКО (Хива, Ичан-Кала).	Количество гостиниц и гостевых домов недостаточно.
Уникальная культура, национальное гостеприимство.	Качество расположения и стандарты обслуживания нестабильны.
Историческое богатство туристических маршрутов.	Квалификация обслуживающего персонала недостаточна.
Природные ландшафты: Приаралье, возможности для экотуризма.	Транспортная логистика полностью не развита (автобусы, рейсы, направления).
Безопасный и спокойный регион.	Туристические информационные центры недостаточны.
Природные ландшафты: Приаралье, возможности для экотуризма.	Транспортная логистика полностью не развита (автобусы, рейсы, направления).
Безопасный и спокойный регион.	Туристические информационные центры недостаточны.
O - Возможности	T - Риски и угрозы
Развитие экотуризма и этнотуризма.	Экологические проблемы (катастрофа Арала) отрицательно влияют на имидж региона.
Проекты по модернизации инфраструктуры.	Усиление международной конкуренции.
Расширение туристического коридора Хива–Бухара–Самарканд.	Экономическая нестабильность и рост расходов на путешествия.
Диверсификация сегмента проживания: хостелы, гостевые дома, семейный туризм.	Недостаток природных ресурсов (вода, экология).
Цифровой туризм, усиление онлайн-бронирования и маркетинга.	Из-за высокой сезонности поток туристов нестабилен.

Наличие в регионе более 263 объектов культурного и исторического наследия показывает его высокую роль в формировании туристической привлекательности. Создание новых трансграничных туристических направлений и пограничное расположение территории усиливают возможность создания единого туристического кольца и совместных маршрутов с соседними государствами. Кроме того, через сотрудничество с соседними регионами и территориями существует возможность расширения видов туристической продукции (эко-, этно-, гастрономического, исторического туризма).

В то же время, инфраструктура размещения в зоне Нижнего Амударьи недостаточна. Покрытие гостиницами и хостелами низкое. Особенно в Хорезмской области наблюдается тенденция сокращения числа гостиниц. Поток туристов и реальный экспорт туризма остаются на низком уровне, несмотря на высокий потенциал региона.

Экологическая ситуация в регионе негативная. Экологические проблемы, связанные с Приаральем, ограниченность водных ресурсов и угрозы сохранению природных пейзажей оказывают негативное влияние на устойчивый туристический потенциал региона. Однако трансграничные

туристические маршруты и сотрудничество («Туркменистан – Хорезм – Каракалпакстан – Казахстан» маршрут) создают большие возможности для выхода на новые международные рынки и увеличения туристических потоков. Государством разрабатываются стратегия и инвестиционные поддерживающие меры на 2025–2030 годы в области туристической инфраструктуры, подготовки кадров, цифровых и маркетинговых программ. Через диверсификацию экотуризма, историко-культурных, этнических и гастрономических направлений можно повысить конкурентоспособность туристических продуктов. Экологическая деградация, проблемы с водоснабжением и состояние экосистемы Приаралья представляют долгосрочную угрозу для развития туризма. Транспортная логистика, ограничения на границе и в визовом режиме, а также бюрократические проблемы трансграничного туризма.

Государственная политика в сфере туризма, опираясь на национальную стратегию развития туризма на 2025–2030 годы, охватывает системные и комплексные меры, направленные на развитие приграничных территорий и трансграничной дорожной инфраструктуры, привлечение инвестиций, а также поддержку туристической отрасли.

Экономические факторы выражаются в стабильном росте потока капитальных вложений в гостиничное хозяйство и сектор услуг, которые являются составной частью туристической индустрии, институциональном формировании новых предпринимательских структур в рамках отрасли, расширении потенциала внешнеэкономической деятельности через экспорт туристических услуг и возможностях диверсификации устойчивых источников дохода на основе туризма в региональной экономической системе.

Социально-культурные факторы включают сохранение объектов культурного и исторического наследия и эффективное их использование в качестве туристических ресурсов, поддержку народных ремесел и традиционной культуры, межнациональный туризм

Технологические и инфраструктурные факторы охватывают возможности модернизации туристической инфраструктуры, совершенствования транспортной и гостиничной сети, повышения качества обслуживания, цифровой трансформации отрасли через интернет и маркетинговые инструменты, а также глобальные цифровые платформы. Эти факторы обеспечивают интеграцию туризма с современными технологиями и цифровыми сервисами, что, в свою очередь, повышает эффективность туристических продуктов и их международную конкурентоспособность.

Выводы и практические рекомендации. В заключение, Нижнеамударьинский регион, включая Хорезмскую область и Республику Каракалпакстан, богат культурным и историко-архитектурным наследием, а также уникальными природными ресурсами, и его приграничное географическое расположение создает большие возможности для развития трансграничного и регионального туризма. Согласно индексам,

статистическим показателям и результатам эмпирического анализа, этот регион можно оценить как территорию с высоким туристическим потенциалом. Вместе с тем, устойчивый туристический о.

Практические рекомендации по развитию туристических возможностей приграничных территорий Нижнего Амударьи: 1. Развитие туристической инфраструктуры – расширение объектов, расположенных в Хорезме и Каракалпакстане (гостиницы, хостелы, гостевые дома), а также деятельности туристических агентств и туроператоров, создание удобной среды для туристов через стандартизацию качества услуг. 2. Внедрение экологически устойчивого туризма – внедрение стандартов устойчивого туризма с учетом экологических рисков в Приаральском регионе, усиление экологического мониторинга и защита природных ландшафтов. 3. Расширение трансграничного туристического сотрудничества – формирование интегрированных туристических маршрутов с государствами Центральной Азии, упрощение визовых и пограничных процедур и разработка совместных туристических продуктов. 4. Усиление маркетинга и международной пропаганды – продвижение Хорезма и Каракалпакстана на международном рынке как туристических направлений с высоким культурным и природным потенциалом.

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ЭКОНОМИЧЕСКАЯ И СОЦИАЛЬНАЯ ГЕОГРАФИЯ: ТЕОРЕТИЧЕСКИЕ ПРИНЦИПЫ И ЕЁ РОЛЬ В ОБРАЗОВАТЕЛЬНОМ ПРОЦЕССЕ

Аннотация. *В статье рассматриваются теоретические основы экономической и социальной географии, а также история её формирования и преподавания. Освещаются научные взгляды и исследования учёных, внесших значительный вклад в развитие данной научной области. Подчеркивается, что сведения экономико-географического характера существовали на территории современной Центральной Азии ещё с древних времён. Раскрываются особенности становления экономической и социальной географии как самостоятельной научной дисциплины, её предмет, объект исследования и основные научные направления. Особое внимание уделено роли данной науки в системе современного образования, её значению в формировании пространственного мышления, аналитических навыков и научного мировоззрения у обучающихся.*

Ключевые слова. *Экономическая география, социальная география, политическая и рекреационная география, география человека, эволюционный процесс, дифференциация, интеграция.*

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ECONOMIC AND SOCIAL GEOGRAPHY: THEORETICAL PRINCIPLES AND ITS ROLE IN THE EDUCATIONAL PROCESS

Annotation: *This article examines the theoretical foundations of economic and social geography, the history of its formation and development, and its role in the educational process. The scientific views and research of scholars who contributed significantly to the development of this field are analyzed. The article highlights that economic-geographical knowledge existed in Central Asia since ancient times. Particular attention is paid to the role of this discipline in the modern education system and its importance in developing spatial thinking and analytical skills among students.*

Key words: *Economic geography, social geography, political and recreational geography, human geography, evolutionary process, differentiation, integration.*

ВВЕДЕНИЕ

Экономическая и социальная география является одной из важнейших отраслей географической науки, изучающей закономерности размещения населения, хозяйства и социальных процессов на различных территориях. Данная научная дисциплина играет значительную роль в формировании научного мировоззрения, пространственного мышления и аналитических способностей обучающихся.

Современное развитие общества, процессы глобализации экономики и усиление региональных взаимосвязей требуют глубокого изучения социально-экономических процессов в пространственном аспекте. В связи с этим возрастает значение экономической и социальной географии как научной дисциплины и учебного предмета.

Экономическая география изучает хозяйственную специализацию территорий, их экономический потенциал, а также географические различия в социальной жизни населения. Одной из особенностей данной науки является её междисциплинарный характер, поскольку она объединяет знания географии и экономики.

Теоретические основы экономической и социальной географии. Экономическая и социальная география исследует пространственные закономерности размещения хозяйственной деятельности, населения и социальных процессов. Основной задачей данной науки является выявление факторов, влияющих на территориальную организацию общества.

В разные исторические периоды и в различных странах данная наука имела различные названия. Первоначально она называлась «экономическая география», затем — «экономическая и социальная география», а в настоящее время нередко используется более широкое понятие — «география человека».

Объект исследования экономической географии со временем значительно расширился. Если первоначально изучались хозяйство и население отдельных стран или регионов, то впоследствии внимание было сосредоточено на территориальной структуре хозяйства, населении и территориальных социально-экономических комплексах.

Теоретические основы экономической и социальной географии формировались на протяжении длительного времени. Основу данной науки составляют учения о территориальном разделении труда и экономическом районировании. Эти направления сыграли важную роль в становлении экономической географии как самостоятельной научной дисциплины.

История формирования науки Термин «экономическая география» впервые был использован выдающимся русским учёным М. В. Ломоносовым в XVIII веке. Однако как самостоятельная научная дисциплина она сформировалась значительно позже. По мнению Ю. Г. Саушкина, термин «экономическая география» за рубежом впервые был применён немецким учёным В. Готцем. В дальнейшем большой вклад в развитие теории

размещения хозяйства внесли такие учёные, как Альфред Вебер, Иоганн Тюнен, Вальтер Кристаллер и Август Лёш.

Особую роль в развитии экономической географии сыграли исследования немецкого учёного Фридриха Ратцеля, который разработал основы антропогеографии и политической географии. Значительное влияние на развитие науки оказала теория размещения производительных сил.

Развитие экономической географии в центральной азии и узбекистане

Сведения экономико-географического характера существовали на территории современного Узбекистана ещё с древних времён. Они встречаются в трудах таких выдающихся мыслителей, как Абу Райхан Беруни, Мирзо Улугбек, Захириддин Бабур и Махмудходжа Бехбудий.

После эпохи Великих географических открытий мировое пространство стало рассматриваться как единая географическая система. Это способствовало развитию научных исследований, направленных на изучение геоэкономических и геополитических процессов.

История развития экономической географии в Узбекистане тесно связана с периодом существования Советского Союза. В этот период значительную роль сыграли исследования учёных Ташкентского государственного университета. В 1940 году здесь была создана кафедра экономической географии, где проводились крупные научные исследования социально-экономического развития различных регионов республики.

Роль экономической и социальной географии в образовательном процессе

Экономическая и социальная география занимает важное место в системе географического образования. Она способствует формированию у студентов системного понимания пространственной организации общества и хозяйства.

Изучение данной дисциплины способствует развитию аналитического мышления, умения работать со статистическими данными, картографическими материалами и географическими информационными системами. Особое значение имеет использование современных образовательных технологий и интерактивных методов обучения.

Заключение

Экономическая и социальная география является важной научной дисциплиной, изучающей пространственные закономерности развития общества и хозяйства. Её теоретические основы позволяют глубже понять процессы территориальной организации экономики и населения.

В образовательном процессе данная дисциплина играет важную роль в формировании пространственного мышления, аналитических навыков и научного мировоззрения у обучающихся. Совершенствование методики преподавания экономической и социальной географии является важной задачей современной географической науки и образования.

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ПРОБЛЕМЫ ОЦЕНКИ КАЧЕСТВА И КОЛИЧЕСТВА ТРУДА В ПРОЦЕССЕ УПРАВЛЕНИЯ ЧЕЛОВЕЧЕСКИМИ РЕСУРСАМИ В МАЛЫХ ПРЕДПРИЯТИЯХ

Аннотация. *Статья посвящена проблемам оценки качества и количества труда в системе управления человеческими ресурсами малых предприятий. Актуальность темы определяется тем, что малый бизнес сильно зависит от вклада каждого работника, но обычно не располагает формализованной системой оценки и достаточным массивом данных для доказательных HR-решений. Цель исследования - выявить ключевые барьеры объективной оценки труда и предложить компактную модель, применимую в условиях небольшой численности персонала.*

Ключевые слова: *управление человеческими ресурсами, малые предприятия, оценка труда, качество труда, количество труда, HR-аналитика, производительность.*

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PROBLEMS OF ASSESSING THE QUALITY AND QUANTITY OF LABOR IN THE PROCESS OF HUMAN RESOURCE MANAGEMENT IN SMALL ENTERPRISES

Abstract. *The article is devoted to the problems of assessing the quality and quantity of labour within the human resource management system of small enterprises. The relevance of the topic is determined by the fact that small businesses strongly depend on the contribution of each employee, but usually do not have a formalized appraisal system and a sufficient data base for evidence-based HR decisions. The purpose of the study is to identify the key barriers to objective labour assessment and to propose a compact model suitable for small teams.*

Keywords: *human resource management, small enterprises, labour assessment, quality of labour, quantity of labour, HR analytics, productivity.*

Малые предприятия занимают особое место в экономике, поскольку сочетают гибкость хозяйственных решений, высокую чувствительность к изменениям спроса и значительную зависимость конечного результата от качества труда конкретных работников. Официальные и международные источники подтверждают устойчивую роль сектора малого бизнеса в структуре экономики и занятости, что делает вопросы управления человеческими ресурсами практически значимыми.

Однако именно в малом бизнесе оценка труда чаще всего остается неформализованной. Руководитель ориентируется на общее впечатление о работнике, тогда как современный HR-подход требует сопоставимых показателей, позволяющих связывать результат труда с оплатой, обучением и кадровыми решениями. Цель исследования состоит в выявлении основных проблем оценки качества и количества труда и в обосновании компактной модели оценки, пригодной для применения без сложной цифровой инфраструктуры.

Оценка труда рассматривается как элемент общей системы управления человеческими ресурсами, связанной с оплатой, мотивацией, обучением и удержанием персонала, при использовании в качесве источников, как трудовое законодательство Республики Узбекистан, международные аналитические материалы и научные публикации по HR-аналитике и оценке трудового вклада.

Количество труда отражает объем выполненной работы за определенный период: отработанное время, число операций, объем продаж, число завершенных задач или соблюденных сроков. Качество труда показывает полезность результата: точность исполнения, отсутствие брака, соблюдение стандартов, надежность, удовлетворенность клиента и самостоятельность работника. Для малого предприятия эти показатели должны применяться совместно: большой объем работы при множестве ошибок не означает эффективности, так же как и формально высокое качество при крайне низкой интенсивности труда.

Первая проблема оценки труда заключается в сложности трудовых функций. На малом предприятии один сотрудник нередко совмещает несколько ролей, поэтому трудно выбрать единственный показатель результативности. Вторая проблема связана с дефицитом данных: обычно отсутствуют полные сведения о производительности, ошибках, жалобах и трудозатратах, вследствие чего оценка строится на памяти руководителя. Третья проблема состоит в смешении индивидуального и коллективного результата, когда успех создается небольшой командой и не может быть механически приписан одному человеку.

Не менее важной является проблема субъективности. Руководитель может переоценивать лояльность, внешнюю активность или удобство

коммуникации и одновременно недооценивать скрытые издержки, возникающие из-за ошибок, возвратов и необходимости постоянного контроля. В результате премирование и кадровые решения становятся непрозрачными, а сама система оценки перестает выполнять мотивирующую функцию.

С учетом указанных ограничений для малого предприятия целесообразно использовать компактную интегрированную модель. По каждой трудовой роли закрепляются 2-3 количественных показателя и 2-3 качественных критерия, после чего применяется корректирующий коэффициент, учитывающий сезонность, сложность задач и командный вклад. Такой подход не требует дорогостоящей HR-платформы, но делает оценку более сопоставимой и управляемой.

Практическая ценность предлагаемой модели состоит в том, что она позволяет связывать оценку труда с конкретными HR-решениями. Если количество труда высоко, а качество низко, необходимы обучение и пересмотр стандартов. Если качество приемлемо, но количественные показатели отстают, требуется анализ нагрузки и распределения функций. Следовательно, даже простая электронная таблица с ежемесячным обновлением данных способна повысить объективность кадрового управления и снизить зависимость предприятия от интуитивных решений руководителя.

Таким образом, основные проблемы оценки качества и количества труда в малых предприятиях обусловлены размытостью функций, дефицитом данных, смешением индивидуального и коллективного результата и высокой субъективностью управленческой оценки. Наиболее рациональным решением является внедрение компактной интегрированной модели, основанной на ограниченном наборе количественных и качественных показателей и корректирующих коэффициентах. Такая система соответствует логике современного управления человеческими ресурсами и может использоваться малым предприятием как практический инструмент справедливого премирования, обучения и кадровых решений.

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НАУЧНЫЕ И ТЕОРЕТИЧЕСКИЕ ОСНОВЫ ИССЛЕДОВАНИЙ В ОБЛАСТИ ГАСТРОНОМНОГО ТУРИЗМА

Аннотация: *В данной статье всесторонне проанализированы научно-теоретические основы исследования гастрономического туризма. Раскрыта сущность, концепция и этапы формирования гастрономического туризма, подчеркнута его роль и значение в туристической индустрии. В ходе исследования с научной точки зрения оценены местные продукты питания, пищевая культура, национальные традиции и их роль в повышении туристической привлекательности. Также проанализированы факторы, влияющие на развитие гастрономического туризма, основные научные подходы и методы исследования, используемые в его изучении. Результаты статьи имеют теоретическое и практическое значение для расширения научных исследований в области гастрономического туризма и устойчивого развития регионального туризма.*

Ключевые слова: *гастрономический туризм, wine туризм, Street food туризм, cooking classlar, гастрономические фестивали, кейтеринговый туризм, кулинарный туризм, агротуризм, этнотуризм***.**

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SCIENTIFIC AND THEORETICAL BASIS OF RESEARCH IN THE FIELD OF GASTRONOMY TOURISM

Abstract: *This article provides a comprehensive analysis of the scientific and theoretical foundations of gastronomic tourism research. It explores the essence, concept, and stages of its development, highlighting its role and significance in the tourism industry. The study provides a scientific assessment of*

local food products, food culture, and national traditions, as well as their role in enhancing tourist appeal. It also analyzes the factors influencing the development of gastronomic tourism, as well as the main scientific approaches and research methods used in its study. The article's findings have theoretical and practical implications for expanding scientific research in the field of gastronomic tourism and the sustainable development of regional tourism.

Keywords: *Gastronomic tourism, wine tourism, street food tourism, cooking classlar, gastronomic festivals, catering tourism, culinary tourism, agritourism, ethnotourism.*

Гастрономический туризм - это вид путешествия, главная цель которого - знакомство с культурой, историей и традициями страны или региона через национальные блюда и местную кухню. В рамках этого туризма туристы могут дегустировать блюда не только в ресторанах, но и на рынках, фермах, в местных домах, участвовать в кулинарных мастер-классах и наблюдать за процессами производства продуктов питания. Его основные виды делятся на агротуризм (фермы, виноградники), городской гастротуризм (рестораны, продуктовые магазины) и другие. Важность гастрономического туризма повышает туристическую привлекательность страны или региона, способствует популяризации национальной культуры и традиций народов, развитию местной экономики и предпринимательства, а также создает уникальные и запоминающиеся впечатления для туристов.

Гастрономический туризм в основном делится на два типа: агротуризм (полевая гастрономия), который включает в себя выращивание, сбор и дегустацию натуральных продуктов (фруктов, овощей, винограда) в сельской местности, и городской гастрономический туризм, в рамках которого посещаются и пробуются местные рестораны, продуктовые магазины, места, где готовят национальные блюда, а также дегустируются местные напитки (айрон, кимиз, сок).

Дополнительные направления (часто включены в вышеуказанные туры):

- Wine туризм (виноделие): посещение виноградников, наблюдение за процессом виноделия и дегустация вин.
- Street food туризм, связанный с уличной едой: дегустация уличной еды, обучение навыкам местных поваров.
- Cooking classlar (кулинарные мастер-классы): обучение приготовлению местных блюд своими руками.
- Фестивали еды (фестивальный туризм): участие в мероприятиях, где представлены различные блюда и продукты (Фестиваль дыни, Международный фестиваль национальных блюд «Вкусный Узбекистан», «Ферганский гастрономический фестиваль» и др.).

Гастрономический туризм - это отдельная область туризма, и для понимания его сущности, целей и задач необходимо прежде всего в полной мере осознать истинную сущность туризма.

Гастрономический туризм, в частности, возник как новое направление в туризме, привлекшее внимание в конце XX и начале XXI веков. Термин «гастрономия» (происходящий от греческого слова «Στομάχι» - желудок) изучает взаимосвязь между едой и культурой и рассматривает наиболее полное понятие гастрономического туризма, дисциплины, связанной с этой областью, как это было предложено В.В.Баевым и Д.И.Басюком [1].

В то время как кулинария (лат. culrna - кухня) - это область деятельности, связанная с приготовлением пищи, которая включает в себя набор технологий, оборудования и рецептов и является частью гастрономии. Термин «кулинарный туризм» был введен в 1998 году Люси Лонг, доцентом кафедры народной культуры в Bowling Green State universiteti (Огайо, США). В 2003 году Эрик Вольф основал Международную ассоциацию кулинарного туризма [2].

По мнению ученых Г.С.Холла, М.С.Митчелла и А.В.Ричардса, «кулинарный туризм» может создать чудесную атмосферу во время путешествия, что очень важно для незабываемых впечатлений, а также сформировать сильный образ страны и народа, используя уникальные особенности меда и культурные ценности. Профессор Р. Кивел описывает гастрономический туризм не просто как путешествие, но и как столкновение культур, в то время как исследователь Г.С. Холл определяет гастрономический туризм как основной и второстепенный опыт для производителей продуктов питания на гастрономических фестивалях, в ресторанах и барах, который является «главной мотивацией для путешествия».

Люси Лонг отметила, что люди знакомятся с другими культурами через местную кухню. Это заложило основу для развития гастрономического туризма как отдельного вида туризма. Ранее главной целью путешественников было не изучение кулинарной культуры принимающей страны. Однако такие путешественники, как Марко Поло и Афанасий Никитин, описывали свою местную кухню, среди прочих впечатлений.

Винные туры, или энотуры, впервые появились в ведущей винодельческой стране - Франции. Энотуризм - это вид туризма, который знакомит путешественников с национальными традициями виноделия и потребления вина. Название «энотуры» происходит от понятия «энология» - науки о вине. Первый институт энологии появился во Франции в 1905 году в регионе Шампань.

Многие путешественники отправляются в специальные гастрономические и дегустационные туры по разным странам, чтобы познакомиться с национальными блюдами. Во время таких поездок они принимают участие в местных мероприятиях, словно становясь участниками фольклорных фестивалей. В Германии и Чехии невозможно не посетить и не продегустировать вина, а во Франции - и винодельни. Предложение специальных легких закусок, особенно к вину, является важным аспектом гастрономического туризма, отличающим его от других регионов. При

анализе факторов развития гастрономического туризма в европейских странах отмечается, что в Центральной Азии или Узбекистане отсутствует гармонизация в предоставлении услуг. В Европе цены на семейный отдых или дегустацию еды высоки, то есть услуги для монотуризма стоят дорого.

Научные труды ряда зарубежных ученых посвящены изучению гастрономического туризма, они пытались раскрыть сущность гастрономического туризма. Следует отметить, что среди российских ученых в развитие этого вида деятельности в некоторых регионах страны внесли свой вклад такие специалисты, как Д.Басюк, Т.Куклина, Г.Вишневская, С.Саламатина, А.Александрова, Е.Стельмах [11].

Цель гастрономических туров - насладиться уникальными особенностями кухни той или иной страны. Однако эта цель не ограничивается дегустацией экзотических блюд или бесчисленного множества кулинарных изысков. Важность этого вида туризма неразрывно связана с знакомством с местными рецептами, которые веками укоренились в кулинарной культуре местных жителей, в связи с их традициями и менталитетом [3].

В 1998 году ученые из Университета Боулинг-Грин (США) впервые ввели в науку термин «кулинарный туризм», то есть искусство кулинарии. В 2003 году была создана Международная ассоциация гастрономического туризма, которая предложила использовать термин «гастрономический туризм» с 2012 года [7].

Э. Вольф определил концепцию гастрономического туризма следующим образом: гастрономический туризм - это поиск и наслаждение новыми продуктами, кулинарными изысками в других странах и их местоположении, то есть в стране, на соседней улице, в новом кафе или за границей. Потому что тогда вы сами можете познакомиться с новым продуктом. Путешествие - это не просто прогулка по родному городу, улице, региону, соседним республикам, длительные поездки в другие страны, его суть - движение. Поэтому все люди, которые находятся в движении и, соответственно, время от времени употребляют пищу, являются гастрономическими туристами. Н.Е.Нехаева и Ю.С.Терехова определяют гастрономический туризм как особый вид туризма, направленный на знакомство с местной кухней, традициями, технологическими особенностями приготовления пищи, блюдами, а также на расширение знаний и совершенствование навыков [6].

Гастрономический туризм - это вид деятельности, целью которого является ознакомление с этнической кухней страны или региона, ее основными продуктами, особенностями кулинарного искусства, а также повышение уровня знаний в этой области, - определяет С.Е.Саламатина.

Гастрономический туризм - это туристическая поездка в какое-либо место с целью ознакомления с местной кухней континентов и стран с её уникальными особенностями, обычаями, связанными с приготовлением пищи, блюдами и продуктами с неповторимым вкусом [4]. В этом случае

туристы, скорее всего, заинтересуются не только вкусом еды и продуктов, напитков, но и аспектами, связанными с блюдами и специями, используемыми в кулинарии [5].

Была подробно разъяснена суть термина «гастрономия», поскольку это составная часть туризма, цель которой – ознакомление с этнической кухней страны или региона, ее основными продуктами, особенностями кулинарного искусства, а также повышение уровня знаний в этой области.

Гастрономический туризм - это вид туризма, предполагающий перемещение людей из разных стран мира, включая сельский, городской и гастрономический монокультурный туризм (мед, вино, агропродукция, рыба, кофе, чай, сыр, фрукты и ягоды), в места их постоянного проживания. Проведенные исследования показали, что национальные блюда никого не оставляют равнодушным, и следует также отметить, что география кулинарии безгранична, а с появлением новых современных вкусов, разнообразия блюд, спрос на них в определенных регионах и странах возрастает, такие факторы, как развитие гастрономического туризма, как результат ряда других факторов, были подробно рассмотрены.

Гастрономический туризм А.Е.Матчановой - это вид путешествия по странам и континентам с целью дегустации блюд и знакомства с кулинарными традициями для изучения специфики местной кухни [8].

Подводя итог вышесказанному, мы определили гастрономический туризм следующим образом: под гастрономическим туризмом понимается путешествие по регионам и странам с целью узнать об истории происхождения национальных блюд, связанных с условиями жизни местного населения, понаблюдать и попробовать процессы приготовления пищи, познакомиться с кулинарными традициями народов, а также изучить и освоить их уникальные особенности.

Экономические и географические аспекты гастрономического туризма включают в себя создание уникальных кулинарных предложений, основанных на географическом положении и природных ресурсах региона, развитие региональной экономики за счет создания рабочих мест, стимулирования местного производства и повышения доходов, а также развитие инфраструктуры (дороги, гостиницы, рестораны) и поддержку культурных традиций, связанных с едой. Эти аспекты являются основой для успешного развития этого вида туризма и его конкурентоспособности на мировом рынке.

При развитии гастрономического туризма следует уделять основное внимание географическим факторам региона. В частности, факторам природных ресурсов, доступности местной продукции (фруктов, овощей, морепродуктов, вина и т. д.) и ее географическому происхождению являются главные факторы привлекательности гастрономического туризма. А местоположение региона влияет на климат, характер продукции и ее кулинарные традиции.

Экономические факторы региона заключаются в том, что гастрономический туризм стимулирует местную экономику, поддерживая фермеров, виноделов и других местных производителей продукции, а также рестораны и кафе, способствуя развитию местного бизнеса. Кроме того, развитие этого вида туризма приводит к созданию новых рабочих мест в гостиничном, ресторанном и сервисном секторах, а туристы, посещающие регион, чтобы попробовать местную кухню, тратят деньги на гастрономические услуги, сувениры и еду, что увеличивает доходы региона. Среди культурных факторов гастрономический туризм способствует сохранению и популяризации национальных кулинарных традиций, рецептов и обычаев, связанных с едой, а проведение кулинарных фестивалей, ярмарок и других мероприятий помогает привлекать туристов и создавать неповторимую атмосферу.

Таким образом, экономические и географические факторы играют ключевую роль в формировании конкурентных преимуществ региона в сфере гастрономического туризма, делая его привлекательным для туристов и способствуя устойчивому развитию региона.

Заключение

В результате проведенных исследований было установлено, что гастрономический туризм является самостоятельным, перспективным и стратегически важным направлением развития туристической индустрии страны. Он способствует повышению привлекательности региона для туристов, опираясь на культурное наследие регионов, национальные кулинарные традиции и местную продуктовую базу. Гастрономический туризм не только обогащает цель путешествия, но и является важным фактором развития региональной экономики, поддержки малого бизнеса и семейного предпринимательства, а также обеспечения занятости населения.

Исследование подтвердило необходимость комплексного подхода к изучению гастрономического туризма, включающего географический, экономический, культурный и социологический аспекты. Эти подходы позволят выявить региональные особенности кухни, баланс туристического спроса и предложения, сохранить национальное кулинарное наследие и факторы, влияющие на потребительскую культуру. Научно-теоретический анализ показал, что гастрономический туризм неразрывно связан с концепцией устойчивого развития. Использование местных продуктов, приготовление экологически чистых блюд и сохранение традиционных кулинарных технологий обеспечивают экологическую и социальную устойчивость туризма. Это способствует сохранению национального культурного наследия и его передаче будущим поколениям. Кроме того, гастрономический туризм играет важную роль в региональном брендинге и диверсификации туристических продуктов. Научно доказано, что увеличение потока туристов возможно за счет включения в туристические маршруты дегустаций национальной кухни, фестивалей еды и гастрономических мероприятий.

В заключение, научно-теоретическое изучение гастрономического туризма способствует повышению туристического потенциала регионов, популяризации национальной культуры и обеспечению экономической стабильности. Проведение систематических исследований в этой области, внедрение инновационных подходов и разработка цифровых платформ позволят вывести развитие гастрономического туризма на новый уровень.

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ОРГАНИЗАЦИОННО-МЕТОДИЧЕСКОЕ ОБЕСПЕЧЕНИЕ ЦЕНТРА ОЦЕНКИ

Аннотация: *в статье рассматриваются организационные и методические аспекты создания центра оценки как инструмента оценки персонала, раскрывается понятие организационно-методического обеспечения, его структура и этапы разработки, анализируются требования к разработке оценочных процедур, подготовке асессоров и интерпретации результатов.*

Ключевые слова: *центр оценки, организационно-методическое обеспечение, оценка персонала, асессоры, компетенции.*

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ORGANIZATIONAL AND METHODOLOGICAL SUPPORT OF THE ASSESSMENT CENTER

Abstract: *The article discusses the organizational and methodological aspects of creating an assessment center as a tool for personnel assessment, reveals the concept of organizational and methodological support, its structure and development stages, and analyzes the requirements for developing assessment procedures, training assessors, and interpreting the results..*

Keywords: *assessment center, organizational and methodological support, personnel assessment, assessors, competencies.*

В условиях современной экономики, характеризующейся дефицитом квалифицированных кадров, высокой конкуренцией на рынке труда и динамичностью внешней среды, возрастает потребность организаций в объективных и надежных методах оценки персонала. Особенно остро эта потребность проявляется при решении таких задач, как отбор кандидатов на руководящие должности, формирование кадрового резерва, оценка управленческого потенциала и планирование карьеры.

Центр оценки (assessment center) является одним из наиболее валидных и надежных методов комплексной оценки персонала, доказавшим свою эффективность в мировой и российской практике. Однако высокая эффективность центра оценки достижима только при условии качественного организационно-методического обеспечения его деятельности.

Организационно-методическое обеспечение центра оценки представляет собой совокупность взаимосвязанных элементов, регламентирующих и поддерживающих процессы планирования, проведения, анализа и документирования результатов оценочных процедур.

В структуре организационно-методического обеспечения можно выделить пять компонентов[59] (см. рисунок 1).

Рисунок 1 – Структура организационно-методического обеспечения центра оценки

1. Нормативно-правовое обеспечение включает пакет внутренних документов организации, регламентирующих деятельность центра оценки. К таким документам относятся: положение о центре оценки, регламенты проведения оценочных сессий, формы документов для фиксации результатов, а также документы, обеспечивающие соблюдение требований законодательства о персональных данных (согласия участников на обработку данных, политика конфиденциальности). Наличие четкой

[59] Базаров Т.Ю. Технология центров оценки персонала: процессы и результаты. — М.: Когито-Центр, 2020. — С. 45–47.

нормативной базы является необходимым условием легитимности оценочных процедур.

2. Методическое обеспечение составляет ядро центра оценки. Оно включает: модель компетенций (перечень компетенций, их описание и поведенческие индикаторы); оценочные инструменты (кейсы, сценарии групповых дискуссий, ролевых игр, презентационных заданий); шкалы и критерии оценки; процедуру интеграции оценок от разных асессоров и по разным упражнениям; шаблоны итоговых отчетов. Качество методического обеспечения непосредственно определяет валидность и надежность результатов оценки.

3. Кадровое обеспечение включает требования к асессорам (наблюдателям и экспертам), процедуру их отбора и обучения. Асессор является одной из основных фигур в центре оценки, поскольку именно он наблюдает за поведением участников, фиксирует поведенческие проявления и оценивает уровень компетенций. Кадровое обеспечение также включает распределение ролей в команде центра оценки (ведущий, асессоры, администратор, координатор), систему замены и ротации.

4. Материально-техническое обеспечение охватывает помещения для проведения оценочных сессий (комнаты для групповых дискуссий, индивидуальных упражнений, комнаты для наблюдения и видеофиксации), оборудование (видеокамеры, диктофоны, компьютеры, проекторы), расходные материалы (бланки, канцелярия), а также программное обеспечение для обработки результатов. Качество материально-технического обеспечения влияет как на комфорт участников, так и на точность наблюдений и фиксации поведения.

5. Информационно-аналитическое обеспечение включает процедуры сбора, хранения и анализа данных о результатах оценки, формирование баз данных участников, расчет статистических показателей надежности и валидности, подготовку сводных отчетов для руководства организации.

Этапы разработки и внедрения центра оценки.

Создание центра оценки – это многоэтапный проект, реализация которого требует участия HR-специалистов, руководителей подразделений и, при необходимости, внешних консультантов. Типовая последовательность этапов включает следующие шаги.

Этап 1. Определение целей и задач. На этом этапе формулируются ответы на вопросы: для каких целей создается центр оценки (отбор, формирование резерва, оценка потенциала, выявление зон развития)? Какие категории персонала подлежат оценке (руководители, специалисты, рабочие)? Как часто будут проводиться оценочные сессии? Ответы на эти вопросы определяют все последующие этапы.

Этап 2. Разработка или актуализация модели компетенций. Модель компетенций является основой для разработки всех оценочных процедур. Важно, чтобы компетенции были конкретизированы через поведенческие индикаторы, то есть конкретные, наблюдаемые действия, которые можно

зафиксировать в ходе оценочных упражнений.[60] Для каждого уровня владения компетенцией описывается соответствующее поведение. Рекомендуемое количество компетенций для центра оценки – от 5 до 8, поскольку большее число затрудняет наблюдение и оценку.

Этап 3. Разработка оценочных упражнений. Для каждой компетенции разрабатывается как минимум одно упражнение, а желательно – два-три, чтобы обеспечить возможность оценки одной компетенции в разных контекстах. Типовой набор упражнений для центра оценки включает: групповую дискуссию (оценка коммуникативных и лидерских компетенций), ролевую игру (оценка навыков взаимодействия, убеждения, работы с возражениями), анализ кейса (оценка аналитических способностей и принятия решений), презентацию (оценка навыков публичных выступлений и аргументации), а иногда и профессиональное тестирование.

Этап 4. Подготовка асессоров. Обучение асессоров включает несколько модулей: знакомство с моделью компетенций и поведенческими индикаторами; обучение технике наблюдения и фиксации поведенческих проявлений; обучение процедуре оценки и интеграции данных; проведение калибровочных сессий для согласования оценок между асессорами.

Этап 5. Проведение пилотной сессии. До запуска центра оценки в полноценную эксплуатацию рекомендуется провести пилотную сессию с участием сотрудников, не включенных в целевую аудиторию (например, стажеров или сотрудников других подразделений). Пилотная сессия позволяет выявить недостатки в организации, методических материалах, действиях асессоров и своевременно их устранить.

Этап 6. Запуск и сопровождение. После успешного проведения пилотной сессии центр оценки запускается в регулярную эксплуатацию.

Подготовка асессоров.

Качество проведения центра оценки напрямую зависит от навыков асессоров.[61]

Навык наблюдения. Навык наблюдения асессора заключается в способности фиксировать конкретные, объективные поведенческие проявления участников, отделяя факты от субъективных интерпретаций и эмоциональных оценок.

Навык классификации. Навык классификации позволяет асессору соотносить наблюдаемые поведенческие акты с заранее определенными компетенциями и их поведенческими индикаторами, определяя степень выраженности каждой компетенции.

Навык интеграции. Навык интеграции обеспечивает способность асессора на основе разрозненных наблюдений (часто от разных асессоров и в разных упражнениях) сформировать целостную, согласованную и

[60] Спенсер Л.М., Спенсер С.М. Компетенции на работе. Модели максимальной эффективности работы. — М.: HIPPO, 2020. — С. 56.
[61] Базаров Т.Ю. Технология центров оценки персонала: процессы и результаты. — М.: Когито-Центр, 2020. — С. 89.

обоснованную оценку по каждой компетенции и по кандидату в целом, что является ключевым фактором надежности центра оценки.

Навык обратной связи. Асессор должен уметь конструктивно, в развивающем ключе донести результаты оценки до участника, избегая оценочных суждений и фокусируясь на конкретных поведенческих проявлениях и их влиянии на эффективность.

Исследования показывают, что обучение асессоров должно быть практико-ориентированным и включать не менее 16–24 академических часов, из которых не менее половины – практические занятия (тренировочные сессии, разбор видеозаписей, калибровочные встречи). Асессоры должны проходить периодическое повышение квалификации (например, раз в 3 года).

В практике создания и функционирования центров оценки выделяется ряд типичных ошибок. Детальный разбор типичных ошибок при организации центров оценки представлен в работе И.Б. Дураковой[62]

Ошибка 1. Разработка модели компетенций без участия руководителей. Способ предотвращения: привлекать руководителей подразделений при разработке компетенций.

Ошибка 2. Использование неподготовленных асессоров. Способ предотвращения: не допускать к оценке асессоров, не прошедших обучение; проводить регулярные калибровочные сессии.

Ошибка 3. Перегрузка программы оценки. Способ предотвращения: ограничивать количество компетенций (не более 5–8) и продолжительность сессии (не более одного рабочего дня).

Ошибка 4. Игнорирование обратной связи для участников. Способ предотвращения: сделать предоставление индивидуальной обратной связи обязательным элементом центра оценки; участники должны понимать свои зоны развития.

Ошибка 5. Отсутствие связи результатов оценки с развитием. Способ предотвращения: по итогам центра оценки для каждого участника разрабатывать индивидуальный план развития, использовать результаты для формирования кадрового резерва.

Таким образом, организационно-методическое обеспечение центра оценки является системообразующим фактором, определяющим эффективность и надежность этого метода оценки персонала.

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КЛИНИКО-ПАТОГЕНЕТИЧЕСКИЕ ФАКТОРЫ РИСКА ОСЛОЖНЕНИЙ ЯЗВЕННОЙ БОЛЕЗНИ ДВЕНАДЦАТИПЕРСТНОЙ КИШКИ У ДЕТЕЙ

Аннотация: *Кровотечение из язв двенадцатиперстной кишки является одним из наиболее тяжёлых и прогностически неблагоприятных осложнений язвенной болезни, занимая ведущее место в структуре летальности при данном заболевании. В исследование включены 42 ребёнка с рецидивирующей формой язвенной болезни двенадцатиперстной кишки, проходившие лечение во 2-й клинике СамМУ в 2021–2024 гг. Основную группу составили 12 (28,6%) пациентов с осложнённым течением заболевания, проявлявшимся язвенным кровотечением, группу сравнения — 30 (71,4%) детей с неосложнённым течением. Проведён анализ анамнестических, клинических и инструментальных данных, включая оценку кислотопродуцирующей функции по показателям антродуоденальной pH-метрии. Семейная предрасположенность к язвенной болезни выявлена у 75% пациентов с осложнённым течением, при этом у 33,3% родственников отмечались осложнённые формы заболевания. В группе сравнения наследственная отягощённость регистрировалась у 46,7% детей без случаев осложнений. Инфицированность Helicobacter pylori в основной группе составила 100%, в контрольной — 80%. Высокий титр IgG к H. pylori достоверно чаще определялся у пациентов с осложнённым течением (58,3% против 16,7%). Установлено, что осложнённое течение язвенной болезни ассоциировано с мужским полом, старшим школьным возрастом, эрозивно-язвенными поражениями гастродуоденальной зоны, множественными язвенными дефектами, высокой бактериальной обсеменённостью и низким уровнем pH в антродуоденальной области. Выявленные предикторы осложнённого течения язвенной болезни двенадцатиперстной кишки у детей позволяют выделить группу высокого риска. Ранняя диагностика и активное диспансерное наблюдение таких пациентов способствуют снижению частоты язвенных осложнений.*

Ключевые слова: *язвенная болезнь двенадцатиперстной кишки, дети, язвенное кровотечение, предикторы осложнений.*

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CLINICAL AND PATHOGENETIC RISK FACTORS FOR COMPLICATIONS OF DUODENAL ULCER DISEASE IN CHILDREN

Abstract. *Bleeding from duodenal ulcers is one of the most severe and prognostically unfavorable complications of peptic ulcer disease, accounting for a leading cause of mortality from this disease. The study included 42 children with recurrent duodenal ulcers who were treated at the 2nd Clinic of Samarkand State Medical University from 2021 to 2024. The main group consisted of 12 patients (28.6%) with complicated course of the disease, manifested by ulcer bleeding, the comparison group - 30 children (71.4%) with uncomplicated course. Anamnestic, clinical and instrumental data were analyzed, including assessment of acid-producing function based on antroduodenal pH-metry. Familial predisposition to peptic ulcer disease was detected in 75% of patients with complicated course, while complicated forms of the disease were noted in 33.3% of relatives. In the comparison group, hereditary burden was recorded in 46.7% of children without cases of complications. Helicobacter pylori infection in the main group was 100%, in the control group - 80%. High IgG titers to H. pylori were significantly more often determined in patients with complicated course (58.3% versus 16.7%). It has been established that complicated peptic ulcer disease is associated with male gender, older school age, erosive and ulcerative lesions of the gastroduodenal region, multiple ulcer defects, high bacterial counts, and low pH in the antroduodenal region. The identified predictors of complicated duodenal ulcer disease in children allow us to identify a high-risk group. Early diagnosis and active follow-up of these patients help reduce the incidence of ulcer complications.*

Keywords: *duodenal ulcer disease, children, ulcer bleeding, predictors of complications.*

Актуальность

Язвенная болезнь двенадцатиперстной кишки относится к хроническим рецидивирующим заболеваниям, для которых характерно чередование фаз обострения и клинической ремиссии. Ведущим морфологическим признаком патологии является образование язвенного дефекта слизистой оболочки двенадцатиперстной кишки. Течение заболевания может сопровождаться развитием тяжёлых осложнений, включая желудочно-кишечные кровотечения, перфорацию и пенетрацию язвы, стеноз привратника, а также злокачественную трансформацию. Высокая распространённость, тенденция к снижению возраста дебюта, частое осложнённое течение и ограниченная эффективность существующих

методов терапии определяют значимость язвенной болезни как актуальной проблемы клинической медицины [1,3,4,7].

Одним из ведущих факторов формирования язвенной болезни является наследственная отягощённость. Особое значение данный фактор имеет при язвенной болезни двенадцатиперстной кишки, для которой характерен аутосомно-доминантный или аутосомно-рецессивный тип наследования, не связанный с половой принадлежностью пациента [7,12].

Важную роль в патогенезе заболевания играет инфекция *Helicobacter pylori*, заражение которой чаще всего происходит в детском возрасте. Рост заболеваемости, ассоциированной с данным микроорганизмом, во многом обусловлен неблагоприятными социально-экономическими условиями, экологическими факторами и нарушениями питания [1,4,7,12].

Современное течение язвенной болезни характеризуется изменением клинических проявлений: всё чаще встречаются малосимптомные и латентные формы заболевания. У детей старшего школьного возраста осложнения язвенной болезни двенадцатиперстной кишки диагностируются более чем у 5% пациентов. Отмечается уменьшение сезонности обострений, снижение эффективности стандартных терапевтических подходов и рост частоты осложнённых форм [7].

По данным ряда исследований, осложнения язвенной болезни двенадцатиперстной кишки развиваются у 26–42% пациентов, при этом наиболее частыми являются желудочно-кишечные кровотечения (30–40%) и перфорация язвы (21–27%) [2,5,7–12]. Распространённость хеликобактерной инфекции среди детей школьного возраста ежегодно увеличивается приблизительно на 10%, достигая максимальных значений во взрослом периоде. В настоящее время *Helicobacter pylori* выявляется примерно у 60% населения мира, что позволяет отнести данную инфекцию к числу наиболее распространённых. Высокий уровень инфицированности указывает на дальнейший рост заболеваний гастродуоденальной зоны, ассоциированных с данным возбудителем. У пациентов с хроническим гастритом и гастродуоденитом *H. pylori* обнаруживается в 82–98% случаев при наличии эрозивно-язвенных изменений слизистой оболочки [1,7,12]. Наиболее тяжёлым и прогностически неблагоприятным осложнением дуоденальных язв остаётся желудочно-кишечное кровотечение, которое является одной из основных причин летального исхода при данном заболевании [2,5,8,10,11].

По данным различных авторов, уровень общей летальности колеблется в пределах 10–14%, тогда как послеоперационная смертность достигает 12–35%. Несмотря на существенный прогресс в области хирургии, эндоскопических методов диагностики, анестезиологического обеспечения и медикаментозной терапии, значимого снижения показателей смертности до настоящего времени не достигнуто. При этом развитие повторных кровотечений повышает риск летального исхода в 1,5–2 раза. К числу факторов, способствующих возникновению гастродуоденальных

кровотечений, относят высокую распространённость язвенной болезни, бесконтрольное применение нестероидных противовоспалительных препаратов и антикоагулянтов, а также отсутствие унифицированных стандартов лечения кровотечений [2,5,8,10,11].

Несмотря на большое количество научных работ, вопросы, касающиеся факторов риска рецидивирования и развития осложнений язвенной болезни, остаются недостаточно изученными. Результаты исследований, посвящённых роли отдельных предикторов, зачастую носят противоречивый характер, что обуславливает необходимость поиска надёжных прогностических критериев осложнённого течения заболевания.

Цель исследования — выявление предикторов осложнённого течения язвенной болезни двенадцатиперстной кишки у детей.

Материалы и методы исследования

В исследование включены 42 пациента с рецидивирующей формой язвенной болезни двенадцатиперстной кишки, находившиеся на лечении во 2-й клинике СамМИ в 2021–2023 гг. Основную группу составили 12 (28,6%) детей с осложнённым течением заболевания, сопровождавшимся язвенным кровотечением; группу сравнения — 30 (71,4%) пациентов с неосложнённым течением. Средний возраст пациентов основной группы составил 16±1,0 года, в группе сравнения — 12±2,4 года ($p<0,01$). Всем детям выполнялись эзофагогастродуоденоскопия, определение уровня IgG-антител к *Helicobacter pylori* и интрагастральная pH-метрия.

Результаты и обсуждение. Анализ анамнестических данных показал наличие наследственной предрасположенности у 75% пациентов основной группы, при этом у 33,3% их родственников отмечались осложнённые формы заболевания. В группе сравнения наследственная отягощённость выявлялась у 46,7% детей, однако случаев осложнённого течения среди родственников зарегистрировано не было. Факторы риска и клинические особенности язвенной болезни двенадцатиперстной кишки у детей представлены в таблице 1.

Таблица 1

Факторы риска, клинические особенности у детей с ЯБДК

№	Показатель	Основная группа n=12	Контрольная группа n=30
1	Наследственная отягощенность по ЯБ	9 (75%)	14 (46,7%)
2	Наследственная отягощенность по кровотечениям	4 (33,3%)	-
3	Длительность заболевания	1,4±0,3 года	3,1±0,6 года
4	Рецидивы ЯБДК	5 (41,6%)	22 (73,3%)
5	Сезонность обострений	4 (33,3 %)	17(56,7 %)
6	Отсутствие болевого синдрома	4 (33,3%)	2 (6,7%)
7	Значительная интенсивность боли	боли 3 (25%)	12 (40%)
8	Материально-бытовые условия	8 (66,7%)	11 (36,7%)

У пациентов с осложненным течением заболевание прогрессировало быстрее – средняя длительность язвенного анамнеза составила 1,4±0,3 года против 3,1±0,6 года в контрольной группе (P<0,01).

Болевой синдром в основной группе был менее выраженным и менее интенсивным, а ночные боли регистрировались реже. В 33,3% случаев отмечалось полное отсутствие болевого синдрома.

Эндоскопическое исследование выявило множественные язвенные поражения у 33,3% пациентов основной группы против 10% в контрольной. У 58,3% пациентов с осложненным течением диагностирован эрозивный гастродуоденит. Эндоскопические показатели у детей с ЯБДК представлены в табл.2.

Таблица 2

Эндоскопические показатели у детей с ЯБДК

№	Показатель	Основная группа n=12	Контрольная группа n=30
1	Эрозивный характер	Гастродуоденита 7 (58,3%)	2 (6,%7)
2	Частота выявления ДГР	5 (41,7%)	20(66,7%)
3	Множественные язвы	4 (33,3%)	3 (10%)
4	Средний размер язвенного дефекта	3,1±1,79 мм	1,8±1,14 мм

Инфицированность Helicobacter pylori среди пациентов основной группы составила 100%, тогда как в контрольной группе – 80%. Высокий титр IgG к HP чаще встречался у пациентов с осложненным течением (58,3% против 16,7%).

Лечение HP-позитивных пациентов включало 10-дневную эрадикационную терапию: омепразол (20–40 мг 2 раза в день), амоксициллин (50 мг/кг 2 раза в день) и кларитромицин (15 мг/кг 2 раза в день). Далее пациенты получали Денол в течение 3 недель. Контроль эффективности терапии осуществлялся через 1 месяц с использованием дыхательного Хелик-теста.

Выводы

Выявленные предикторы осложнённого течения язвенной болезни двенадцатиперстной кишки у детей позволяют выделить группу высокого риска. Ранняя диагностика и активное диспансерное наблюдение таких пациентов способствуют снижению частоты язвенных осложнений.

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ТРАДИЦИИ ИСТОРИОПИСАНИЯ В ЦЕНТРАЛЬНОЙ АЗИИ В XIX–XX ВВ. (К ВОПРОСУ О ТРАДИЦИЯХ ХОРЕЗМСКОЙ ИСТОРИОГРАФИЧЕСКОЙ ШКОЛЫ)

Аннотация. *Военно-политические и социально-экономические трансформации, а также качественные сдвиги в культурно-образовательной сфере Центральной Азии XIX века обусловили эволюцию региональной историографии в контексте усложняющихся исторических реалий. В данный период, в противовес традиционным канонам, в историческом дискурсе акцент сместился на комплексный анализ политической и социально-экономической жизни отдельных ханств и генеалогию правящих династий. Дифференциация историографических подходов привела к институционализации Кокандской, Хивинской и Бухарской научных школ. В представленной статье эксплицируются специфические характеристики и методологические особенности Хивинской историографической школы.*

Ключевые слова: *Центральная Азия, Хивинское ханство, исторический процесс, нарратология, историография, первоисточники, историографические школы, переводческая деятельность, источниковедческий анализ.*

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HISTORIOGRAPHY OF CENTRAL ASIA IN THE 19TH – 20TH CENTURIES (SPECIFIC FEATURES OF THE KHOREZM HISTORIOGRAPHICAL SCHOOL TRADITIONS)

Abstract. *The military-political and socio-economic transformations, along with qualitative shifts in the cultural and educational spheres of 19th-century Central Asia, necessitated the evolution of regional historiography within the context of increasingly complex historical realities. During this period, in contrast to traditional canons, the historical discourse shifted its emphasis toward a comprehensive analysis of the political and socio-economic life of individual khanates and the genealogy of ruling dynasties. The differentiation of historiographical approaches led to the institutionalization of the Kokand, Khiva, and Bukhara scientific schools. This article explicates the specific characteristics and methodological features of the Khiva school of historiography.*

Keywords: *Central Asia, Khiva Khanate, historical process, narratology, historiography, primary sources, historiographical schools, translation activity, source criticism.*

Введение

Историография Центральной Азии XIX — начала XX вв. представляет собой сложный и многогранный объект исследования, детерминированный спецификой общественно-политических трансформаций данного периода. В отличие от предшествующих эпох, XIX век характеризуется интенсификацией внешнеполитической деятельности Бухарского эмирата, Кокандского и Хивинского ханств. Особое место в историческом контексте занимает эскалация геополитического соперничества между Российской и Британской империями, приведшая к радикальным изменениям административно-политической карты региона. Параллельно с военно-политическими процессами, приоритетными объектами современного историографического анализа становятся эволюция научно-культурной среды и институциональные преобразования в сфере образования. Труды историков того времени рассматриваются не только как нарративное изложение событий, но и как репрезентативные первоисточники по социально-экономической и политической антропологии региона. В рассматриваемый период в таких интеллектуальных центрах, как Бухара, Хива, Коканд и Ташкент, произошла окончательная консолидация самобытных историографических школ, каждая из которых выработала уникальные методологические подходы к фиксации и интерпретации исторического процесса.

Актуальность темы

В ряду историографических школ, сформировавшихся в Центральной Азии, Хорезмско-Хивинская школа историографии обладает рядом специфических черт, отличающих её от традиционных подходов, характерных для Бухарского эмирата и Кокандского ханства. К числу таких отличительных особенностей можно отнести доминирование узбекского языка в повествовательной традиции Хорезма, а также содержательную преемственность и хронологическую последовательность исторических сочинений, которые, дополняя друг друга, образуют единый комплексный нарратив. Характерной чертой данной школы является также профессиональная преемственность историков: каждый последующий автор продолжал деятельность своего предшественника, что позволило сформировать целостную и системную историческую панораму Хивинского ханства. Кроме того, в качестве самостоятельного и уникального направления хорезмской историографии выделяется формирование самобытной школы художественного и научного перевода.

Обзор литературы

Ключевой детерминантой, маркирующей самобытность Хорезмско-Хивинской историографической школы и её дивергенцию от Бухарской и

Кокандской традиций, является приоритетное использование узбекского языка в качестве основного медиума исторического повествования. Исследователи констатируют, что в XIX веке Хорезмская школа занимала лидирующие позиции в создании нарративных источников на тюркском языке, формируя корпус исторических сочинений на среднеазиатском тюрки [4.4.].

Как отмечает К. Муниров: «Традиция историописания на узбекском языке получила масштабное развитие именно в Хивинском ханстве. Дело, инициированное Абулгази-ханом, в XIX столетии с высоким мастерством продолжили выдающиеся узбекские поэты и маститые историографы Шермухаммад Мунис и Мухаммад Риза Огахи. Эти великие ученые-хронисты, наряду с фиксацией истории Хорезма, заложили основы самобытной научной школы в данной области» [1.4.].

Фундаментальным отличительным признаком Хорезмско-Хивинской школы, выделяющим её на фоне Бухарского и Кокандского центров, является строгое соблюдение принципа хронологического континуитета и преемственности летописной традиции. Речь идет о практике последовательного дописывания исторических трудов: сочинение, начатое одним автором, подхватывалось и развивалось его преемником. Подобный алгоритм обеспечивал непрерывность исторического процесса в текстах, что создавало уникальные условия для формирования целостной, системной ретроспективы истории Хивинского ханства. В частности, в исследовательских кругах подчеркивается, что историографическая деятельность Муниса, Огахи и Баяни выстраивалась именно в рамках данной парадигмы — как взаимодополняющий цикл трудов, представляющих собой органическое продолжение друг друга [2.664.].

Данный вектор историописания, заложенный Шермухаммадом Мунисом, получил дальнейшее развитие в творчестве Мухаммада Ризы Огахи. Согласно сведениям, приведенным в антологии «Тазкираи Кайюми»: «Элтузар-хан поручил Шермухаммаду составление истории Хорезма. После кончины Элтузар-хана в 1806 году взошедший на престол Мухаммад Рахим-хан подтвердил распоряжение о продолжении этого труда. Данное сочинение, получившее название “Фирдавс ул-икбал”, охватывает исторические события в Хорезме вплоть до 1812 года» [3.100.].

Обсуждение

Особого внимания заслуживает феномен выраженной протекции хивинских монархов в отношении развития исторической науки. Данная тенденция подтверждается целым рядом прецедентов: указом правителя Эш-султана Утамишу-хаджи о составлении исторического труда; личной инициативой хивинского хана Абулгази в написании фундаментальных хроник; а также аналогичными указами Элтузар-хана Мунису и Аллакули-хана Огахи. Подобный патронаж со стороны верховной власти является уникальной чертой хорезмской историографии, свидетельствующей о

высокой степени востребованности исторического знания и стремлении правителей к созданию верифицированной летописи государства.

Именно эта институциональная преемственность стала ключевым фактором создания труда Огахи «Фирдавс ул-икбал». В антологии «Тазкираи Кайюми» отмечается: «Литературное поприще досталось Огахи в наследие от его дяди, мавлано Муниса. В 1838 году от Рождества Христова по повелению Аллакули-хана ему было поручено продолжить начатый Мунисом труд “Фирдавс ул-икбал”. Во втором томе Огахи приступил к фиксации событий, очевидцем которых был он сам. Работа продолжалась и в эпоху Мухаммад Рахим-хана II, в результате чего под редакцией Огахи были изложены исторические события вплоть до 1872 года. Вклад Огахи в историографию Хорезма неоценим, он оставил после себя важнейший исторический памятник» [3.146-149].

В других источниках указывается на роль Мухаммада Юсуфа Баяни как прямого преемника Огахи: «Традиции Огахи в области историописания и его исторический труд были продолжены Мухаммадом Юсуфом Баяни» [5]. К. Муниров также акцентирует внимание на деятельности Баяни как наследника историографической и переводческой школы Муниса и Огахи: «Их начинания на рубеже XIX и XX веков продолжил видный ученый-историк и поэт Мухаммад Юсуф Баяни» [1.4].

Согласно результатам иных исследований, во второй половине XIX — начале XX вв. данную традицию развивали Табиби и Баяни. Последний, наряду с прозаическими сочинениями, такими как «Тарихи Табари», осуществил высокопрофессиональный перевод историко-художественного произведения Камолиддина Бинаи «Шайбани-наме», написанного в жанре маснави, а также арабского исторического трактата Мавлано Дарвеша Ахмада «Сахаиф ул-ахбор» («Страницы известий», 1–2 тома) [6.218-227].

В рамках устоявшейся традиции, по указу хивинского хана Мухаммада Рахим-хана II, Мухаммад Риза Табиби [7] подготовил фундаментальный труд «Тарихи Хоразмшохи» («История Хорезмшахов»). Данное сочинение, охватывающее период с древнейших времен до начала XX века, детально освещает вопросы правления и административной деятельности династии Кунгратов. Научная значимость этого труда возрастает в связи с тем, что он выступает логическим продолжением летописи Огахи, фиксируя исторические события после 1872 года [8.84-110]. Мухаммад Риза Табиби признан одним из крупнейших придворных историографов своего времени; в своем сочинении он представил последовательный хронологический анализ сложных политических и экономических трансформаций второй половины XIX — начала XX вв., а также отразил динамику культурного развития Хорезмского региона.

Другим выдающимся продолжателем традиций Хорезмской школы является Мухаммад Юсуф Баяни [9]. Приступая к написанию своего основного труда «Шажарайи Хоразмшохи» («Родословная Хорезмшахов»), Баяни отмечал, что детали ряда событий отсутствовали в работах его

предшественника Огахи, в связи с чем он стремился реконструировать историческую картину на основе показаний непосредственных участников и очевидцев: «...историю вышеупомянутого периода (период правления Мухаммад Рахим-хана II до 1872 года — прим. авт.) я восстановил, разыскав старцев, принимавших участие в делах того времени, и тщательно верифицировал их рассказы». В процессе работы над «Историей Хорезма» Баяни уделял особое внимание методологии исторического описания, настаивая на императиве объективности и правдивости: «К написанию исторических книг есть одно требование: хронист не должен проявлять пристрастности, ему надлежит излагать события с предельной достоверностью. В противном случае его слова не найдут признания у читателя» [10].

Таким образом, усилиями представителей этой школы был сформирован корпус фундаментальных трудов, таких как «Фирдавс ул-икбал» Муниса [11.517], «Шахид ул-икбал», «Джами ул-вакеати султани» [13.126], «Зубдат ут-таварих» [14.240] и «Рияз уд-даула» [15.214] Огахи, а также «Шажарайи Хоразмшохи» Баяни [10]. Данные произведения и по сей день сохраняют статус первичных и наиболее авторитетных источников по истории Хорезма [16.208].

Переводческая направленность историописания. Одним из ключевых векторов развития Хорезмско-Хивинской историографической школы второй половины XIX — начала XX вв. выступает переводческая деятельность. Роль Мухаммада Ризы Огахи в этом процессе рассматривается рядом исследователей как фундамент для формирования уникальной переводческой традиции, обладающей статусом самостоятельного научного направления [23.349].

Исследователь Х. Назирова в своих трудах акцентирует внимание на следующей специфике Хивинской школы: «В эпоху правления династии Кунгратов инициируется масштабная и системная трансляция исторических и агиографических сочинений с арабского и персидского языков на тюркский. Несмотря на то, что подобные попытки предпринимались ранее правителями из династии Шейбанидов, именно Кунграты достигли в этой области наивысших результатов. Подобная “тюркизация” исторического дискурса имела важнейшее культурное значение. Переводчики рассматривали адаптацию текстов на тюркский язык как способ популяризации знаний, поскольку сочинения на арабском и персидском языках отвечали запросам лишь узкого круга интеллектуальной элиты» [4.12-13].

В сфере переводов, равно как и в историописании, сохранялась строгая приверженность традиционализму. Представители данной школы не ограничивались созданием оригинальных хроник по истории Хорезма, но и осуществили интеграцию широкого пласта классического восточного наследия в узбекскую языковую среду [1.4].

В частности, Огахи осуществил перевод на узбекский язык таких значимых историко-литературных памятников, как «Равзат ус-сафа» Мирхонда, «Тарихи джахангушаи Надири» Мухаммада Махди Астрабади, «Бадаи ал-вакаи» Зайниддина Васифи, «Табакати Акбар-шахи» Мухаммада Муки Хирати и «Тазкираи Муким-хани» Мухаммада Юсуфа Мунши [26]. Другие источники подтверждают многогранный характер его деятельности: являясь автором серии оригинальных трудов («Рияз уд-даула», «Зубдат ут-таварих», «Джами ул-вакеати султани», «Гулшани давлат» и «Шахид ул-икбал»), охватывающих историю Хорезма с 1825 по 1872 годы, Огахи также переложил на узбекский язык более 20 фундаментальных исторических и художественных сочинений с арабского и персидско-таджикского языков [27].

Преемственность и институционализация переводческой традиции. Традиционный характер переводческой деятельности в Хорезмской историографической школе, а также участие в этом процессе целой плеяды выдающихся историков и литераторов свидетельствуют о достижении данной сферой уровня научного совершенства. Перевод не просто существовал параллельно с оригинальным историописанием, но и выступал в качестве необходимого компонента, дополняющего и верифицирующего исторический нарратив. Инициатива в этом вопросе вновь принадлежала хивинским монархам, которые ставили перед историографами задачу по адаптации фундаментальных трудов на узбекский язык, стремясь сделать их доступными для широких слоев населения.

Согласно сведениям «Тазкираи Кайюми»: «Мухаммад Рахим-хан поставил перед Мунисом Хорезми третью важную задачу: осуществить перевод с таджикского языка на узбекский знаменитого исторического сочинения “Равзат ус-сафа”, написанного Мирхондом в Герате в эпоху Алишера Навои. Мавлано Мунис успел завершить перевод первого тома этой монументальной хроники и работал над вторым томом, когда в 1829 году безвременно скончался в разгар эпидемии холеры в Хорезме» [3.100].

В последующем Огахи переложил на узбекский язык более двадцати произведений с персидского. Во второй половине XIX — начале XX вв. данную эстафету подхватили Табиби и Баяни. В частности, Баяни осуществил перевод прозаических трудов, таких как «Тарихи Табари», и взял на себя сложную задачу по интерпретации историко-художественных произведений, написанных в жанре маснави, включая «Шайбани-наме» Камолиддина Бинаи. Им также был виртуозно переведен арабский исторический трактат Мавлано Дарвеша Ахмада «Сахаиф ул-ахбор» («Страницы известий», 1–2 тома) и отредактирован узбекский перевод сочинения Атауллы ибн Фазлуллы Хусайни «Равзат ул-ахбаб» («Сад любящих»). Камил Хорезми, в свою очередь, адаптировал на узбекский язык малые прозаические формы: сборники рассказов и притч Бархурдора Мумтаза («Махбуб ул-кулуб») и Фахриддина Али Сафи («Латаиф ут-таваиф») [28].

Период с конца XVIII до начала XX вв. признан наиболее продуктивным и репрезентативным этапом в истории узбекского перевода. За это время на узбекский язык было переведено более 150 разножанровых сочинений с арабского, персидского, азербайджанского и турецкого языков, составивших основу духовного наследия. В этот процесс были вовлечены не только признанные корифеи - Огахи, Камил, Баяни и Табиби, но и такие мастера, как Мухаммадрасул Мирзо, Санаи, Роджи, Талибходжа, М. Рафе, Хабиби и Магфурходжа [6.218-227].

Еще одним выдающимся представителем Хорезмской школы является Мухаммад Риза Табиби. В соответствии с установившейся в хивинской историографии традицией составления трудов по монаршему указу, он по повелению Мухаммад Рахим-хана II создал историко-художественное сочинение под названием «Маджмуат аш-шуараи Ферузшахи» («Собрание поэтов Ферузшаха») [30.320]. Данный труд, развивая заложенные Огахи принципы, представляет собой фундаментальную тазкиру (антологию), в которой детально освещается деятельность более чем 30 поэтов, литераторов и историков, живших и творивших в Хорезмском ханстве в эпоху правления Мухаммад Рахим-хана II (Феруза). Помимо биографических сведений, автор дает глубокий анализ социально-политических процессов того времени.

Относительно личности и наследия Ахмада Табиби литературовед У. Долимов отмечает: «Первичные сведения о творческом пути Ахмада Табиби содержатся в трудах Мухаммада Юсуфа Баяни, русского тюрколога А. Н. Самойловича, а также современника поэта — Хасанмурада-кари Мухаммадамина Лаффаси». Последний указывает: «По указу Феруза Ахмаджан, взяв псевдоним Табиби, преуспел в стихосложении и создал множество строк, снискавших благоволение правителя, издав четыре тома диванов. Два из них составлены на персидском языке, два — на тюркском (узбекском). Помимо этого, также по велению Феруза, в течение одного года он систематизировал сведения о всех поэтах эпохи и подготовил их жизнеописания» [31; 32.464].

Заключение

В рамках переводческой деятельности Хорезмско-Хивинской историографической школы процесс трансляции на узбекский язык осуществлялся с предельно бережным отношением к содержательной аутентичности первоисточников. При этом переводчики зачастую прибегали к методу адаптации, трансформируя сложные поэтические формы оригиналов в доступное прозаическое повествование, что обеспечивало легкость восприятия и понимания текстов читателями.

В качестве итоговых выводов можно констатировать, что в ряду интеллектуальных центров Центральной Азии XIX – начала XX вв. (Коканда, Ташкента, Бухары) Хорезмско-Хивинская школа историографии занимает уникальное положение. Её самобытность и научная значимость детерминированы следующими концептуальными факторами:

- Лингвистическая спецификация: приоритетное использование узбекского языка в историческом дискурсе;

- Структурно-содержательный континуитет: труды и деятельность историков характеризуются строгой хронологической последовательностью и преемственностью, что позволило создать целостную, системную панораму истории Хивинского ханства без событийных лакун;

- Институционализация перевода: формирование автономной школы художественного и научного перевода, обеспечившей интеграцию классического наследия Востока в локальную среду.

Таким образом, Хорезмско-Хивинская школа не только проявила себя как уникальный феномен в региональном интеллектуальном пространстве, но и сыграла фундаментальную роль в эволюции историографической традиции и развитии исторической науки в Центральной Азии в целом.

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ПОВЫШЕНИЕ ЭНЕРГОЭФФЕКТИВНОСТИ ДВИГАТЕЛЕЙ ПОСТОЯННОГО ТОКА

Аннотация. *В данной статье рассматриваются основные методы повышения энергоэффективности двигателей постоянного тока, широко применяемых в промышленных и энергетических системах. Проведен анализ потерь энергии, возникающих в процессе работы двигателя, а также предложены современные подходы к их снижению. Особое внимание уделено оптимизации режимов работы, совершенствованию конструктивных параметров и применению интеллектуальных систем управления.*

Ключевые слова: *двигатель постоянного тока, энергоэффективность, потери энергии, электропривод, оптимизация, управление, моделирование.*

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IMPROVING THE ENERGY EFFICIENCY OF DC MOTORS

Abstract. *This article discusses the main methods for improving the energy efficiency of DC motors widely used in industrial and energy systems. The analysis of energy losses occurring during motor operation is carried out, and modern approaches to their reduction are proposed. Special attention is paid to optimization of operating modes, improvement of design parameters, and application of intelligent control systems.*

Keywords: *DC motor, energy efficiency, energy losses, electric drive, optimization, control, modeling.*

Введение

В современных условиях развития энергетики и промышленности особое значение приобретает проблема повышения энергоэффективности электрических машин. Двигатели постоянного тока (ДПТ) широко применяются в различных областях, таких как транспорт, автоматизированные системы, металлургия и микроэнергетика.

Несмотря на широкое распространение асинхронных двигателей, ДПТ сохраняют актуальность благодаря высоким пусковым характеристикам, плавности регулирования скорости и высокой точности управления. Однако

их недостатком является сравнительно низкий коэффициент полезного действия (КПД) при определённых режимах работы.

1. Основные потери энергии в двигателях постоянного тока

Энергоэффективность ДПТ определяется величиной потерь, возникающих в процессе преобразования электрической энергии в механическую.

Основные виды потерь включают:

1.1 Электрические потери

Возникают в обмотках якоря и возбуждения:

потери в меди (I^2R)

переходные сопротивления

1.2 Магнитные потери

Связаны с процессами в магнитопроводе:

гистерезис

вихревые токи

1.3 Механические потери

трение в подшипниках

сопротивление воздуха

1.4 Дополнительные потери

искрение на коллекторе

неравномерность магнитного поля

Суммарные потери снижают КПД двигателя, который определяется как:

$$\eta = \frac{P_{\text{выход}}}{P_{\text{вход}}} \cdot 100\backslash\%$$

2. Методы повышения энергоэффективности

2.1 Оптимизация режимов работы

Работа двигателя в номинальном режиме позволяет минимизировать потери. Перегрузка или недогрузка приводит к снижению КПД.

Основные меры:

выбор оптимальной нагрузки

регулирование напряжения

стабилизация тока

2.2 Совершенствование конструкции двигателя

Повышение эффективности достигается за счёт:

применения качественных магнитных материалов

уменьшения сопротивления обмоток

улучшения охлаждения

Использование современных материалов снижает потери в стали и меди.

2.3 Применение систем управления

Современные системы управления позволяют:

автоматически регулировать режим работы

минимизировать потери
поддерживать оптимальные параметры
Особенно эффективны:
PID-регуляторы
адаптивные системы
цифровые контроллеры (например, Arduino)
2.4 Снижение потерь в коллекторе
Для уменьшения искрения применяются:
улучшенные щётки
оптимизация формы коллектора
регулировка угла коммутации
3. Математическое моделирование
Для анализа энергоэффективности используется математическая модель двигателя:

$$U = E + I_a R_a$$

где:
U — напряжение питания
E — ЭДС якоря
I_a — ток якоря
R_a — сопротивление
ЭДС определяется как:

$$E = k\,\Phi\omega$$

Момент двигателя:

$$M = k\Phi I_a$$

Моделирование позволяет:
прогнозировать КПД
анализировать режимы
оптимизировать параметры

4. Использование программных средств

Современные программные средства (MATLAB, Simulink) позволяют:

- моделировать работу двигателя
- строить характеристики
- проводить оптимизацию

Результаты моделирования показывают, что:

- оптимизация тока снижает потери на 10–15%
- правильный выбор параметров повышает КПД до 90%

5. Интеллектуальные системы управления

Перспективным направлением является внедрение:

- нейронных сетей
- нечёткой логики
- предиктивного управления

Эти методы позволяют:

- адаптироваться к нагрузке
- снижать энергопотребление

- увеличивать срок службы двигателя

6. Практическое применение

Повышение энергоэффективности ДПТ актуально для:

микроэнергетических систем

автономных установок

транспортных средств

В частности, в системах микроГЭС применение оптимизированных электроприводов позволяет значительно снизить потери энергии.

Заключение

В результате проведённого анализа установлено, что повышение энергоэффективности двигателей постоянного тока является комплексной задачей, включающей оптимизацию режимов работы, совершенствование конструкции и внедрение современных систем управления.

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ЭКСПЕРИМЕНТАЛЬНО ВЫЗВАННЫЕ ИЗМЕНЕНИЯ ГИСТОЛОГИЧЕСКОГО СТРОЕНИЯ НАДПОЧЕЧНИКОВ ПОД ДЕЙСТВИЕМ МЕТИЛВИНИЛПИРИДИНА

Аннотация. *В ходе эксперимента изучено влияние метилвинилпиридина на гистологическую структуру надпочечников белых крыс. Данное вещество бесцветно, имеет резкий запах и используется в химическом производстве полимеров и резиновых материалов. При исследовании гистологических срезов проявляется лимфоцитарной инфильтрацией ткани надпочечников, выраженной реакцией со стороны сосудов соединительнотканной капсулы, а также сосудов всех зон коркового вещества и синусов мозгового вещества.*

Ключевые слова: *эксперимент, метилвинилпиридин, крыса, надпочечник, клобочковая зона, гематоксилин-эозин, по методу Ван-Гизона.*

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EXPERIMENTALLY INDUCED CHANGES IN THE HISTOLOGICAL STRUCTURE OF THE ADRENAL GLANDS UNDER THE ACTION OF METHYLVINYLPYRIDINE

Abstract. *The experiment investigated the effect of methylvinylpyridine on the histological structure of the adrenal glands of white rats. This substance is colorless, has a sharp odor, and is used in the chemical production of polymers and rubber materials. Examination of histological sections revealed lymphocytic infiltration of adrenal tissue, a pronounced vascular reaction in the connective tissue capsule, as well as in the vessels of all zones of the cortex and the sinuses of the medulla.*

Keywords: *experiment, methylvinylpyridine, rat, adrenal gland, glomerular zone, hematoxylin-eosin, Van Gieson method.*

Введение

В современных условиях в связи с широким использованием антибиотиков в медицине, ветеринарии, сельском хозяйстве, а также рядом

других неблагоприятных факторов (загрязнение биосферы промышленными отходами, включая и радиоактивные вещества) наметился сдвиг в микробной экологии человека и животных [1]. Традиционные подходы в последние десятилетия к этиопатогенезу многих распространенных болезней человека и животных не дают новых конструктивных идей, позволяющих разрабатывать высокоэффективные средства и методы профилактики и лечения различных патологических состояний и синдромов [2]. В настоящее время проблема терапии и особенно восстановление нормальной структуры и функции органов и тканей у сельскохозяйственных животных остается далеко не разрешенной, и поэтому представляются оправданными поиски новых, более эффективных методов и средств направленного воздействия на развитие восстановительных процессов в них [3]. Метилвинилпиридин (МВП), как производное пиридина, жидкое, с неприятным запахом, бесцветное вещество, широко используется в химической промышленности при синтезе различных полимеров и синтетического каучука. В целях предупреждения производственных отравлений представляет интерес изучение степени токсичности указанного вещества. Это вещество поражает в первую очередь центральную нервную систему и вызывает дистрофические изменения ряде паренхиматозных органов [4]. Данная работа является исследованием морфологического характера, проведенным на экспериментальных животных, и представляет результаты, полученные при изучении влияния МВП на гистоструктуру органов нейрогуморальной системы – надпочечников.

Цель исследования

Изучить гистологическое изменения гистологического строения надпочечников под действием метилвинилпиридина

Материалы и методы

Эксперименты проведены на 12 белых крысах, весом 180 - 240 г. Опытным животным перорально в пищевод при помощи шприца иглы, с насаженным на нее хлоропреновым наконечником вводился раствор МВП. Контрольным животным соответственно таким же способом вводилась водопроводная вода. Испытуемое вещество нами применялось в различных дозах. В первой серии 12 белых крыс получали МВП в дозе по 0.01 мг/кг; во второй 12 животных - до 0,l мг/кг и в третьей 27 крыс - по 1,0 мг/кг своего веса. При этом для гистологической обработки брали надпочечники, которые фиксировали в кальций - формалина. Срезы, полученные на замораживающем микротоме, окрашивались гематоксилин-эозином, по методу Ван – Гизон.

Результаты исследования

При изучении гистологических срезов, взятых от надпочечников подопытных животных, мы отмечаем, что действие на организм белых крыс в дозах 0,01: 0,1 и 1,0 мг/кг в течение 20 и 40 суток вызывало изменения гистоструктуры указанных органов. Это выражалось в лимфоцитарной инфильтрации ткани надпочечников, в значительной реакции со стороны

сосудов соединительнотканной капсулы, а также сосудов всех зон коры и синусов мозгового вещества. При этом сосуды были расширены и заполнены преимущественно лимфоцитами и небольшим количеством эритроцитов, нередко наблюдалось краевое стояние их. Следует заметить, что стенки мелких сосудов были более утолщены, а покрывающая надпочечники соединитель - вотканная капсула была более расширенной и богатой клетками фибробластического ряда при действии МВП в дозах О,1 и 1.0 мг/кг. От капсулы соединительнотканные тяжи грубыми прослойками спускались в пучковую зону. При окраске гематоксилин-эозином в коре надпочечников четко определялись клубочковая, пучковая и сетчатая зоны. Под соединительно - тканной капсулой были видны группы более мелких темных

клеток. В клубочковой зоне среди некрупных клеток с более светлой цитоплазмой и темным ядром часто встречались митозы. Клетки пучковой зоны имели разную величину, полигональную форму и ячеистую цитоплазму, однако ячеистость была нечеткой при действии МВП в дозе 1,0 мг/кг. Многие клетки содержали крупные светлые ядра с хорошо видимым ядрышком, и вместе с тем, на значительных участках видны и с более темным, бесструктурным, меньшей величины ядром и с темной цитоплазмой. Сетчатая зона при окраске гематоксилин-эозином выглядела более темным фоном, ее мелкие клетки в виде тяжей переплетались в сеть. В этой области наиболее выражена рассеянная и очаговая лимфоцитарная инфильтрация. Хромаффинные клетки мозгового вещества располагались плотно друг к другу, гнездами, между которыми находились довольно широкие синусы с единичными лимфоцитами у их внутреннего края, лежащими очагами у их наружной стенки и рассеянными на фоне самих хромаффинных клеток. Отдельные более мелкие синусы были заполнены эритроцитами, последние наблюдались и за пределами их стенок, что было особенно выражено при воздействии МВП в дозах 0,1 и 1,0 мг/кг. Следует отметить, что действие МВП на организм белых крыс в дозах от 0,01 до 1,0 мг/кг к концу 20-х суток вызывает значительное уменьшение липидной субстанции в итерреналовых клетках всех зон коры надпочечников, однако через 40 суток, напротив, наблюдалось накопление суданофильных включений в клетках всех зон, кроме клубочковой. Изучая гистоструктуру надпочечников подвергавшихся воздействию МВП в дозах от 0,1 до 1,0 мг/кг в течение 40 суток и последующей месячной выдержки животного в состоянии последействия мы находим выраженные явления отечности со стороны надпочечной капсулы и межэпителиальных соединительнотканных прослоек коры, участки кровоизлияний, особенно на границе сетчатой зоны и мозгового вещества, признаки стаза сосудов, более интенсивную рассеянную и околососудистую инфильтрацию, преимущественно лимфоцитарную, диапедез эритроцитов в ткани пучковой и сетчатой зон. В случаях воздействия МВП на надпочечники в течение 70, 90 суток в дозах от 0,01 до 1,0 мг/кг вышеописанные явления в тканях были более выражены,

особенно со стороны сетчатой зоны и мозгового вещества (отечность, рассеянная и очаговая инфильтрация лимфоцитами, расширение и кровенаполнение сосудов, диапедез эритроцитов). При этом в пучковой зоне преобладало грубое нарушение радиального хода интерреналовых тяжей, среди клеток которых обнаруживались делящиеся и группы дистрофически измененных. Одновременно с этим определялась гипертрофия пучковой зоны и ее интерреналовых клеток наряду с встречающимися дистрофическими формами их, нарушением радиальности хода эпителиальных тяжей, а также слабым накоплением кислых мукополисахаридов в клубочковой и сетчатой зонах.

Заключение

Анализ полученных данных позволяет отметить, что длительное воздействие метилвинилпиридина (в течение 20, 40,70, 90 суток) на организм животного в дозах 0,01_10 мг/кг вызывает неблагоприятные изменения в гистоструктуре надпочечников, а именно: рассеянную и очаговую лимфоцитарную инфильтрацию во всех зонах и мозговом веществе; расширение и кровенаполнение сосудов вплоть до их стаза, особенно в сетчатом и мозговом веществе; грубое нарушение радиального расположения эпителиальных тяжей в пучковой зоне; реактивные и дистрофические клеточные сдвиги; понижение содержания количества глыбок кислых мукополисахаридов в коре.

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ТАЖРИБАДА МЕТИЛВИНИЛПИРИДИННИНГ БУЙРАК УСТИ БЕЗИ ГИСТОЛОГИК ТУЗИЛИШИГА ТАЪСИРИ

Аннотация. *Тажриба давомида метилвинилпиридиннинг оқ каламушларнинг буйрак усти бези гистологик тузилишига таъсири ўрганилди. Ушбу модда рангсиз, ўткир ҳидга эга бўлиб, полимерлар ва резина материалларининг кимёвий ишлаб чиқаришида қўлланилади. Гистологик кесмаларни ўрганишда буйрак усти бези тўқимасининг лимфоцитар инфильтрацияси, бириктирувчи тўқима капсуласи томондан томирларнинг яққол реакцияси, шунингдек, кортикал модданинг барча зоналари томирлари ва мия моддаси синусларининг реакцияси кузатилди.*

Калит сўзлар: *Тажриба, метилвинилпиридин, каламуш, буйрак усти бези, клубочковая зона, гематоксилин-эозин, Ван-Гизон усули бўйича.*

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EXPERIMENTALLY INDUCED CHANGES IN THE HISTOLOGICAL STRUCTURE OF THE ADRENAL GLANDS UNDER THE ACTION OF METHYLVINYLPYRIDINE

Abstract. *The experiment investigated the effect of methylvinylpyridine on the histological structure of the adrenal glands of white rats. This substance is colorless, has a sharp odor, and is used in the chemical production of polymers and rubber materials. Examination of histological sections revealed lymphocytic infiltration of adrenal tissue, a pronounced vascular reaction in the connective tissue capsule, as well as in the vessels of all zones of the cortex and the sinuses of the medulla.*

Keywords: *experiment, methylvinylpyridine, rat, adrenal gland, glomerular zone, hematoxylin-eosin, Van Gieson method.*

Кириш

Ҳозирги шароитда тиббиётда, ветеринарияда, қишлоқ хўжалигида антибиотикларнинг кенг қўлланилиши, шунингдек, бошқа бир қатор салбий омиллар (саноат чиқиндилари, жумладан радиоактив моддалар билан

биосферанинг ифлосланиши) туфайли инсон ва ҳайвонларнинг микроб экологиясида ўзгаришлар кузатилмоқда [1]. Сўнгги ўн йилликларда инсон ва ҳайвонларнинг кўплаб тарқалган касалликлари этиопатогенезига анъанавий ёндашувлар янги конструктив ғояларни бермаяпти. Бу эса турли патологик ҳолатлар ва синдромларнинг олдини олиш ва даволаш учун юқори самарали воситалар ва усулларни ишлаб чиқишга имкон бермайди [2]. Ҳозирги пайтда қишлоқ хўжалиги ҳайвонларида орган ва тўқималарнинг нормал тузилиши ва функциясини тиклаш муаммоси ҳали ҳам ҳал этилмаган бўлиб қолмоқда. Шунинг учун уларда тикланиш жараёнларини ривожлантиришга қаратилган янги, самаралироқ усуллар ва воситаларни қидириш тўғри бўлади [3]. Метилвинилпиридин (МВП) пиридиннинг ҳосиласи бўлиб, суюқ, ёқимсиз ҳидли, рангсиз моддадир ва кимёвий саноатда турли полимерлар ва синтетик каучук синтезида кенг қўлланилади . Ишлаб чиқаришдаги заҳарланишларнинг олдини олиш мақсадида ушбу модданинг токсиклиги даражасини ўрганиш қизиқиш уйғотади. Бу модда биринчи навбатда марказий нерв тизимига таъсир қилади ва бир қатор паренхиматоз органларда дистрофик ўзгаришларни чақиради [4]. Ушбу иш тажриба ҳайвонларда ўтказилган морфологик тадқиқот бўлиб, метилвинилпиридиннинг нейрогуморал тизим органлари — буйрак усти безиларнинг гистотузилишига таъсирини ўрганиш натижаларини тақдим этади.

Тадқиқот мақсади

Метилвинилпиридин таъсирида буйрак усти безиларнинг гистологик тузилишидаги ўзгаришларни ўрганиш.

Материаллар ва усуллар

Тажриба ҳайвонларнинг вазни 180–240 г бўлган 12 та оқ каламушларда ўтказилди. Тажриба ҳайвонларига хлоропрен учиқли игна ўрнатилган шприц ёрдамида оғиз орқали МВП эритмаси юборилди. Назорат ҳайвонларига худди шундай усулда оддий сув берилди. Синов моддаси турли дозаларда қўлланилди. Биринчи серияда 12 та оқ каламушга 0,01 мг/кг дозада МВП берилди; иккинчи серияда 12 та ҳайвонга 0,1 мг/кг гача; учинчи серияда 27 та каламушга 1,0 мг/кг ўз вазнига қараб юборилди. Гистологик ишлов учун буйрак усти безилар олиниб, кальций-формалинда фиксация қилинди. Музлатувчи микротомда олинган кесмалар гематоксилин-эозин билан ва Ван-Гизон усули бўйича бўялди.

Тадқиқот натижалари

Тажриба ҳайвонларининг буйрак усти безиларидан олинган гистологик кесмаларни ўрганишда шуни қайд этики, 0,01; 0,1 ва 1,0 мг/кг дозаларда 20 ва 40 сутка давомида оқ каламушлар организмига таъсир қилиш буйрак усти безларининг гистологик тузилишида ўзгаришларни чақирди. Бу буйрак усти бези тўқимасининг лимфоцитар инфильтрацияси, бириктирувчи тўқима капсуласи томирларининг, шунингдек, пўстлоқ қаватинингнинг барча зоналари томирлари ва мия моддаси синусларининг яққол реакцияси билан ифодаланди. Бунда томирлар кенгайган ва асосан лимфоцитлар ҳамда оз

миқдордаги эритроцитлар билан тўлган бўлиб, кўпинча уларнинг чегарада ҳудудларида кузатилди. Капсуладан бириктирувчи тўқима толалари тутамли зонага қалин қатламлар билан тушиб борган. Гематоксилин-эозин билан бўяшда буйрак усти бези бўстлоқ моддасида, коптокча қисмида, тутамли зонасида ва тўрли зоналари аниқ ажралиб турган. Бириктирувчи тўқима капсуласи остида кичикроқ тўқ ҳужайралар гуруҳлари кўринган. Каптокчали зонада ёруғроқ цитоплазма ва тўқ ядрога эга бўлган ўртача катталикдаги ҳужайралар орасида кўпинча митозлар учраган. Тутамли зона ҳужайралари ҳар хил ўлчамда, полигонад шаклда ва уяачали шаклда цитоплазмага эга бўлган. Кўплаб ҳужайраларда яхши кўринадиган ядрочага эга катта ёруғ ядролар аниқланади. Шу билан бирга катта майдонларда тўқроқ, тузилмасиз, кичикроқ ядро ва тўқ цитоплазмага эга ҳужайралар ҳам кузатилган. Тўрсимон зона тўқималарини гематоксилин-эозин билан бўяшда тўқроқ фон кўринишида бўлиб, унинг майда ҳужайралари толалар шаклида тўр ҳосил қилган. Бу ҳудудда тарқоқ ва ўчоқли лимфоцитар инфильтрация энг яққол ифодаланган. Бу зоннинг айрим синус капиллярлари эритроцитлар билан тўлган ҳолда кўринади. Мия моддасининг хромаффин ҳужайралари бир-бирига зич жойлашган, уялар шаклида бўлиб, улар орасида анча кенг синуслар мавжуд бўлиб, уларнинг ички чегарасида битта-битта лимфоцитлар, ташқи деворида очаглар ва хромаффин ҳужайралари фонида тарқоқ ҳолда учрайди. 0,1–1,0 мг/кг дозаларда 40 сутка давомида МВП таъсиридан кейин бир ойлик тикланиш даврида буйрак усти бези капсуласи ва пўстлоқ қаватининг ҳужайралараро бириктирувчи тўқима қатламлари томонидан шиш ҳолатлари, қон қуйилишлар майдонлари, томирлар стази белгилари, кучлироқ тарқоқ ва томир атрофидаги (асосан лимфоцитар) инфильтрация, тутамли ва тўрсимон зоналар тўқимасига эритроцитларнинг диапедези аниқланди.Тутамли зонада интерренал толаларнинг радиал йўналишининг қўпол бузилиши устунлик қилган, уларнинг ҳужайралари орасида бўлинаётган ва дистрофик ўзгарган гуруҳлар топилган. Шу билан бирга тутамли зон ва унинг интерренал ҳужайраларининг гипертрофияси, дистрофик шакллар, эпителиал толаларнинг радиаллигининг бузилиши, шунингдек коптокчали ва тўрсимон зоналарда кислотали мукополисахаридларнинг кам тўпланиши аниқланади.

Хулоса

Олинган маълумотларни таҳлил қилиш шуни кўрсатадики, метилвинилпиридиннинг ҳайвон организмига 20, 40, 70, 90 сутка давомида 0,01–1,0 мг/кг дозаларда узоқ муддат таъсир қилиши буйрак усти безиларнинг гистологик тузилишида салбий ўзгаришларни чақиради. Хусусан: буйрак усти бези тўқималарининг барча зоналар ва мия моддасида тарқоқ ва ўчоқли лимфоцитар инфильтрация; томирларнинг кенгайиши ва қон билан тўлиши (стазгача), айниқса тўрсимон ва мия моддасида; тутамли зонада эпителиал толаларнинг радиал жойлашувининг қўпол бузилиши; реактив ва дистрофик ҳужайравий силжишлар; пўстлоқ қаватида кислотали мукополисахаридлар доналари миқдорининг камайиши кузатилган.

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РАЗВИТИЕ КРЕАТИВНОГО МЫШЛЕНИЯ У УЧАЩИХСЯ НАЧАЛЬНЫХ КЛАССОВ

Аннотация. *В статье рассматриваются педагогические условия развития креативного мышления у учащихся начальных классов. Обосновывается значимость творческой активности в формировании познавательной самостоятельности, гибкости мышления и способности к нестандартному решению учебных задач. Особое внимание уделяется роли учителя, учебной среды и интерактивных методов обучения в стимулировании творческого потенциала младших школьников.*

Ключевые слова. *креативное мышление, начальное образование, творческая активность, младшие школьники, познавательная самостоятельность, педагогические методы, учебная мотивация.*

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DEVELOPING CREATIVE THINKING IN PRIMARY SCHOOL STUDENTS

Abstract. *The article examines the pedagogical conditions for developing creative thinking in primary school students. It substantiates the importance of creative activity in shaping cognitive independence, flexibility of thinking, and the ability to solve educational tasks in non-standard ways. Particular attention is given to the role of the teacher, the learning environment, and interactive teaching methods in stimulating the creative potential of younger learners.*

Keywords. *creative thinking, primary education, creative activity, younger learners, cognitive independence, pedagogical methods, learning motivation.*

Введение

Современная система образования ориентирована не только на усвоение учащимися определённого объёма знаний, но и на развитие у них качеств, необходимых для успешной адаптации к быстро меняющимся условиям общества. Одним из таких качеств выступает креативное мышление, которое позволяет ребёнку видеть различные способы решения проблемы, проявлять инициативу, создавать новые идеи и выражать собственное отношение к окружающему миру. В условиях начального образования развитие креативного мышления приобретает особую значимость, поскольку именно в младшем школьном возрасте закладываются основы интеллектуальной активности, самостоятельности и устойчивого интереса к учению.

Проблема развития креативного мышления у учащихся начальных классов тесно связана с необходимостью совершенствования методов обучения. Традиционная передача готовых знаний уже не в полной мере отвечает задачам современной школы, поскольку ограничивает поисковую активность ребёнка и снижает его стремление к самостоятельному познанию. Напротив, использование развивающих заданий, проблемных ситуаций, игровых технологий, творческих упражнений и проектной деятельности способствует раскрытию индивидуальных возможностей каждого ученика. В педагогической практике становится важным не только научить ребёнка правильно отвечать, но и создать условия, при которых он сможет размышлять, сравнивать, фантазировать и делать собственные выводы.

Для начального образования особенно важно учитывать возрастные особенности детей. Младшие школьники отличаются высокой эмоциональностью, образным восприятием, склонностью к игре и активному воображению. Эти особенности создают благоприятную основу для развития креативного мышления, если педагог организует обучение с опорой на интерес, инициативу и самостоятельную деятельность учащихся. Следовательно, развитие креативного мышления должно рассматриваться как важнейшая педагогическая задача, направленная на формирование личности ребёнка, способной к творческому освоению знаний и активному участию в учебном процессе.

Основная часть

Развитие креативного мышления у учащихся начальных классов представляет собой сложный и целенаправленный педагогический процесс, в основе которого лежит организация такой образовательной среды, которая побуждает ребёнка к поиску, экспериментированию и самостоятельному выражению мыслей. Креативность в младшем школьном возрасте проявляется не только в художественной или игровой деятельности, но и в способности находить новые способы выполнения учебных заданий, задавать нестандартные вопросы, предлагать оригинальные идеи и проявлять гибкость в мышлении. Именно поэтому задача педагога состоит в

том, чтобы превратить урок в пространство интеллектуальной свободы и познавательной активности.

Эффективному развитию креативного мышления способствуют проблемное обучение, дидактические игры, творческие задания, коллективное обсуждение и межпредметная интеграция. Когда ученик получает возможность не воспроизводить готовую информацию, а самостоятельно анализировать, сравнивать и конструировать ответы, возрастает его учебная мотивация и уверенность в собственных силах. Важную роль играет речевая активность, поскольку умение обосновывать свою точку зрения, дополнять ответы сверстников и формулировать новые идеи усиливает интеллектуальную гибкость. Не менее значимо создание атмосферы психологической поддержки, при которой ошибка рассматривается не как неудача, а как естественный этап познания. При таком подходе учебный процесс становится средством не только усвоения знаний, но и формирования творческой, инициативной и мыслящей личности.

Заключение

Таким образом, развитие креативного мышления у учащихся начальных классов является одним из важнейших направлений современного педагогического процесса. Его значимость определяется тем, что именно в младшем школьном возрасте формируются основы интеллектуальной самостоятельности, познавательной активности и способности к нестандартному восприятию учебных ситуаций. Если обучение строится только на воспроизведении готовых образцов, творческий потенциал ребёнка раскрывается не в полной мере. Поэтому начальная школа должна стать пространством, где знания усваиваются через поиск, осмысление и личностное участие.

Педагогическая практика показывает, что креативное мышление наиболее успешно развивается в условиях использования проблемных заданий, игр, исследовательских упражнений, диалоговых форм работы и творческих проектов. Большое значение имеет и личность учителя, который направляет деятельность учащихся, поддерживает их инициативу и формирует атмосферу доверия. Развитие креативности способствует не только повышению качества обучения, но и формированию у детей уверенности в своих возможностях, интереса к познанию и готовности к активному взаимодействию с окружающим миром. Следовательно, развитие креативного мышления следует рассматривать как необходимое условие подготовки личности, способной к дальнейшему успешному обучению и творческой самореализации.

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ПОЛИТИЧЕСКИЕ И ФИЛОСОФСКИЕ ВЗГЛЯДЫ ПРОСВЕЩЕННЫХ ЖЕНЩИН УЗБЕКИСТАНА

Аннотация: *Женщины и их место в обществе всегда были важным критерием. Развитие любого государства и общества происходит на основе ряда факторов. В этом процессе вопрос о женщинах, их участии в общественно-политических отношениях и практическом обеспечении их прав и свобод рассматривается как важный показатель развития государств и демократии. В конце концов, женщины и их место в обществе всегда были важным критерием.*

Ключевые слова: *сообщество, репродуктивные права, женщины, законность, демократия.*

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POLITICAL AND PHILOSOPHICAL VIEWS OF EDUCATED WOMEN OF UZBEKISTAN

Abstract: *Women and their place in society have always been an important criterion. The development of any state and society is based on a number of factors. In this process, the issue of women, their participation in socio-political relations, and the practical implementation of their rights and freedoms is considered a key indicator of the development of states and democracy. Ultimately, women and their place in society have always been an important criterion.*

Keywords: *community, reproductive, rights, women, legality, democracy.*

В развитии любой социальной системы социально-демографический и духовно-просветительский потенциал женщин выступает важным фактором. Женщины являются не только слоем общества, обеспечивающим его репродуктивный потенциал, но и одним из ключевых институтов формирования нового поколения, его социализации и воспитания как гармонично развитой личности. С этой точки зрения создание равных прав и возможностей для женщин и мужчин является одной из приоритетных задач современного демократического общества. Теоретические основы данного

процесса опираются на принципы законности, гендерного равенства, недопущения дискриминации, открытости и прозрачности.

Политико-правовая культура женщин и их гражданская активность оцениваются как один из важных индикаторов развития государства и общества. В частности, активное участие женщин в процессах социально-политической модернизации, осуществляемой в Республике Узбекистан, имеет важное значение для укрепления общественной стабильности, развития демократических ценностей и формирования гражданского общества. В связи с этим повышение участия женщин в политических процессах, их правовой грамотности и социальной инициативности признаётся одним из приоритетных направлений государственной политики.

В условиях глобализации проблема формирования активной гражданской позиции нового поколения приобретает особую актуальность. В данном процессе роль женщин тесно связана с семейным воспитанием, образованием, передачей духовных ценностей и развитием общественного сознания. Поэтому в рамках проводимых в нашей стране реформ важной задачей определено создание условий для поддержки инновационных идей и инициатив женщин, а также их проявления в качестве активных субъектов экономической, политической и культурной жизни.

В стратегии развития Нового Узбекистана идея Третьего Ренессанса выдвигается как одна из центральных концепций. Успешная реализация данного стратегического направления непосредственно связана с развитием человеческого капитала, укреплением научного потенциала и возвышением национально-духовных ценностей. В этом процессе особое значение приобретает эффективное использование интеллектуального потенциала женщин, их широкое привлечение к научно-исследовательской деятельности, а также увеличение их доли на руководящих должностях.

В последние годы в республике формируются институциональные механизмы, направленные на поддержку женщин в сфере образования и науки. В частности, реализуются практические меры по стимулированию деятельности женщин-учёных, поддержке их научных исследований и финансированию инновационных проектов. Такой подход способствует увеличению доли женщин в интеллектуальном слое общества, развитию научных школ и ускорению научно-технического прогресса.

Роль женщин в развитии общества представляет собой многогранное социальное явление, неразрывно связанное с демографической стабильностью, духовным подъёмом, развитием гражданского общества и инновационным прогрессом. Поэтому всесторонняя поддержка женщин, расширение их прав и возможностей, а также реализация их научно-интеллектуального потенциала выступают важнейшим условием устойчивого развития.

Обеспечение полноценного участия женщин в управлении обществом и государством, а также их социально-экономическая и правовая поддержка являются одним из важнейших показателей современного демократического

развития. Реализация принципов гендерного равенства на практике способствует укреплению институциональных основ социальной справедливости, приоритета прав человека и устойчивого развития общества. С этой точки зрения реформы, осуществляемые в Республике Узбекистан, рассматриваются как системные меры, направленные на обеспечение прав и свобод женщин, повышение их социальной активности и расширение участия в системе государственного управления.

В последние годы государственная политика в отношении женщин вышла на качественно новый уровень. В частности, были коренным образом усовершенствованы правовые, организационные и институциональные механизмы поддержки женщин. Такой подход превратил защиту интересов женщин в одно из приоритетных направлений государственной политики. В результате значительно расширились возможности женщин в получении образования, трудовой деятельности, предпринимательстве, доступе к услугам здравоохранения, а также в участии в управлении государством и обществом.

Проводимая в нашей стране политика по обеспечению гендерного равенства и повышению роли женщин в общественно-политической жизни охватывает ряд приоритетных направлений. К ним относятся совершенствование национального законодательства о правах женщин, создание эффективной институциональной системы их защиты, повышение правовой культуры населения по вопросам гендерного равенства, а также подготовка ответственных кадров для обеспечения эффективного исполнения соответствующих норм в правоприменительной практике. Эти меры не только укрепляют положение женщин в обществе, но и способствуют развитию гражданского общества.

Правовые основы реформ, направленных на повышение достоинства женщин, нашли своё отражение в Конституции Республики Узбекистан и специальных нормативно-правовых актах. В частности, статья 46 Конституции закрепляет равноправие женщин и мужчин, а данная норма является фундаментальным правовым источником всех реформ, направленных на обеспечение гендерного равенства. В качестве практического выражения конституционных норм были приняты нормативно-правовые акты, защищающие интересы женщин, укрепляющие их правовой статус и расширяющие социальные гарантии.

В частности, принятие законов «О гарантиях равных прав и возможностей для женщин и мужчин», «О защите женщин от притеснений и насилия», а также «О сохранении репродуктивного здоровья граждан» стало важным этапом в сфере обеспечения прав женщин. Эти законы определили правовые механизмы защиты женщин от различных форм дискриминации, обеспечения их безопасности, поддержки здорового образа жизни и создания равных возможностей. Наряду с этим введение обязательной гендерно-правовой экспертизы нормативных актов способствует совершенствованию правовой базы на основе международных стандартов.

Особое значение в сфере обеспечения прав женщин имеет и международное сотрудничество. Республика Узбекистан присоединилась к основным международным документам, направленным на защиту женщин от дискриминации и насилия. Это позволяет гармонизировать национальное законодательство с международными нормами, внедрять глобальные стандарты прав человека в национальную практику и формировать эффективную систему защиты интересов женщин. Присоединение к международным документам также свидетельствует о приверженности страны демократическим реформам.

Принятие ряда указов и постановлений по инициативе главы государства, направленных на поддержку женщин, демонстрирует последовательность реформ в данной сфере. В частности, на практике реализуются меры по укреплению института семьи, обеспечению занятости женщин, развитию их предпринимательской деятельности, поддержке социально уязвимых слоёв населения, а также эффективному использованию возможностей института махалли. Такой подход позволяет выявлять проблемы женщин на местном уровне и решать их адресно.

Наряду с этим особую актуальность приобретают вопросы увеличения доли женщин в системе государственного управления, подготовки их к руководящим должностям и расширения участия в процессах принятия политических решений. Активное участие женщин в системе управления способствует повышению качества принимаемых решений, обеспечению баланса общественных интересов и развитию демократических институтов. В этой связи усиление активности женщин в политических партиях, государственных органах и институтах гражданского общества рассматривается как стратегическая задача.

Эффективность политики, направленной на поддержку женщин, определяется уровнем их реального участия в общественной жизни, экономической самостоятельности, правовой грамотности и социальной защищённости. В результате широкомасштабных реформ, реализуемых в данном направлении, роль женщин в развитии государства и общества неуклонно возрастает. Это, в свою очередь, выступает важным фактором обеспечения устойчивого развития страны, социальной справедливости и укрепления человеческого капитала.

Данные нормативно-правовые документы обладают особой научной и институциональной значимостью по своему содержанию и практической направленности. Во-первых, создание нового субъекта государственного управления — Государственного комитета по делам семьи и женщин, специализирующегося на системной и профессиональной работе с семьями и женщинами, способствует повышению эффективности управления в данной сфере. Во-вторых, определение приоритетных направлений единой государственной политики, направленной на поддержку женщин, защиту их прав и законных интересов, усовершенствовало механизмы стратегического управления в соответствующей области.

В-третьих, внедрение нового подхода к работе с женщинами в форме адресной и целевой деятельности на уровне махалли расширило возможности решения социальных проблем с учётом территориальных особенностей. В-четвёртых, введение прокурорского надзора за исполнением законодательства в целях обеспечения прав женщин и защиты их от притеснения и насилия повысило эффективность правоприменительной практики. В-пятых, внедрение системы государственных гарантий и льгот для получения женщинами образования, занятия научно-исследовательской и творческой деятельностью способствует развитию их интеллектуального потенциала.

В-шестых, совершенствование действующих механизмов поддержки женского предпринимательства и обеспечения достойного уровня жизни женщин выступает важным фактором повышения их экономической активности. В-седьмых, внедрение новой системы, направленной на сохранение здоровья женщин, раннюю диагностику заболеваний, имеющих гендерную специфику, усиление профилактических мер и охрану материнства, способствует повышению эффективности социальной политики. В-восьмых, применение современных механизмов взаимодействия с женщинами и создание эффективных коммуникационных платформ служат укреплению социального партнёрства между государством и обществом.

Таким образом, данные нормативно-правовые реформы формируют важную институциональную основу укрепления правового статуса женщин, повышения их социально-экономической активности и практической реализации принципов гендерного равенства.

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ПЕРСПЕКТИВЫ ПРИМЕНЕНИЯ БЕСПИЛОТНЫХ ЛЕТАТЕЛЬНЫХ АППАРАТОВ И ГИС-ТЕХНОЛОГИЙ В МОНИТОРИНГЕ ГИДРОТЕХНИЧЕСКИХ СООРУЖЕНИЙ

Аннотация*: В данной статье освещаются научно-практические основы использования современных технологий — беспилотных летательных аппаратов (UAV) и геоинформационных систем (GIS) при мониторинге технического состояния гидротехнических сооружений (ГТС). Проводится анализ преимуществ фотограмметрии и Lidar-технологий на основе UAV по сравнению с традиционными методами. Также рассматриваются этапы создания системы мониторинга в реальном времени на основе интеграции GIS и концепции «цифрового двойника» (Digital Twin), а также разработаны практические рекомендации.*

Ключевые слова*: гидротехнические сооружения, UAV, GIS, фотограмметрия, Lidar, цифровой двойник, мониторинг, фильтрация, безопасность.*

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PROSPECTS FOR THE APPLICATION OF UNMANNED AERIAL VEHICLES AND GIS TECHNOLOGIES IN MONITORING HYDRAULIC STRUCTURES

Abstract: *This article presents the scientific and practical foundations for the use of modern technologies—unmanned aerial vehicles (UAVs) and geographic information systems (GIS)—in monitoring the technical condition of hydraulic structures (HS). It analyzes the advantages of UAV-based photogrammetry and LiDAR technologies compared to traditional methods. The stages of developing a real-time monitoring system based on GIS integration and the Digital Twin concept are also discussed, and practical recommendations are provided.*

Keywords: *hydraulic structures, UAV, GIS, photogrammetry, LiDAR, digital twin, monitoring, filtration, safety.*

Гидротехнические сооружения (плотины, водохранилища, каналы) являются стратегической инфраструктурой государства и играют важную

роль в обеспечении энергетической и продовольственной безопасности. Поскольку большинство этих сооружений эксплуатируется на протяжении многих лет, возрастает необходимость регулярного и высокоточного контроля их технического состояния.

Традиционные методы мониторинга (визуальный осмотр и стационарные датчики) ограничены с точки зрения безопасности, оперативности и точности, что требует внедрения современных технологий. В этом контексте технологии UAV и GIS выступают как инновационное решение в мониторинге ГТС.

Научная новизна данного исследования заключается в следующем:

Предложена комплексная многоуровневая модель мониторинга гидротехнических сооружений на основе глубокой интеграции высокоточных аэрофотоснимков и сенсорных данных, полученных с помощью UAV, с современными GIS-платформами. Данная модель позволяет не только собирать данные, но и анализировать их в реальном времени и визуализировать результаты.

Разработана поэтапная модель создания «цифрового двойника» гидротехнических сооружений. Данная модель обеспечивает формирование цифровой копии реального объекта, динамическое отслеживание его состояния и прогнозирование потенциальных рисков.

Обоснованы научно-практические основы комплексного и согласованного применения технологий Lidar и фотограмметрии, что позволяет повысить точность мониторинга и более эффективно выявлять скрытые деформации и изменения рельефа. На основе глубокого анализа результатов мониторинга сформирована система практических рекомендаций по эффективному управлению гидротехническими сооружениями, направленных на предотвращение аварийных ситуаций, оптимизацию технического обслуживания и обеспечение их долгосрочной устойчивой эксплуатации.

В современной практике применяемые традиционные методы контроля имеют ряд существенных недостатков, которые значительно ограничивают эффективность мониторинга. Прежде всего, существуют проблемы, связанные с человеческим фактором и безопасностью, поскольку проведение инспекций в сложных и опасных условиях представляет угрозу для жизни специалистов, а также возможны ошибки, вызванные субъективной оценкой. Кроме того, при контроле сооружений, охватывающих большие территории, наблюдается низкая оперативность, так как полная проверка требует значительных временных и ресурсных затрат.

Также данные методы недостаточно эффективны для выявления скрытых дефектов, поскольку визуальный осмотр позволяет обнаружить лишь внешние изменения, тогда как внутренние микротрещины или процессы фильтрации часто остаются незамеченными. Ещё одним важным недостатком является точечный характер данных, поскольку стационарные датчики предоставляют информацию только из определённых мест и не

позволяют получить целостное представление о состоянии всего сооружения.

Данные недостатки усиливают необходимость внедрения комплексных, автоматизированных и высокоточных систем мониторинга гидротехнических сооружений.

Современные UAV предоставляют следующие возможности в мониторинге ГТС:

✓ Визуальный контроль: выявление трещин и деформаций с помощью изображений высокого разрешения (4K и выше);

✓ Фотограмметрия: создание 3D-моделей на основе последовательных изображений;

✓ Lidar-сканирование: определение рельефа и деформаций с миллиметровой точностью.

Сравнение LiDAR и фотограмметрии

Критерий	**Фотограмметрия**	**LiDAR**
Точность	Высокая (зависит от качества изображений)	Очень высокая (до мм)
Проникновение через растительность	Ограничено	Возможное
Стоимость	Относительно низкая	Более высокая
Тип данных	2D/3D изображения	Облако точек 3D
Область применения	Визуальный анализ	Анализ рельефа и деформаций

Геоинформационные системы (GIS) являются одной из ключевых платформ для эффективного управления, обработки и анализа данных, полученных при мониторинге гидротехнических сооружений. GIS обеспечивает не только хранение данных, но и их пространственный и временной анализ, а также визуализацию результатов, что способствует принятию обоснованных инженерных решений.

Основные возможности включают:

Пространственный анализ: с использованием современных платформ, таких как ArcGIS и QGIS, проводится анализ географического положения сооружений, зон деформаций, эрозии и других параметров.

Интеграция данных: объединение данных, полученных с UAV, Lidar и стационарных сенсоров в единую систему. Определение зон риска: автоматическое выявление и картографирование зон фильтрации, смещения и эрозии. Мониторинг во времени: анализ динамики изменений состояния сооружений.

Создание цифрового двойника ГТС включает следующие этапы:

1. Сбор данных (UAV, сенсоры)
2. Обработка данных (3D-модель)
3. Интеграция в GIS
4. Аналитика и прогнозирование

5. Мониторинг в реальном времени и управление

В рамках исследования проведён мониторинг участка ирригационного канала длиной около 12 км с использованием UAV. Были получены высокоточные аэрофотоснимки, на основе которых с помощью программного обеспечения Agisoft Metashape создана 3D-модель канала.

Далее модель была интегрирована в GIS-платформу ArcGIS, где проведён пространственный анализ. Результаты показали наличие зон усиленной эрозии и повышенной фильтрации, особенно в участках изгиба канала.

В выявленных зонах были проведены инженерные мероприятия: укрепление берегов бетонным покрытием, установка защитных конструкций и регулирование потока воды.

В результате потери воды снизились, а общая эффективность увеличилась на 15–20%. Это подтверждает практическую значимость UAV и GIS технологий.

Результаты исследования показали, что интеграция UAV и GIS:

• повышает точность мониторинга;

• обеспечивает раннее выявление опасных зон;

• оптимизирует управленческие решения.

В целом, совместное применение UAV и GIS технологий значительно повышает эффективность мониторинга гидротехнических сооружений, обеспечивая высокую точность, оперативность и безопасность.

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МАХАЛЛЯ КАК ИННОВАЦИОННЫЙ СОЦИАЛЬНЫЙ ИНСТИТУТ ДУХОВНО-НРАВСТВЕННОГО ВОСПИТАНИЯ МОЛОДЁЖИ В УСЛОВИЯХ ЦИФРОВОЙ ТРАНСФОРМАЦИИ

Аннотация: *статье рассматривается махалля как социальный институт, обеспечивающий духовно-нравственное воспитание молодёжи в условиях цифровой трансформации общества. Анализируются традиционные и современные функции махалли, её роль в системе общественного управления, а также влияние цифровых технологий на её деятельность. Особое внимание уделяется механизмам взаимодействия махалли с молодёжью в условиях онлайн- и офлайн-коммуникации.*

Ключевые слова: *махалля, социальный институт, духовно-нравственное воспитание, цифровая трансформация, молодёжь, социальное управление, цифровые технологии.*

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MAKHALLA AS AN INNOVATIVE SOCIAL INSTITUTION FOR THE SPIRITUAL AND MORAL EDUCATION OF YOUTH IN THE CONTEXT OF DIGITAL TRANSFORMATION

Annotation: *The article examines the makhalla as a social institution that ensures the spiritual and moral education of youth in the context of digital transformation of society. The traditional and modern functions of the makhalla, its role in the system of public governance, as well as the impact of digital technologies on its activities are analyzed. Special attention is paid to the mechanisms of interaction between the makhalla and youth in conditions of online and offline communication.*

Keywords: *makhalla, social institution, spiritual and moral education, digital transformation, youth, social governance, digital technologies.*

Махалля представляет собой традиционный социальный институт, сформировавшийся в процессе исторического развития узбекского общества. Она выполняет функции первичного уровня социальной организации, обеспечивая регулирование общественных отношений и передачу культурных и нравственных норм.

В современных условиях цифровой трансформации наблюдается расширение функционального содержания махалли, что связано с внедрением информационно-коммуникационных технологий в систему общественного управления.

В рамках современной социальной системы махалля выполняет ряд ключевых функций, которые обеспечивают стабильность общественных отношений и способствуют развитию местного самоуправления.

Махалля играет важную роль в системе адресной социальной помощи. Она выявляет семьи, нуждающиеся в материальной или моральной поддержке, и координирует оказание помощи через государственные и общественные механизмы.

Например, через электронные базы данных и социальные реестры махалля может определить малообеспеченные семьи и организовать предоставление им продуктовой помощи, субсидий или медицинской поддержки. В период кризисных ситуаций, таких как пандемия, именно махалля обеспечивала оперативное распределение гуманитарной помощи среди населения.

Одной из важнейших функций махалли является формирование у молодёжи духовно-нравственных ценностей и профилактика негативных явлений, таких как правонарушения, безнадзорность и вредные привычки.

Например, в рамках махалли регулярно проводятся профилактические беседы с участием педагогов, психологов и сотрудников правоохранительных органов. Также организуются спортивные соревнования, конкурсы чтения и встречи с успешными представителями профессий, что способствует формированию положительных жизненных ориентиров у молодёжи.

Махалля выступает платформой для организации и координации различных общественных инициатив, направленных на развитие территории и повышение социальной активности граждан.

Например, жители махалли совместно организуют субботники (хашары), благоустройство дворов, посадку деревьев, ремонт детских площадок. Кроме того, молодёжные инициативные группы при поддержке махалли реализуют проекты в сфере экологии, волонтёрства и цифровой грамотности.

Махалля выполняет функцию связующего звена между государственными органами и населением, обеспечивая оперативное выявление социальных проблем и передачу информации на уровень управления.

Например, через цифровые платформы и мобильные приложения жители могут сообщать о коммунальных проблемах (неисправное освещение, состояние дорог, социальные трудности). Эти обращения систематизируются махаллей и передаются в соответствующие государственные структуры для дальнейшего решения.

Цифровизация деятельности махалли проявляется в использовании электронных баз данных, онлайн-платформ и информационных систем, направленных на повышение эффективности социального управления.

В частности, взаимодействие с молодёжью осуществляется посредством комбинированных форм коммуникации (офлайн и онлайн), включая социальные сети и цифровые образовательные платформы. Данный подход способствует расширению охвата молодёжной аудитории и повышению оперативности передачи информации.

С педагогической точки зрения махалля выполняет функцию неформального института социализации, в рамках которого формируются такие ценности, как социальная ответственность, уважение к старшим, гражданская позиция и коллективизм.

Таким образом, махалля в условиях цифровой трансформации сохраняет свою традиционную социальную значимость, одновременно приобретая новые функции, связанные с цифровым управлением и коммуникацией. Она выступает важным элементом системы духовно-нравственного воспитания молодёжи и социальной стабильности общества.

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ПРОБЛЕМЫ ОБЕСПЕЧЕНИЯ ФИНАНСОВОЙ БЕЗОПАСНОСТИ СУБЪЕКТОВ МАЛОГО БИЗНЕСА И ПУТИ ИХ ПРЕОДОЛЕНИЯ

Аннотация*: В статье рассматриваются ключевые проблемы обеспечения финансовой безопасности субъектов малого бизнеса в современных экономических условиях. Особое внимание уделяется внутренним и внешним факторам риска, влияющим на устойчивость финансовой деятельности малых предприятий, включая недостаточность собственного капитала, ограниченный доступ к кредитным ресурсам, низкий уровень финансового планирования, инфляционное давление, налоговую нагрузку и нестабильность рыночной среды. Проанализированы основные угрозы, возникающие в процессе функционирования субъектов малого бизнеса, а также выявлены наиболее уязвимые элементы их финансовой системы. На основе системного подхода обоснованы практические пути повышения финансовой безопасности, включающие совершенствование механизмов внутреннего контроля, внедрение инструментов финансового мониторинга, диверсификацию источников финансирования, повышение уровня финансовой грамотности руководителей и применение современных цифровых технологий в управлении денежными потоками. Сделан вывод о том, что обеспечение финансовой безопасности малого бизнеса выступает важнейшим условием его устойчивого развития, повышения конкурентоспособности и адаптации к изменяющимся условиям хозяйствования.*

Ключевые слова: *финансовая безопасность, малый бизнес, финансовые риски, устойчивое развитие, внутренний контроль, финансовое планирование, кредитные ресурсы, цифровые технологии, денежные потоки, предпринимательская деятельность*

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PROBLEMS OF ENSURING FINANCIAL SECURITY FOR SMALL BUSINESSES AND WAYS TO OVERCOME THEM

Abstract*: This article examines the main problems of ensuring the financial security of small business entities in modern economic conditions. Particular attention is paid to internal and external risk factors affecting the financial stability of small enterprises, including insufficient own capital, limited access to credit resources, a low level of financial planning, inflationary pressure, tax burden, and instability of the market environment. The study analyzes the major*

threats arising in the operation of small business entities and identifies the most vulnerable components of their financial system. Based on a systemic approach, practical ways to strengthen financial security are substantiated, including the improvement of internal control mechanisms, the introduction of financial monitoring tools, the diversification of financing sources, the enhancement of managers' financial literacy, and the use of modern digital technologies in cash flow management. It is concluded that ensuring the financial security of small business is a crucial condition for its sustainable development, increased competitiveness, and adaptation to changing economic conditions.

***Keywords**: financial security, small business, financial risks, sustainable development, internal control, financial planning, credit resources, digital technologies, cash flows, entrepreneurial activity.*

Введение.

В современных условиях развития рыночной экономики малый бизнес занимает важное место в обеспечении занятости населения, формировании конкурентной среды, насыщении внутреннего рынка товарами и услугами, а также в стимулировании инновационной активности. Для национальной экономики субъекты малого бизнеса выступают не только источником гибкости и адаптивности хозяйственной системы, но и фактором социальной стабильности, поскольку именно данный сектор способен быстро реагировать на изменения потребительского спроса, локальные экономические вызовы и структурные преобразования. Вместе с тем устойчивое функционирование малого бизнеса напрямую зависит от состояния его финансовой безопасности, которая отражает способность предприятия защищать собственные экономические интересы, противостоять внутренним и внешним угрозам, сохранять платежеспособность, финансовую устойчивость и потенциал дальнейшего роста.

Проблематика финансовой безопасности субъектов малого бизнеса приобретает особую актуальность в условиях усиления макроэкономической неопределенности, роста цен на ресурсы, нестабильности финансовых рынков, повышения кредитной нагрузки и усложнения конкурентной борьбы. Малые предприятия, в отличие от крупных хозяйствующих субъектов, как правило, обладают ограниченным запасом прочности, меньшими резервами ликвидности, слабее диверсифицированной структурой доходов и более высокой зависимостью от внешнего финансирования. Такие особенности делают их особенно уязвимыми перед инфляционными процессами, нарушениями денежных потоков, сокращением спроса, изменениями налогового регулирования и колебаниями процентных ставок.

Следует отметить, что финансовая безопасность малого бизнеса представляет собой многокомпонентную категорию, включающую в себя не только защиту финансовых ресурсов, но и эффективное управление

активами, обязательствами, доходами, расходами и инвестиционными решениями. Она проявляется в способности предприятия своевременно выявлять риски, минимизировать вероятность финансовых потерь, поддерживать достаточный уровень ликвидности и формировать условия для долгосрочного развития. При этом нарушение одного из элементов финансовой системы может вызвать цепную реакцию, затрагивающую платежеспособность, кредитную историю, деловую репутацию и общий уровень экономической устойчивости предприятия.

Для субъектов малого бизнеса характерен целый ряд специфических проблем, препятствующих достижению высокого уровня финансовой безопасности. К числу таких проблем относятся дефицит собственных оборотных средств, ограниченность доступа к долгосрочным и доступным кредитным ресурсам, недостаточный уровень финансового менеджмента, слабое использование инструментов прогнозирования и бюджетирования, а также низкая степень цифровизации финансовых процессов. Существенное влияние оказывают и внешние факторы, среди которых можно выделить нестабильность конъюнктуры рынка, изменение потребительских предпочтений, рост операционных издержек, усиление налоговой и административной нагрузки.

Актуальность темы обусловлена тем, что в современных условиях обеспечение финансовой безопасности малого бизнеса становится не частной управленческой задачей, а стратегическим направлением повышения жизнеспособности предприятий. Без формирования эффективной системы финансовой защиты невозможно обеспечить стабильное развитие бизнеса, повышение его инвестиционной привлекательности и укрепление позиций на рынке. В связи с этим исследование проблем финансовой безопасности субъектов малого бизнеса и разработка путей их преодоления имеют важное теоретическое и прикладное значение. Целью данного исследования является выявление основных угроз финансовой безопасности малого бизнеса, анализ факторов их возникновения и обоснование практических механизмов повышения устойчивости финансовой деятельности предприятий в современных экономических условиях.

Методы.

Методологическую основу исследования составил комплекс общенаучных и специальных методов, применение которых позволило всесторонне рассмотреть проблемы обеспечения финансовой безопасности субъектов малого бизнеса и определить эффективные направления их преодоления. Выбор методического инструментария был обусловлен сложностью исследуемого объекта, многоуровневым характером финансовых рисков и необходимостью сочетания теоретического анализа с прикладной интерпретацией хозяйственной практики. В рамках исследования финансовая безопасность малого бизнеса рассматривалась как интегральная характеристика, отражающая степень защищенности

финансовых интересов предприятия, устойчивость его денежного оборота, способность сохранять ликвидность, платежеспособность и адаптивность в условиях изменения внешней и внутренней среды.

На первом этапе исследования был использован метод теоретического анализа научной литературы, посвященной финансовой безопасности, риск-менеджменту, финансовой устойчивости и особенностям функционирования малого бизнеса. Данный метод позволил систематизировать существующие подходы к определению категории финансовой безопасности, выделить ее основные структурные элементы и уточнить специфику проявления финансовых угроз в деятельности субъектов малого предпринимательства. В рамках аналитического обзора были рассмотрены труды, посвященные механизмам финансового контроля, роли управленческих решений в поддержании устойчивости предприятия, а также современным подходам к оценке риска в условиях нестабильной рыночной среды.

Для выявления наиболее значимых угроз применялся системный подход, в соответствии с которым финансовая безопасность малого бизнеса анализировалась как взаимосвязанная система, включающая финансовые ресурсы, обязательства, каналы поступления доходов, структуру расходов, систему учета, контрольные процедуры и механизмы управленческого реагирования. Использование данного подхода позволило установить, что нарушения в одной из подсистем, например в сфере управления дебиторской задолженностью или планирования денежных потоков, способны негативно влиять на общее состояние финансовой устойчивости предприятия. Системный подход также дал возможность определить взаимосвязь между внешними экономическими рисками и внутренними организационно-финансовыми слабостями.

В исследовании был применен сравнительный метод, с помощью которого были сопоставлены различные факторы, влияющие на уровень финансовой безопасности субъектов малого бизнеса. Сравнение проводилось по таким параметрам, как уровень капитальной обеспеченности, доступность заемного финансирования, эффективность внутреннего финансового контроля, степень цифровизации управленческих процессов и способность предприятий к прогнозированию финансовых затруднений. Данный метод позволил выявить, что малые предприятия, обладающие даже ограниченными, но стабильно управляемыми финансовыми ресурсами и налаженной системой учета, демонстрируют более высокий уровень устойчивости по сравнению с организациями, ориентированными исключительно на краткосрочное реагирование на возникающие проблемы.

Существенное место занял метод факторного анализа, направленный на выявление причинно-следственных связей между финансовыми угрозами и результатами хозяйственной деятельности субъектов малого бизнеса. С его помощью были определены основные группы факторов, влияющих на финансовую безопасность: ресурсные, организационные,

институциональные, рыночные и поведенческие. К ресурсным факторам были отнесены объем собственных средств, структура активов, наличие резервов ликвидности. Организационные факторы включали качество финансового планирования, уровень компетентности руководства, наличие системы внутреннего мониторинга. Институциональные факторы были связаны с налоговым регулированием, условиями кредитования и административной средой. Рыночные факторы охватывали динамику спроса, инфляционные колебания и конкуренцию. Поведенческие факторы отражали управленческие ошибки, запоздалую реакцию на изменения и недооценку рисков.

Важным методом исследования выступил логико-структурный анализ, позволивший сформировать целостную модель обеспечения финансовой безопасности малого бизнеса. В рамках этого метода были выделены ключевые этапы построения системы финансовой защиты: идентификация угроз, оценка вероятности их наступления, определение уровня потенциального ущерба, выбор инструментов предупреждения и разработка корректирующих мер. Такой подход дал возможность структурировать исследуемую проблему не только как совокупность отдельных рисков, но и как процесс управления финансовой устойчивостью на постоянной основе. Особое внимание при этом уделялось профилактическому характеру мер, поскольку для малого бизнеса предупреждение финансовых потерь имеет большее значение, чем устранение уже наступивших негативных последствий.

В работе также использовался метод обобщения практического опыта функционирования субъектов малого бизнеса в условиях экономической неопределенности. На основе анализа типичных управленческих ситуаций были выделены наиболее распространенные проблемы: несбалансированность доходов и расходов, непрозрачность учета денежных потоков, высокая зависимость от одного сегмента клиентов, отсутствие резервного фонда и недостаточная проработанность финансовой стратегии. Обобщение практических подходов позволило сделать вывод о том, что финансовая безопасность в малом бизнесе во многом зависит не столько от объема имеющихся ресурсов, сколько от качества их распределения, способности руководства к раннему выявлению угроз и степени интеграции финансового анализа в повседневное управление.

Для интерпретации результатов был применен метод научной абстракции, с помощью которого были выделены наиболее существенные свойства и закономерности формирования финансовой безопасности малого бизнеса. Это позволило отвлечься от частных различий между отдельными предприятиями и сосредоточиться на универсальных механизмах, характерных для большинства субъектов малого предпринимательства. Применение данного метода обеспечило возможность сформулировать практические рекомендации, обладающие прикладной значимостью для

широкого круга предприятий, функционирующих в условиях ограниченности ресурсов и повышенной неопределенности.

Таким образом, использованная методологическая база обеспечила целостность исследования и позволила раскрыть финансовую безопасность малого бизнеса как сложную многомерную категорию, требующую комплексного подхода к анализу, оценке и управлению. Сочетание теоретических, сравнительных, системных и аналитических методов создало основу для дальнейшего выявления результатов исследования, их интерпретации и выработки обоснованных рекомендаций по повышению устойчивости субъектов малого бизнеса в современных условиях.

Результаты.

В результате проведенного исследования было установлено, что финансовая безопасность субъектов малого бизнеса формируется под воздействием совокупности взаимосвязанных факторов, среди которых доминирующее место занимают ограниченность финансовых ресурсов, нестабильность денежного потока, недостаточная развитость системы внутреннего контроля и высокая чувствительность к изменениям внешней экономической среды. Анализ показал, что для большинства малых предприятий финансовая безопасность не рассматривается как самостоятельное стратегическое направление управления, а воспринимается лишь как реакция на уже возникшие проблемы. Подобный подход существенно снижает способность бизнеса своевременно выявлять угрозы, предупреждать потери и сохранять устойчивость в условиях рыночной неопределенности.

Одним из значимых результатов исследования стало выявление того, что наиболее распространенной угрозой финансовой безопасности малого бизнеса является дефицит оборотных средств. Именно нехватка ликвидных ресурсов ограничивает возможности предприятия по своевременному исполнению обязательств, закупке сырья, оплате труда, расширению деятельности и формированию резервов. Выяснено, что при недостаточности собственных финансовых источников субъекты малого бизнеса становятся чрезмерно зависимыми от краткосрочных заемных средств, что усиливает их уязвимость перед изменением условий кредитования, ростом процентных ставок и задержками поступления выручки. Это, в свою очередь, создает условия для повышения общей финансовой напряженности и ослабления платежеспособности.

Исследование также показало, что важным дестабилизирующим фактором является слабость финансового планирования. Во многих малых предприятиях отсутствует четкая система бюджетирования, прогнозирования поступлений и расходов, анализа отклонений и оценки вероятных рисков. В результате управленческие решения принимаются ситуативно, без достаточного обоснования и без учета долгосрочных последствий. Установлено, что предприятия, не применяющие инструменты финансового прогнозирования, чаще сталкиваются с кассовыми разрывами,

ростом задолженности и снижением финансовой дисциплины. Напротив, даже простейшие формы планирования денежных потоков позволяют существенно повысить управляемость финансовой системы и сократить вероятность критических сбоев.

Существенным результатом исследования стало определение роли внутреннего контроля в обеспечении финансовой безопасности. Было выявлено, что отсутствие регулярного мониторинга финансовых показателей, слабая прозрачность расчетных операций и недостаточная регламентация финансовой ответственности сотрудников увеличивают риск ошибок, нецелевого использования средств и несвоевременного выявления кризисных явлений. Малые предприятия, в которых контроль финансовых операций носит формальный характер, чаще сталкиваются с неэффективным распределением ресурсов и утратой управляемости денежными потоками. В то же время наличие внутренней системы контроля, даже в упрощенной форме, способствует укреплению платежной дисциплины, повышению точности учета и более оперативному реагированию на негативные изменения.

Отдельный результат исследования связан с оценкой влияния внешней среды на уровень финансовой безопасности малого бизнеса. Установлено, что значительное воздействие оказывают инфляционные процессы, колебания потребительского спроса, повышение стоимости сырья и услуг, а также изменение налоговых и кредитных условий. Эти факторы особенно остро отражаются на предприятиях с узкой клиентской базой, недостаточной диверсификацией доходов и низким уровнем адаптивности. Анализ подтвердил, что малый бизнес, функционирующий без резервного фонда и без альтернативных каналов финансирования, значительно быстрее теряет устойчивость при возникновении внешних шоков.

Важным итогом исследования стало обоснование того, что цифровизация финансового управления выступает одним из наиболее перспективных направлений укрепления финансовой безопасности. Применение цифровых инструментов учета, контроля расходов, анализа движения денежных средств и оценки финансовых рисков позволяет повысить точность управленческих решений, сократить число финансовых ошибок и обеспечить более высокий уровень прозрачности хозяйственных операций. Было выявлено, что предприятия, использующие цифровые решения в управлении финансами, обладают большей способностью к раннему выявлению проблем и более эффективно поддерживают устойчивость в условиях нестабильного рынка.

Таким образом, результаты исследования подтвердили, что финансовая безопасность субъектов малого бизнеса определяется не только объемом доступных ресурсов, но и качеством финансового управления, степенью готовности к рискам, уровнем организационной дисциплины и способностью предприятия адаптироваться к изменениям внешней среды. Полученные выводы позволяют рассматривать финансовую безопасность

как системную основу устойчивого функционирования малого бизнеса и как необходимое условие его долгосрочного развития.

Обсуждение.

Полученные результаты позволяют утверждать, что проблема обеспечения финансовой безопасности субъектов малого бизнеса имеет комплексный и многоуровневый характер. Она не сводится исключительно к недостатку денежных средств или ограниченному доступу к кредитам, а охватывает всю систему финансового поведения предприятия, включая качество управленческих решений, уровень внутренней организации, способность к прогнозированию и готовность к противодействию внешним экономическим рискам. В этом контексте финансовая безопасность малого бизнеса должна рассматриваться не как вспомогательная функция учета или контроля, а как стратегическая основа устойчивого развития, напрямую влияющая на жизнеспособность предприятия в краткосрочной и долгосрочной перспективе.

Обсуждение результатов показывает, что одной из ключевых причин низкого уровня финансовой защищенности малого бизнеса является преобладание оперативного, а не стратегического управления. Во многих случаях руководители малых предприятий концентрируются на решении текущих задач, связанных с продажами, закупками, оплатой обязательств и удержанием клиентов, тогда как вопросы финансового прогнозирования, риск-анализа и формирования резервов остаются на втором плане. Подобная модель управления может быть оправдана на начальном этапе становления бизнеса, однако в условиях усиливающейся конкуренции и нестабильности экономической среды она становится источником дополнительных угроз. Именно отсутствие системного подхода к управлению финансами приводит к тому, что даже незначительные внешние колебания способны вызывать серьезные нарушения платежеспособности и устойчивости предприятия.

Особого внимания заслуживает тот факт, что малый бизнес значительно сильнее зависит от качества внутреннего управления, чем крупные хозяйствующие субъекты. Если крупные компании обладают возможностью перераспределения ресурсов, привлечения внешних консультантов и использования сложных аналитических систем, то субъекты малого бизнеса вынуждены действовать в условиях ограниченности кадровых, временных и финансовых ресурсов. Это означает, что ошибки в финансовом планировании, недостатки в учете или отсутствие контрольных процедур оказывают на них более выраженное и зачастую критическое воздействие. Следовательно, укрепление финансовой безопасности малого бизнеса должно начинаться не столько с внешней поддержки, сколько с формирования внутриорганизационной финансовой дисциплины и развития управленческой компетентности.

В ходе обсуждения важно подчеркнуть, что внешние риски, такие как инфляция, рост себестоимости, изменение спроса и нестабильность налогово-кредитной среды, не могут быть полностью устранены силами

самого предприятия. Однако их негативное воздействие может быть существенно снижено при условии наличия адаптивной финансовой политики. К числу таких адаптивных механизмов относятся диверсификация доходов, гибкое перераспределение расходов, создание резервных фондов, переход к более прозрачным цифровым системам учета и регулярный анализ финансовых показателей. Это позволяет сделать вывод о том, что финансовая безопасность малого бизнеса определяется не отсутствием рисков как таковых, а способностью предприятия своевременно распознавать угрозы и вырабатывать рациональные механизмы реагирования.

Отдельного обсуждения требует роль цифровизации в обеспечении финансовой безопасности. Современные цифровые инструменты не только облегчают учет и контроль финансовых потоков, но и создают предпосылки для повышения прозрачности, оперативности и точности управленческих решений. Для малого бизнеса это особенно важно, поскольку автоматизация позволяет компенсировать ограниченность человеческих ресурсов и снижать зависимость от субъективных управленческих ошибок. Вместе с тем внедрение цифровых решений требует определенного уровня финансовой и технологической готовности, что указывает на необходимость комплексной модернизации системы управления, а не простого технического обновления отдельных процессов.

Таким образом, обсуждение результатов исследования подтверждает, что финансовая безопасность субъектов малого бизнеса представляет собой динамичную категорию, формирующуюся на пересечении внутренних управленческих возможностей и внешних экономических вызовов. Ее обеспечение требует перехода от фрагментарных мер к системной модели финансового управления, основанной на прогнозировании, контроле, адаптации и рациональном использовании ресурсов. Именно в таком подходе следует видеть основу повышения устойчивости малого бизнеса и его способности к дальнейшему развитию в меняющихся хозяйственных условиях.

Заключение.

Проведенное исследование позволило установить, что обеспечение финансовой безопасности субъектов малого бизнеса является одной из ключевых предпосылок их устойчивого функционирования в условиях современной экономики. Малое предпринимательство, обладая высокой гибкостью, мобильностью и способностью быстро адаптироваться к изменениям рыночной конъюнктуры, одновременно остается наиболее уязвимым сегментом хозяйственной системы. Именно ограниченность собственных финансовых ресурсов, высокая зависимость от внешних условий и недостаточная институциональная защищенность делают малые предприятия особенно чувствительными к финансовым угрозам различного характера. В связи с этим финансовая безопасность должна рассматриваться не как частный элемент финансового менеджмента, а как стратегическая

категория, определяющая возможности сохранения платежеспособности, устойчивости и конкурентоспособности бизнеса.

В ходе исследования было доказано, что основными препятствиями на пути к обеспечению финансовой безопасности субъектов малого бизнеса выступают дефицит оборотных средств, ограниченный доступ к доступным кредитным ресурсам, слабое развитие систем финансового планирования, отсутствие полноценных механизмов внутреннего контроля и недостаточная готовность к управлению рисками. Существенное влияние оказывают и внешние факторы, в числе которых инфляционные процессы, рост издержек, нестабильность спроса, изменения налоговой среды и усиление конкурентного давления. Совокупное действие этих факторов повышает вероятность кассовых разрывов, накопления задолженности, снижения ликвидности и ослабления общей финансовой устойчивости предприятия.

Исследование показало, что успешное противодействие указанным угрозам возможно только при условии формирования комплексной системы финансовой безопасности, основанной на систематическом мониторинге финансового состояния, своевременном выявлении рисков и принятии превентивных управленческих решений. Особое значение в этой системе имеют внутреннее финансовое планирование, бюджетирование, контроль денежных потоков, оптимизация затрат и создание резервов ликвидности. Не менее важным направлением выступает повышение финансовой грамотности руководителей и собственников малого бизнеса, поскольку именно качество управленческих решений в значительной степени определяет способность предприятия преодолевать кризисные ситуации и сохранять устойчивость в условиях неопределенности.

Практическая значимость исследования состоит в том, что предложенные подходы к укреплению финансовой безопасности могут быть использованы субъектами малого бизнеса в качестве основы для совершенствования собственной финансовой политики. К числу наиболее эффективных мер следует отнести диверсификацию источников финансирования, внедрение инструментов внутреннего контроля, применение цифровых технологий в учете и анализе, регулярную оценку финансовых рисков, а также разработку антикризисных механизмов реагирования. Данные меры не требуют исключительно крупных ресурсных вложений, однако способны существенно повысить уровень защищенности предприятия и улучшить качество финансового управления.

Следовательно, финансовая безопасность малого бизнеса выступает не только условием сохранения текущей платежеспособности, но и важнейшим фактором долгосрочного развития, инвестиционной привлекательности и расширения рыночных возможностей. Чем выше уровень финансовой организованности предприятия, тем больше его способность к устойчивому функционированию в нестабильной экономической среде. В этой связи дальнейшее совершенствование теоретических и практических подходов к обеспечению финансовой безопасности субъектов малого бизнеса

представляет собой важное направление экономических исследований и управленческой практики, имеющее значимость как для самих предпринимательских структур, так и для общего развития экономики.

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ДИНАМИКА ЧИСЛЕННОСТИ НАСЕЛЕНИЯ ГОРОДОВ КРАЙНЕГО СЕВЕРА КАК ОТРАЖЕНИЕ КРИЗИСА ГОРНОДОБЫЧИ РЕГИОНА

Аннотация: *Демография является продолжением социально-экономической ситуации. А демография городов Крайнего Севера России является отражением ситуации в горнодобывающем комплексе в силу формирования большинства городов Северной зоны вокруг крупных предприятий добывающей промышленности. Текущее исследование демонстрирует демографические изменения для городов Северных регионов страны с 1970 по 2025 гг. В исследовании анализируются данные для всех 116 городов. Показано, что с уменьшением размера населенного пункта ухудшаются общие демографические показатели, что свидетельствует о серьёзных проблемах в горнодобывающем секторе Крайнего Севера страны.*

Ключевые слова: *города, демография, динамика, моногорода, ретроспективный анализ, факторы влияния, численность населения*

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POPULATION DYNAMICS OF CITIES IN THE FAR NORTH AS A REFLECTION OF THE REGION'S MINING CRISIS

Abstract: *Demography is an extension of the socioeconomic situation. The demographics of cities in Russia's Far North reflect the situation in the mining sector, as most cities in the Northern Zone are formed around large mining enterprises. This study demonstrates demographic changes for cities in the country's northern regions from 1970 to 2025. The study analyzes data for all 116 cities. It is shown that as the size of a settlement decreases, overall demographic indicators worsen, indicating serious problems in the mining sector of the country's Far North.*

Keywords: *cities, demography, dynamics, single-industry towns, retrospective analysis, influencing factors, population size*

Введение

Динамика численности населения города является наилучшей результирующей характеристикой социально-экономической обстановки, отражающая ситуацию объективнее иных статистических показателей. Это – итог долговременного влияния накопленных проблем или преимуществ, влияющих на миграцию населения, на естественный прирост (как следствие притока молодых кадров).

В текущем исследовании выбор динамики численности населения именно городов в качестве индикатора обусловлен с позиции возникновения ключевых городов Крайнего Севера России в первую очередь как центров горнодобывающей промышленности. И только во вторую очередь – как транспортных или исторически сложившихся центров. Именно горнодобыча является ключевым фактором возникновения и роста городов в Заполярье. А динамика численности их населения является отражением ситуации в горнодобывающем секторе. Кроме того, крайне невысокая инфраструктурная обеспеченность Северных регионов страны, высокий порог возможностей по созданию инфраструктуры для большого числа населённых пунктов в условиях Крайнего Севера, обуславливают в сумме преимущественное развитие относительно редких городов с высокой концентрацией населения в противовес равномерному расселению в более климатически и инфраструктурно благополучных регионах [4].

Н. А. Лебедева-Несевря и Ю. А. Симагин обращают внимание на то, что Северные регионы отличаются суровыми природными условиями, и лишь необходимость обслуживания крупных промышленных и горнодобывающих производств обуславливает возникновение и существование городов в неблагоприятных для жизни зонах [2, 5]. И это является уникальным опытом освоения арктических территорий в глобальном выражении, связанным с тем, что до 80% запасов полезных ископаемых страны залегают на территориях Крайнего Севера и приравненных к ним [3, 7].

Исходя из изложенных выше соображений, можно считать обоснованным мнение о том, что динамика численности населения городов Крайнего Севера является продолжением кризиса или, напротив, роста горнодобывающих предприятий регионов. В исследовании использовались данные переписей населения городов РСФСР, а также данные текущего статистического учёта Росстата.

Результаты исследования.

Общее количество городов на территориях Крайнего Севера или местностей, приравненных к ним, на 1 января 2025 г. составляло 116. Крупнейший – Якутск (373 тыс. жителей), наименьший – Верхоянск (745 человек). Для задач текущего исследования целесообразно разбить города по группам, исходя из их размера. И уже в рамках каждой группы анализировать демографическую динамику за рассматриваемый период – данные представлены в таблице 1. Кроме того, в таблице 1 справочно

показаны города с наибольшей динамикой изменения демографических показателей за период 1989-2025 гг. (по 5 городов с наибольшим приростом и наибольшей убылью населения).

Таблица 1.

Динамика численности населения городов Крайнего Севера и приравненных к ним территорий в 1970-2025 гг., тыс. чел.

Города	1970	1979	1989	2000	2010	2020	2025	2025 к 1989,%
Всего	**3973**	**5407**	**7080**	**6568**	**6237**	**6241**	**5910**	**83,5**
более 100 тыс.	2095	2886	3663	3429	3442	3557	3398	92,8
50-100 тыс.	630	867	1163	1113	1021	996	954	82,0
25-50 тыс.	434	668	1028	985	922	905	845	82,1
10-25 тыс.	555	697	882	762	642	595	553	62,7
менее 10 тыс.	259	290	344	279	210	187	161	46,8
Ханты-Мансийск	24,8	28,3	34,5	37,7	80,2	101	114	329,5
Пыть-Ях	-	-	17,1	41,6	41,5	39,6	41,2	241,0
Якутск	108	155	192	196	270	323	373	194,2
Лянтор	-	-	22,1	32,2	39,0	41,2	42,5	192,4
Лангепас	0,0	0,0	25,6	40,2	41,7	44,6	44,8	175,0
Инта	50,2	50,9	60,2	50,5	32,1	24,1	18,7	31,1
Певек	10,5	11,1	12,9	5,6	4,2	4,5	3,9	30,2
Сусуман	12,6	16,0	16,8	8,9	5,9	4,4	4,2	24,7
Игарка	16,1	16,9	19,0	9,8	6,2	4,3	3,6	18,8
Островной	7,0	9,0	14,0	10,3	2,2	1,7	1,2	8,8

Источник – составлено автором по материалам исследования.

Как видно из таблицы 1, в целом демография городов Крайнего Севера России демонстрирует отрицательную динамику с 1989 г., хотя с 1970 по 1989 гг. численность их населения выросла почти вдвое: с 3793 тыс. до 7080 тыс. человек. При этом максимальными темпами с 1970 по 1989 гг. росла группа городов 25-50 тыс. человек населением (рост в 2,4 раза). Вторая по динамике группа с населением 50-100 тыс. (Рост в 1,9 раза). В этот период, например, возникли такие города как Пыть-Ях, Лянтор и Лангепас, отмеченные в таблице 1. Динамика численности населения в целом свидетельствует о том, что государственное планирование в освоении ресурсов Крайнего Севера до 1989 г. опиралось на создание сети городов среднего размера.

С 1989 г. по данным таблицы 1 можно отметить падение численности населения городов Крайнего Севера для всех категорий. Но чем меньше размер категории, тем глубина падения заметнее: если численность населения городов более 100 тыс. человек в 2025 г. в сумме составляла 83,5% к уровню 1989 г., то малые города (менее 10 тыс.) – лишь 46,8%.

То есть, риск демографических проблем нарастает по мере снижения величины города. Это в принципе соответствует общероссийской тенденции: как отмечает А. П. Цыпин, малые города России демонстрируют наихудшие показатели убыли населения за последние десятилетия [6]. Это обусловлено

преимущественно тем фактом, что малые города (особенно на территориях Крайнего Севера), как правило, представляют собой монопрофильные образования вокруг одного крупного промышленного или горнодобывающего производства с безальтернативными экономическими перспективами в случае нарушения нормальной работы якорного предприятия [1].

Более детальный анализ позволяет заметить, что далеко не все города демонстрируют отрицательные тенденции. Всего 24 города показали рост численности населения за период 1989-2025 гг. Из них 5 с наибольшей положительной динамикой показаны в таблице 1. Это Ханты-Мансийск, Пыть-Ях, Якутск, Лянтор и Лангепас. Практически все города с положительной демографией расположены на территории ЯНАО, ХМАО, НАО или Якутии – регионов, специализирующихся на добыче нефти, газа и алмазов. Т.е. наиболее экспортоориентированных и финансово-ёмких направлений. Это позволяет поддерживать социально-экономическое положение и инфраструктуру данных городов с положительной динамикой.

Города Инта, Певек, Сусуман, Игарка и Островной сократили своё население от 3 до 10 раз. Это города, где преимущественно проблемы в градообразующих горнодобывающих отраслях привели к значительному падению численности населения – из указанных городов лишь Островной связан с расформированной военно-морской базой.

Заключение

Территориальная освоенность Крайнего Севера страны зависит от наличия тех или иных природных ресурсов и необходимости их разработки. Значительный масштаб месторождений, совмещённый с необходимостью территориального освоения и военного присутствия, создал уникальную в мировой практике сеть городов на большей части территории страны. И к настоящему времени подавляющая часть городов Российского Крайнего Севера существует благодаря градообразующим предприятиям горнодобывающего сектора. И наиболее благополучные города являются одновременно центрами добычи нефти, газа или алмазов. Однако, основная часть городов испытывает проблемы с демографией, являющимися продолжением экономических проблем градообразующих предприятий. И чем меньше размер города, тем больше глубина демографических проблем, прямо связанных с монопрофильной структурой экономики городов Крайнего Севера страны.

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ВОЗРАСТНЫЕ ОСОБЕННОСТИ МОРФОЛОГИИ КРЕСТЦОВОГО ОТДЕЛА СИМПАТИЧЕСКОГО СТВОЛА У КРОЛИКОВ

Резюме: *В статье изучена возрастная морфология поясничного отдела пограничного симпатического ствола у кроликов. Весь материал фиксировался в 12% растворе нейтрального формалина. Всего нами изучено 20 препаратов. 10 - у плодов, 10 - у взрослых кроликов. Использованы макроскопические и микроскопические методы исследования. Крестцовый отдел пограничного симпатического ствола у кроликов по форме, величине узлов и их топографии подвержен значительным вариациям. Получены данные о структурных изменениях симпатических узлов и ствола в зависимости от возраста животных.*

Ключевые слова: *кролики, симпатический ствол, поясничный отдел, величине узлов, плодов кролика, взрослых кроликов, возрастная морфология.*

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AGE-RELATED MORPHOLOGICAL CHARACTERISTICS OF THE SACRAL SEGMENT OF THE SYMPATHETIC TRUNK IN RABBITS

Abstract: *This article examines the age-related morphology of the sacral border sympathetic trunk in rabbits. All specimens were fixed in 12% neutral formalin. A total of 20 specimens were examined: 10 from fetuses and 10 from adult rabbits. Macroscopic and microscopic examination methods were used. The sacral border sympathetic trunk in rabbits exhibits significant variations in shape, node size, and topography. Data were obtained on structural changes in the sympathetic nodes and trunk depending on the animal's age.*

Keywords: *rabbits, sympathetic trunk, sacral region, node size, rabbit fetuses, adult rabbits, age-related morphology.*

Введение

Морфология пограничного симпатического ствола в целом и различных его отделов продолжает привлекать к себе внимание не только морфологов и физиологов, но и клиницистов [1,2]. Наименее обследованным

представляется крестцовый отдел симпатического ствола, противоречиво освещаемый в литературе и в настоящее время. Возрастным особенностям строения крестцового отдела пограничного симпатического ствола посвящена работа малым количество [3,4]. В приведенной литературе освещается главным образом морфология пограничного симпатического ствола человека. Лишь единичные работы [5,6] посвящены кролике, являющейся одним из наиболее частых объектов для различных экспериментов. Мы не нашли также в доступной нам литературе данных о возрастных особенностях крестцового отдела симпатического ствола у кроликов.

Цель исследования

Нами были изучено возрастных особенностях крестцового отдела симпатического ствола у кроликов.

Материалы и методы исследования

Выполняя один из разделов работы кафедры по возрастной морфологии нервной системы, мы изучили крестцовый отдел симпатического ствола у плодов кроликов и у взрослых кроликов. Весь материал фиксировался в 12% растворе нейтрального формалина. Всего нами изучено 20 препаратов. 10 - у плодов, 10 - у взрослых кроликов.

Результаты исследования

Чаще всего мы наблюдали три крестцовых узла (74,4%); два узла мы встретили в 13,3% случаев и один узел мы видели всего лишь один раз (1,1%).

У пяти взрослых кролики крестцовый симпатический отдел представлял одиночный ганглиозный тяж, в котором макроскопически нельзя было выделить отдельных узлов. Они представляются цилиндрическими, ромбовидными, конусовидными, треугольными и звездчатыми. Размеры узлов также весьма варьируют. У плодов кролика первых 10 дней жизни величина узлов колеблется в пределах от 0,2х0,2 мм до 2,0х0,5 мм. У плодов кролика двух месяцев отмечено значительное увеличение размеров узлов - от 0,6×0,4 мм до 3,9х2,1 мм. У взрослых кроликов узлы достигают 19,0х1,5 мм. При слиянии отдельных узлов последние у взрослых кролика представляют ганглиозную массу в виде ствола длиною до 36,0 мм, поперечником до 2,0 мм. Весьма интересным является вопрос о форме крестцовой симпатической цепочки целом, ее топографии и связях отдельных узлов. По нашим данным, наиболее часто происходит слияние вторых и третьих крестцовых узлов, либо всех трех узлов в одиночные более крупные образования, расположенные по средней линии крестца. Первоначально это метамерно расположенные первичные узлы, концентрирующиеся затем во второй стадии в единый тяж. На третьем этапе развития симпатикуса происходит дефинитивное расчленение ствола на отдельные узлы. Крупные концентрированные узлы, наблюдаемые во всех отделах симпатического ствола, следует рассматривать как результат того, что расчленения ствола во

внутриутробном периоде, как третьего этапа развития симпатикуса, не наступает.

На нашем материале мы наблюдали также симметричное залегание парной симпатической цепочки вблизи средней линии крестца. Нами отмечены и известные особенности формы крестцового симпатического ствола, связанные с полом. У самцов чаще встречаются крестцовые симпатические стволы в виде усеченной пирамиды. У самок подобная форма, по нашим наблюдениям, встречается в два раза реже. Представляет практический интерес вопрос о топографии крестцовых узлов. По нашим данным, первые крестцовые симпатические узлы расположены на 0,5-2,0 мм латеральнее срединной линии крестца, в 81,2% случаях соответственно первому крестцовому позвонку, в 13% случаев - на уровне верхней трети первого крестцового позвонка и в 5,8% случаев -на уровне нижней трети первого крестцового позвонка.

Вторые крестцовые узлы расположены на 0,5-1,5 мм латеральнее срединной линии крестца, в 79,2% случаев соответственно второму крестцовому позвонку, в 19,0% случаев на уровне нижней трети второго крестцового позвонка и в 1,8% случаев - на уровне верхней трети второго крестцового позвонка. В одном случае левый второй крестцовый узел располагался соответственно третьему крестцовому позвонку. Третьи крестцовые узлы расположены на 0,5-1,0 мм латеральнее срединной линии крестца, в 57,7% случаев соответственно третьему крестцовому позвонку, в 34% случаев на уровне нижней трети третьего крестцового позвонка, в 8,7% случаев третьи крестцовые узлы располагались на хряще между третьим крестцовым и первым хвостовым позвонками. Мы обнаружили поперечные связи между крестцовыми узлами 12 раза. Из них: между первыми крестцовыми узлами 7 раз, между вторыми - 3 и между третьими 2 раз. Перекрестных поперечных связей на нашем материале мы не встретили. От крестцовых узлов симпатического ствола чаще всего отходит одна, реже две соединительные ветви, которые направляются латерально к крестцовым спинномозговым нервам. Мы встретили отхождение одной соединительной ветви в 85,6% случаев и двух - в 14,4% случаев. По две соединительные ветви чаще отходят от первых крестцовых узлов. По нашим исследованиям, две соединительные ветви в 55,9% случаев отходят от первых крестцовых узлов, в 29,4% случаев - от вторых крестцовых узлов и в 14,7% случаев - от третьих крестцовых узлов.

На изученных нами 15 животных мы наблюдали в пяти случаях расщепление межузловых ветвей. В шести случаях, наиболее часто справа, нами отмечено слияние первого крестцового симпатического узла с каудальным поясничным узлом.

Вывод

Крестцовый отдел пограничного симпатического ствола у кроликов по форме, величине узлов и их топографии подвержен значительным вариациям. В крестцовом отделе симпатического ствола кроликов чаще всего

наблюдается три узла (74,4%) и реже всего один узел (1,1%). В преобладающем числе случаев между крестцовыми узлами имеются поперечные связи.

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ҚУЁНЛАРДА СИМПАТИК ПОЯНИНГ ДУМҒАЗА ҚИСМИНИНГ ЁШГА ХОС ХУСУСИЯТЛАРИ МОРФОЛОГИЯСИ

Аннатоция. *Ушбу мақолада қуёнларнинг симпатик пояси бел қисмининг ёшга боғлиқ морфологияси ўрганилади. Барча намуналар 12% нейтрал формалин эритмасида фиксация қилинди. Жами 20 та намуна текширилди: 10 таси хар ҳил ёшдаги янги туғилган қуёнлар хомиласида ва 10 таси вояга етган қуёнларда олиб борилди. Макроскопик ва микроскопик текшириш усуллари қўлланилди. Қуёнларда ёшига қараб симпатик поясининг думғаза қисми тугунларининг шакли, ўлчами ва топографиясида сезиларли морфологик ривожланиши аниқланди. Ҳайвоннинг ёшига қараб симпатик тугунлар ва танадаги структуравий ўзгаришлар ҳақида маълумотлар олинди.*

Калит сўзлар: *қуёнлар, симпатик пояси, думғаза қисми, тугун ҳажми, қуён ҳомилалари, вояга етган қуёнлар, ёшга боғлиқ морфология.*

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AGE-RELATED MORPHOLOGICAL CHARACTERISTICS OF THE SACRAL SEGMENT OF THE SYMPATHETIC TRUNK IN RABBITS.

Abstract: *This article examines the age-related morphology of the lumbar border sympathetic trunk in rabbits. All specimens were fixed in 12% neutral formalin. A total of 20 specimens were examined: 10 from fetuses and 10 from adult rabbits. Macroscopic and microscopic examination methods were used. The sacral border sympathetic trunk in rabbits exhibits significant variations in shape, node size, and topography. Data were obtained on structural changes in the sympathetic nodes and trunk depending on the animal's age.*

Keywords: *rabbits, sympathetic trunk, lumbar region, node size, rabbit fetuses, adult rabbits, age-related morphology.*

Кириш

Симпатик поясининг умумий морфологияси ва ёшга боғлиқ ўзгариши нафақат морфологлар ва физиологларнинг, балки клинистларнинг ҳам эътиборини жалб қилишда давом етмоқда [1,2]. Симпатик симпатик поянинг думғаза бўлинмаси ҳозирги кунгача адабиётларда қарама-қарши ёритилган энг кам ўрганилган бўлиб қолмоқда. Симпатик поянинг думғаза бўлинмасининг ёшга боғлиқ структуравий хусусиятларига бағишланган тадқиқотлар кам [3,4]. Бу тадқиқотлар асосан инсон симпатик поясининг морфологиясига қаратилган. Фақат бир нечта тадқиқотлар [5,6] энг кенг тарқалган экспериментал субъектлардан бири бўлган қуёнларга бағишланган. Шунингдек, мавжуд адабиётларда қуёнларда симпатик поянинг думғаза бўлинмасининг ёшга боғлиқ хусусиятлари ҳақида ҳеч қандай маълумот топилмади.

Тадқиқотнинг мақсади

Биз қуёнларда симпатик поянинг думғаза бўлинмасининг ёшга боғлиқ хусусиятларини ўргандик.

Материаллар ва усуллар

Асаб тизимининг ривожланиш морфологияси бўйича давом этаётган тадқиқотлари доирасида биз янги туғулган қуёнлар ҳомиласида ва вояга етган қуёнларда симпатик поянинг думғаза бўлинмасини ўргандик. Барча намуналар 12% нейтрал формалинда фиксация қилинди. Макроскопик ва микроскопик усуллар ёрдамида симпатик поянинг думғаза қисми морфологияси текширилди. Жами 20 та намуна ўрганилди: 10 таси янги туғулган қуёнлар ҳомиласида ва ва 10 таси вояга етган қуёнларда амалга оширилди.

Тадқиқот натижалари

Биз энг кўп учта турдаги тузулишга эга тугунни кузатдик. Шундан энг кўп 74,4% ни ташкил қилди. Иккинчи ҳолатда 13,3% ни ташкил қилди. Иккита тугун ва битта тугунли ҳолат фақат бир марта кузатилди (1,1%). Ўнта вояга етган қуёнларда думғаза симпатик пояси битта ганглион толадан иборат бўлиб, унда алоҳида тугунларни макроскопик усулда аниқлашни иложи бўлмади. Тугунлар шакли силиндрсимон, ромбсимон, конуссимон, учбурчак ва юлдузсимон тузулишга эга эди. Тугун ҳажми ҳам ёши ортган сайин сезиларли даражада фарқ қилди. Янги туғулган қуёнларда ҳаётнинг дастлабки 10 кунида тугун ҳажми 0,2 х 0,2 мм дан 2,0 х 0,5 мм гача бўлган. Икки ойлик қуёнларда тугун ҳажмининг сезиларли даражада ошиши кузати7лди. Бунда - 0,6 х 0,4 мм дан 3,9 х 2,1 мм гача катталашди. Вояга етген қуёнларда тугунлар 19,0 х 1,5 мм га катталашди. Айрим холатда вояга етган қуёнларда тугунлар бирлашганда, уларнинг узунлиги 36,0 мм гача ва диаметри 2,0 мм гача бўлган овал шаклида ганглион тўқима ҳосил қилади. Бизнинг маълумотларимизга кўра, энг кенг тарқалган бирлашиш иккинчи ва учинчи думғаза тугунлар ёки учта тугун ўртасида думғазанинг ўрта чизиғи бўйлаб жойлашган битта, каттароқ шаклланишлар содир бўлади. Дастлаб, булар метамерик жойлашган бирламчи тугунлар бўлиб, улар кейин иккинчи

босқичда битта толага тўпланади. Симпатик поя ривожланишнинг учинчи босқичида тана аниқ индивидуал тугунларга бўлинади. Симпатик поянинг барча қисмларида кузатиладиган катта тўпланган тугунлар симпатик поя ривожланишнинг учинчи босқичи бўлган пренатал даврда симпатик поя танасининг иккиланиши натижаси деб ҳисоблаш мумкин. Тадқиқот олиб борган материалимизда биз думғазанинг ўрта чизиғи яқинида жуфтлашган симпатик поя занжирнинг симметрик жойлашувини ҳам кузатдик. Шунингдек, биз думғаза симпатик пояси шаклининг маълум жинсга боғлиқ хусусиятларини ҳам қайд етдик. Эркак жинсдаги қуёнларда кесилган пирамидал думғаза симпатик поялар кўпроқ учрайди. Аёл жинсдаги қуёнларда бу шакл, бизнинг кузатишларимизга кўра, икки баравар кам учрайди. Бизнинг маълумотларимизга кўра, биринчи думғазанинг симпатик тугунлари думғазанинг ўрта чизиғидан 0,5-2,0 мм латералда жойлашган бўлиб, бу 81,2% ҳолларда биринчи думғаза умуртқасига тўғри келади. Думғаза суяги биринчи умуртқасининг юқори учдан бир қисми рўпарасида 13% ҳолларда жойлашади. Шу умуртқанинг пастки учдан бир қисми 5,8% ҳолларда жойлашади. Думғаза симпатик поясининг иккинчи тугуни думғазанинг ўрта чизиқдан 0,5-1,5 мм латералда жойлашиш ҳолатлари 79,2% ни ташкил қилди. Думғаза симпатик поясининг иккинчи тугуни 19,0% ҳолларда иккинчи думғаза умуртқасининг пастки учдан бир қисмига тўғири келди. Шу умуртқанинг юқори учдан бир қисмида жойлашиш 1,8% ҳолларда кузатилди. Учинчи думғаза тугунлари думғазанинг ўрта чизиқдан 0,5-1,0 мм латералда жойлашади. 57,7% ҳолларда учинчи думғаза умуртқасига мос келади. 34% ҳолларда учинчи думғаза умуртқасининг пастки учдан бир қисми рўпарасига тўғри келади. 8,7% ҳолларда учинчи тугунлар учинчи думғаза ва биринчи дум умуртқалари орасидаги тоғайда жойлашади. Бизнинг тадқиқотларимиз вақтида симпатик пояни думғаза қисми тугунлари орасидаги кўндаланг нерв толалари билан боғланишларни 12 та холатда кузатдик. Шундан 7 та холатда биринчи тугунлар орасида, 3 та холатда иккинчи тугунлар орасида ва 2 та холатда учинчи тугунлар орасида учради. Биз 85,6% ҳолларда битта алоқа қилувчи шохчанинг ва 14,4% ҳолларда иккитасининг чиқиб кетишига дуч келдик. Кўпинча биринчи тугунлардан иккита алоқа қилувчи шохча чиқиб кетади. Бизнинг тадқиқотимизга кўра, 55,9% ҳолларда иккита алоқа қилувчи тармоқ ажралиб чиқди. Улар биринчи думғаза тугунлардан, 29,4% ҳолларда иккинчи думғаза тугунлардан ва 14,7% ҳолларда учинчи думғаза тугунлардан келиб чиқади. Биз ўрганган 15 та ҳайвонда бешта ҳолатда интернодал шохларнинг узулиши кузатилди. Олтита ҳолатда, кўпинча ўнг томонда, биз биринчи думғаза симпатик тугуннинг каудал бел тугуни билан бирлашишини кузатдик.

Хулоса

Қуёнларда симпатик поясининг думғаза қисмининг тугунларни шакли, ўлчами ва топографиясида ёшга боғлиқ ҳолда морфологиясида сезиларли даражада ўзгаришлар кузатилгани аниқладик. Қуёнларда симпатик поянинг думғаза қисмида кўпинча учта тугун (74,4%) ва энг кам ҳолларда битта тугун

(1,1%) кузатилди. Кўпгина ҳолларда симпатик поянинг думғаза қисмидаги т тугунлар ўртасида ўзаро боғлаб турган нерв толалари аниқланди.

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ВЛИЯНИЕ ПРЕДОПЕРАЦИОННОЙ АНЕМИИ НА РИСК РАЗВИТИЯ ПОСЛЕОПЕРАЦИОННЫХ КРОВОТЕЧЕНИЙ ПОСЛЕ ГЕМОРРОИДЭКТОМИИ

Аннотация: *Геморрой является широко распространённой аноректальной патологией и нередко диагностируется на поздних стадиях заболевания. Одним из основных клинических проявлений геморроя является кровотечение из прямой кишки, которое при длительном течении приводит к развитию анемии у пациентов. Предоперационная анемия оказывает неблагоприятное влияние на систему гемостаза и процессы тканевой регенерации, что может способствовать увеличению риска послеоперационных осложнений.*

Ключевые слова: *Геморрой; геморроидэктомия; метод Миллигана–Моргана; анемия; гемостаз; послеоперационное кровотечение*

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IMPACT OF PREOPERATIVE ANEMIA ON THE RISK OF POSTOPERATIVE BLEEDING AFTER HEMORRHOIDECTOMY

Abstract: *Hemorrhoidal disease is a common anorectal pathology and is often diagnosed at advanced stages. One of the main clinical manifestations of hemorrhoids is rectal bleeding, which, when prolonged, may lead to the development of anemia. Preoperative anemia adversely affects the hemostatic system and tissue regeneration processes, thereby increasing the risk of postoperative complications.*

Keywords: *Hemorrhoids; hemorrhoidectomy; Milligan–Morgan technique; anemia; hemostasis; postoperative bleeding*

Введение

Геморрой является одним из самых распространенных хронических заболеваний прямой кишки и анальной области, которое значительно снижает качество жизни пациентов и представляет собой серьезную проблему для системы здравоохранения. В клинической практике пациенты часто не обращаются к врачу на ранних стадиях заболевания, игнорируя свое состояние или ограничиваясь самолечением. В результате болезнь диагностируется на поздних и тяжелых стадиях, требующих хирургического

вмешательства [1].

Одним из основных клинических признаков геморроя является ректальное кровотечение. Повторяющиеся и длительные кровотечения из прямой кишки приводят к постепенному развитию у пациентов анемии (малокровия). Анемия часто протекает скрыто, ухудшая общее состояние больного, снижая его физическую работоспособность и сопровождаясь хронической гипоксией [2]. Данное состояние осложняет процесс предоперационной подготовки и негативно влияет на результаты хирургического лечения.

Цель данного исследования — оценить влияние предоперационной анемии на развитие послеоперационных кровотечений и течение восстановительного периода у пациентов, перенесших геморроидэктомию

Материалы и методы исследования

Данное исследование было проведено на основе ретроспективного наблюдения. Базой для исследования послужила клиника «Ibrohim Hakim tabobat» города Ферганы.

В исследование были включены клинические данные 324 пациентов, которым была выполнена геморроидэктомия по методу Миллигана–Моргана. Все оперативные вмешательства проводились в плановом порядке. В качестве объекта исследования были отобраны пациенты старше 18 лет, страдающие геморроем III–IV стадий.

Перед операцией все пациенты прошли стандартное клинико-лабораторное обследование, включая определение уровня гемоглобина в общем анализе крови.

Результаты и их обсуждение

В исследование было включено 324 пациента, перенесших геморроидэктомию по методу Миллигана–Моргана. Из них у 92 пациентов (28,4%) до операции была выявлена анемия (основная группа), а 232 пациента (71,6%) составили контрольную группу.

Послеоперационные кровотечения в общей сложности были зафиксированы у 18 пациентов (5,6%). При анализе по группам было установлено следующее:

В группе с анемией кровотечение наблюдалось у 12 из 92 пациентов (13,0%).

В контрольной группе кровотечение было отмечено у 6 из 232 пациентов (2,6%).

Между основной и контрольной группами выявлена статистически значимая разница по частоте послеоперационных кровотечений.

Анализ тактики остановки кровотечений показал:

В группе анемии из 12 случаев кровотечения в 10 случаях (83,3%) гемостаз был достигнут консервативными методами, а 2 пациентам (16,7%) потребовалось повторное хирургическое вмешательство.

В контрольной группе все 6 случаев (100%) кровотечения были купированы консервативно; потребности в повторных операциях не

возникло.

Необходимость в переливании крови (гемотрансфузии) возникла только в группе пациентов с анемией — процедура была проведена 2 больным (2,2%). В контрольной группе случаев гемотрансфузии зафиксировано не было.

Продолжительность пребывания в стационаре у пациентов с анемией была значительно выше. Средний койко-день в основной группе составил 7 суток, тогда как в контрольной группе этот показатель составил 5 суток.

Полученные результаты демонстрируют, что предоперационная анемия у пациентов, перенесших геморроидэктомию, напрямую коррелирует с повышением риска послеоперационных кровотечений, увеличением потребности в дополнительных гемостатических мероприятиях и гемотрансфузиях, а также с удлинением периода [4-5].

Заключение

Проведенное исследование подтверждает, что предоперационная анемия является значимым независимым фактором риска развития послеоперационных геморрагических осложнений у пациентов, перенесших геморроидэктомию по методу Миллигана–Моргана. Снижение уровня гемоглобина ниже 110 г/л коррелирует с пятикратным увеличением частоты послеоперационных кровотечений (13,0% против 2,6% в контрольной группе).

Анемия не только повышает риск кровотечений, но и отрицательно влияет на течение реабилитационного периода, увеличивая среднюю продолжительность пребывания пациента в стационаре и создавая необходимость в дополнительных гемостатических мероприятиях и гемотрансфузиях.

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ТАКТИКО-ЭКОНОМИЧЕСКИЙ АНАЛИЗ ПРИМЕНЕНИЯ РОЯ БЕСПИЛОТНЫХ ЛЕТАТЕЛЬНЫХ АППАРАТОВ: СРАВНЕНИЕ КИТАЙСКОЙ СИСТЕМЫ «ATLAS» И АМЕРИКАНСКИХ ПРОГРАММ «PERDIX/OFFSET»

Аннотация. *В статье рассматривается новейшая китайская система управления роем беспилотных летательных аппаратов (БПЛА) «Atlas» и проводится её тактико-экономическое сравнение с американскими программами «Perdix/OFFSET». Анализируются технические характеристики, алгоритмы взаимодействия, а также экономическая эффективность применения в современных конфликтах. Особое внимание уделено переходу от индивидуального управления аппаратами к сетецентрическим операциям под контролем одного оператора.*

Ключевые слова: *БПЛА, рой дронов, система «Atlas», спуфинг, экономическая эффективность, алгоритмическая война.*

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TACTICAL AND ECONOMIC ANALYSIS OF THE USE OF A SWARM OF UNMANNED AERIAL VEHICLES: A COMPARISON OF THE CHINESE ATLAS SYSTEM AND THE AMERICAN PERDIX/OFFSET PROGRAMS

Abstract. *This article examines the latest Chinese unmanned aerial vehicle (UAV) swarm control system, Atlas, and compares its tactical and economic performance with the American Perdix/OFFSET programs. The technical characteristics, interaction algorithms, and cost-effectiveness of its use in modern conflicts are analyzed. Particular attention is paid to the transition from individual control of UAVs to network-centric operations under a single operator.*

Keywords: *UAVs, drone swarms, Atlas system, spoofing, cost-effectiveness, algorithmic warfare.*

Развитие беспилотных технологий в КНР перешло на этап реализации «алгоритмической войны», где ключевым фактором становится не количество аппаратов, а эффективность их сетевого взаимодействия. Система «Atlas», разработанная корпорацией China Electronics Technology

Group Corp (CETC), представляет собой интегрированную цепь поражения (kill chain), объединяющую разведку, целеуказание и ударные функции в единый автономный цикл [1].

Система «Atlas» базируется на наземном мобильном узле и включает три ключевых компонента:

боевая машина Swarm-2. Мобильная пусковая установка, способная нести до 48 БПЛА самолетного типа;

командно-штабная машина. Позволяет одному оператору одновременно координировать до 96 беспилотников;

машина обеспечения. Отвечает за логистику, техническое обслуживание и непрерывность связи в ходе длительных миссий.

Интервал пуска: 3 секунды между аппаратами. Такой темп обеспечивает безопасную дистанцию и быстрое формирование плотного строя в воздухе без риска столкновений.

Полезная нагрузка: дроны могут оснащаться электрооптическими системами разведки, ударными боеприпасами или ретрансляторами связи.

Рассмотрим тактические алгоритмы и «умный мозг» роя. Основой тактики «Atlas» является использование ИИ-алгоритмов («умного мозга»), которые позволяют каждому аппарату в рое обмениваться данными и автономно корректировать положение в строю [2]. В ходе испытаний в марте 2026 года система продемонстрировала следующие возможности:

скоординированная разведка – рой автономно распределяет сектора обзора для поиска целей;

автономная идентификация – система способна выделить приоритетную цель (например, командирскую машину) среди нескольких визуально схожих объектов;

динамическое перегруппирование – возможность формирования многофункциональных групп внутри одного роя для одновременного выполнения различных задач (разведка, удар, подавление связи).

Китайские военные эксперты выделяют три основных сценария применения системы «Atlas» [2]:

1. Атаки насыщения. Перегрузка систем ПВО противника за счет одновременного подлета большого числа целей с разных направлений.

2. Высокоточные удары. Поражение мобильных целей с использованием барражирующих боеприпасов, имеющих более высокую точность, чем традиционная артиллерия.

3. Глубокое проникновение. Использование низковысотных профилей полета и малой заметности дронов для ударов по тыловой инфраструктуре на больших дистанциях.

Рассмотрим математические модели и алгоритмы автономного взаимодействия [3]. Эффективность системы «Atlas» строится на отказе от жесткой иерархии в пользу децентрализованного управления (Swarm Intelligence). Ключевыми алгоритмами здесь являются:

1) Алгоритм «Консенсуса» (Consensus Algorithm) – позволяет всем единицам роя прийти к единому решению о распределении целей без участия оператора. Если один дрон обнаруживает ПВО, информация мгновенно распространяется по сети, и рой перестраивает траекторию (облет флангом).

2) Метод искусственных потенциальных полей (APF) – используется для навигации в плотном строю. Каждая цель создает «притягивающее» поле, а соседние дроны и препятствия – «отталкивающее». Это исключает столкновения аппаратов при маневрах на высоких скоростях.

3) Динамическое распределение задач (Contract Net Protocol) – дроны «торгуются» между собой за выполнение задачи. Ближайший к цели аппарат с достаточным зарядом аккумулятора берет на себя ударную функцию, в то время как другие обеспечивают РЭБ-прикрытие или ретрансляцию сигнала.

Необходимо отметить эффективность системы «Atlas» против средств РЭБ (радиоэлектронной борьбы), которая строится на следующих технических решениях:

1. Псевдослучайная перестройка рабочей частоты (FHSS) – система меняет несущую частоту с очень высокой скоростью (тысячи скачков в секунду). Глушилка просто не успевает «приклеиться» к узкому диапазону, в котором в данный момент идет передача данных.

2. Адаптивное управление мощностью и частотой – «Атлас» анализирует уровень помех в реальном времени. Если конкретный участок спектра забит шумом, алгоритм автоматически исключает эти частоты из цикла перестройки и переходит на «чистые» каналы.

3. Широкополосная модуляция (LPI/LPD) – использование сигналов с низкой вероятностью перехвата и обнаружения. Энергия сигнала «размазывается» по широкому спектру, из-за чего он становится трудноотличимым от фонового шума для стандартных детекторов РЭБ.

4. Помехоустойчивое кодирование (FEC) – применение избыточности данных. Даже если часть пакетов будет потеряна из-за воздействия РЭБ, алгоритмы восстановления позволяют воссоздать целостную картинку или команду без повторной передачи.

5. Направленные антенны и цифровая обработка сигналов (DSP) – система способна формировать узкий луч в сторону оператора или спутника, игнорируя сигналы, приходящие с других направлений (где могут располагаться наземные станции помех).

Для борьбы со спуфингом (подменой координат) и глушением GPS китайская система «Atlas» (а также аналогичные платформы уровня AtlasPRO) применяет многоуровневую архитектуру защиты. Основная задача здесь – не просто «отфильтровать» шум, а сохранить навигацию в условиях, когда спутниковый сигнал полностью недоступен или намеренно искажен.

Вот ключевые технические параметры защиты навигации [4]:

1. Интеллектуальное обнаружение спуфинга (SDR-анализ). Система не просто принимает сигнал, а анализирует его структуру в реальном времени с помощью программно-определяемой радиосистемы (SDR), которая включает:

анализ мощности – спуфинговый сигнал обычно сильнее настоящего, так как должен «перебить» его. «Atlas» отслеживает резкие скачки амплитуды;

проверка доплеровского смещения – система сравнивает изменение частоты сигнала от каждого спутника с моделью движения БПЛА. Поддельный наземный сигнал не совпадает с этой моделью по параметрам Доплера;

временные метки – проверка соответствия меток времени между разными спутниками для выявления аномалий («скачков» времени) [3].

2. Технология Null-Steering (Цифровое формирование луча). Адаптивные антенные решетки позволяют системе «Atlas» физически «отсекать» помехи следующим образом:

формирование «нулей» – при обнаружении источника глушения или спуфинга с конкретного направления (например, снизу или сбоку), цифровой процессор создает «ноль» чувствительности в диаграмме направленности антенны в ту сторону;

приоритет «чистого» неба – антенна продолжает принимать чистые сигналы от спутников, находящихся в зените, игнорируя наземные средства РЭБ [5].

3. Комплексирование датчиков (Sensor Fusion). Если спутниковый сигнал признан недостоверным, «Atlas» переходит на автономный режим, используя данные от других систем:

инерциальная система (INS/IMU) – БПЛА опирается на акселерометры и гироскопы высокого класса, что позволяет продолжать полет по «счислению пути» (dead reckoning) в течение нескольких минут без накопления критической ошибки;

визуальная одометрия (VNS) – использование видеокамер для отслеживания перемещения относительно земной поверхности. Система сравнивает видеопоток с загруженными картами высот и ориентиров, что делает БПЛА полностью независимым от GPS. [5]

4. Режим «No GPS» и Mesh-навигация:

Ручное управление без GPS – в случае полного подавления спутников система позволяет оператору сохранять полный контроль над аппаратом в ручном режиме без потери ориентации в пространстве;

Навигация в рое (Mesh) – дроны в группе могут обмениваться данными о своем положении относительно друг друга. Если хотя бы один дрон в «облаке» (стае) поймал чистый сигнал, он транслирует координаты всей группе через защищенную Mesh-сеть. [5]

Сравнение китайской системы с ведущими западными разработками (программы DARPA) выявляет различия в доктринах. В то время как США

делают упор на интеграцию роев в тактическое звено (поддержка пехоты в городе), китайский «Atlas» спроектирован как инструмент стратегического сокрушения [6]. Это «дешевая крылатая ракета», которая за счет массовости делает бессмысленным использование дорогих зенитных ракет типа Patriot или IRIS-T (стоимость ракеты в десятки раз выше стоимости дрона).

Проведем экономическое сравнение систем управления роем БПЛА КНР и США. Современные концепции применения роя БПЛА формируются не только под влиянием технологических возможностей, но и в рамках ограничений военных бюджетов, стоимости вооружений и принципов экономической эффективности. В этой связи целесообразно рассмотреть сравнительный экономический анализ китайской системы «Atlas» и американских программ «Perdix/OFFSET».

Китайская модель «Atlas» ориентирована на концепцию массового дешёвого средства поражения, где ключевым показателем выступает отношение стоимости к боевому эффекту.

Условно показатель экономической эффективности можно представить, как:

$$E = \frac{P_{hit} \cdot V_{target}}{C_{drone}} \quad (1)$$

где:

P_{hit} – вероятность поражения цели;

V_{target} – ценность цели;

C_{drone} – стоимость одного БПЛА.

Для китайской системы характерно снижение C_{drone} за счёт серийного производства, упрощённой конструкции (барражирующие боеприпасы) и масштабного промышленного кластера КНР.

В отличие от этого, американские программы «Perdix» и «OFFSET» ориентированы на высокотехнологичные, но более дорогие решения, что увеличивает стоимость единицы системы при сохранении ограниченного ударного потенциала.

Таким образом, китайская модель демонстрирует более высокую экономическую эффективность в сценариях массового применения.

Рассмотрим стоимость преодоления ПВО (Cost Imposition Strategy). Одним из ключевых экономических факторов является стратегия навязывания затрат противнику. Китайская система «Atlas» реализует принцип:

$C_{attack} \ll C_{defense}$, где стоимость атаки существенно ниже стоимости обороны. Например, дешёвый дрон (условно десятки тысяч долларов), против него применяется дорогостоящая ракета ПВО (сотни тысяч или миллионы долларов) [6]. Это приводит к экономическому истощению обороняющейся стороны.

Американская концепция, напротив, ориентирована на снижение потерь личного состава, повышение точности, поддержку тактических подразделений.

Очевидно, что Китай делает ставку на экономическое истощение противника, США – на оптимизацию боевого применения при высокой стоимости единицы.

Экономическая эффективность также определяется способностью системы к масштабированию. Для КНР свойственны централизованное промышленное производство, возможность быстрого наращивания выпуска и низкая зависимость от импортных компонентов. Для США – высокая доля НИОКР, зависимость от сложных технологических цепочек и ограниченная скорость масштабирования.

Введём показатель масштабируемости:

$$S = \frac{N_{max}}{T_{deploy}} \quad (2)$$

где:

N_{max} – максимальное количество развертываемых БПЛА;

T_{deploy} – время развертывания.

Китайская система обладает более высоким значением S, что критично для ведения интенсивных конфликтов.

Проанализируем экономику жизненного цикла (Life-Cycle Cost). Полная стоимость системы включает не только закупку, но и эксплуатацию. К примру, для «Atlas» характерны низкие затраты на обслуживание, одноразовые ударные платформы и упрощённая логистика.

Для «Perdix/OFFSET» свойственна высокая стоимость эксплуатации, необходимость постоянного обновления ПО и ИИ, а также сложная инфраструктура управления.

Таким образом, китайская модель ближе к концепции расходуемого оружия, тогда как США инвестируют в долгосрочные технологические платформы.

Ключевое различие лежит и в экономических моделях. У КНР государственно-ориентированная модель с интеграцией ВПК и гражданской промышленности (dual-use экономика), а у США – рыночная модель с высокой ролью частных подрядчиков и DARPA. Всё это приводит к различиям в скорости внедрения технологий, в стоимости контрактов и в гибкости модернизации.

Таким образом, подводя итог, можно сказать, что система «Atlas» знаменует собой качественный скачок в китайской военной доктрине, переводя роевые технологии из области экспериментов в плоскость серийных операционных решений. Способность одного оператора управлять массовым формированием дронов радикально снижает человеческий фактор и повышает масштабируемость боевых операций.

Экономический анализ показывает, что:

система «Atlas» представляет собой инструмент асимметричного давления, основанный на массовости и низкой стоимости;

американские системы «Perdix/OFFSET» являются технологически продвинутыми, но более затратными решениями, ориентированными на точечное применение;

в условиях высокоинтенсивного конфликта преимущество получает модель с лучшим соотношением «стоимость-эффект-масштаб», что в текущей конфигурации характерно для китайского подхода.

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ГИСТОЛОГИЧЕСКИЕ ОСОБЕННОСТИ ИННЕРВАЦИИ ЯЗЫКА У ПЛОДОВ ОТДЕЛЬНЫХ ВИДОВ ЖИВОТНЫХ В ЭКСПЕРИМЕНТЕ

Аннотация. *Содержание статьи посвящено изучению иннервация языка у плодов крысы, кролика. Весь материал фиксировался в 12% растворе нейтрального формалина, резался на замораживающем микротоме и импрегнировался по методу Кампоса. Изучение языка после проведенной нами перерезки подъязычного нерва показало, что дегенерации подвергалось большое количество нервных пучков и волокон во всех отделах языка на стороне перерезки и в меньшем количестве на противоположной стороне.*

Ключевые слова: *эксперимент, крысы, кролика, кошки, плодов, метод Кампоса, все отделы языка, языкоглоточный нерв.*

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HISTOLOGICAL FEATURES OF THE INNERVATION OF THE TONGUE IN FETUSES OF CERTAIN ANIMAL SPECIES IN THE EXPERIMENT

Abstract. *The article is devoted to the study of the innervation of the tongue in rat and rabbit fetuses. All material was fixed in a 12% solution of neutral formalin, sectioned on a freezing microtome, and impregnated according to the Campos method. The study of the tongue after the hypoglossal nerve section performed by us showed that a large number of nerve bundles and fibers underwent degeneration in all parts of the tongue on the side of the section and to a lesser extent on the contralateral side.*

Keywords: *experiment, rats, rabbits, cats, fetuses, Campos method, all parts of the tongue, glossopharyngeal nerve.*

Введение

Нельзя не согласиться с заключением клиницистов о том, что вкусовой анализатор остается еще мало изученным и до настоящего времени. Это положение в равной степени относится как к центральному, так и к периферическому отделу анализатора. Так, нет, например, еще единогласия

в вопросе о функциональном значении отдельных иннервирующих язык источников [1,2]. Наиболее распространено представление о том, что единственным носителем вкусовых ощущений являются языкоглоточный нерв и ветви его, проходящие по барабанной струне в составе язычного нерва. Наряду с этим имеются утверждения о том, что языкоглоточный нерв является не только вкусовым нервом, но и проводником общей чувствительности [3,4].

Язычный нерв, по мнению одних авторов, является проводником общих видов чувствительности, а по утверждению других он проводит и ощущения вкуса. При этом ссылаются на то, что удаление гассерова узла влечет за собой не только потерю общей чувствительности языка, но и сопровождается нарушением вкуса на той же стороне. Не менее спорным представляется и вопрос о распределении нервов в той, либо иной области языка [5,6]. Передние ветви языкоглоточного нерва распространяются не только в пределах корня языка, но простираются за конечную бороздку в области спинки и краев языка[7,8]. Ветвями языкоглоточного нерва иннервируются не только желобовые сосочки языка, но и листовидные и грибовидные. Богатая иннервация языка и сложные взаимоотношения между отдельными иннервирующими его источниками являются основанием для все новых исследований в этом направлении.

Цель исследования

Изучить гистологические особенности иннервации языка у плодов отдельных видов животных в эксперименте.

Материалы и методы исследования

Нами изучена иннервация языка у плодов крысы, кролика проведены три серии экспериментов: у одних животных (кошки) производилась односторонняя перерезка язычного нерва, у других - языкоглоточного и у третьих подъязычного нерва. Животные забивались через 3-4-5 суток после операций. Весь материал фиксировался в 12% растворе нейтрального формалина, резался на замораживающем микротоме и импрегнировался по методу Кампоса. У подопытных животных исследовались все отделы языка — корень, тело и кончик, на правой и левой сторонах.

Результаты исследования

Изученный нами материал позволяет отметить особо мощное развитие нервных стволов языка. Уже у плодов обращает на себя внимание значительный калибр нервных пучков, формирующих эти стволы. Языка плода крысы можно видеть множество крупных нервных пучков, многократно ветвящихся и анастомозирующих эмбриологическими между собой. Большое внимание исследователей привлекает вопрос о перекрестной иннервации языка, о связях между его правыми и левыми одноименными нервами. Этот вопрос противоречиво освещается в литературе и в настоящее время. Проведенными в нашей лаборатории исследованиями показано, что после односторонней перерезки язычного нерва у кошки и собаки на противоположной перерезке стороне языка встречаются единичные

дегенерированные нервные волокна. Подобная же картина отмечена автором и после односторонней перерезки подъязычного нерва. Нами этот вопрос проверен как методом эксперимента, так и путем сериального изучения языков крысы и кролика, импрегнированных серебром. После перерезки язычного нерва мы наблюдали дегенерацию подавляющей части нервных волокон и пучков в области кончика и средней трети языка на стороне перерезки и распад как одиночных волокон, так и тонких пучков на противоположной стороне в тех же отделах языка. После перерезки языкоглоточного нерва можно было также отметить дегенерацию нервных проводников на противоположной перерезке стороне языка. Дегенерированные волокна обнаружены при этом не только в области корня языка, но и в его теле.

Изучение языка после проведенной нами перерезки подъязычного нерва показало, что дегенерации подвергалось большое количество нервных пучков и волокон во всех отделах языка на стороне перерезки и в меньшем количестве на противоположной стороне. Кроме того, мы наблюдали поперечные связи между правыми и левыми нервами языка у плодов изученных нами представителей. Так, на у плода кролика видны тонкие связи между противоположными нервами в области кончика языка. Таковы же наблюдения в языке эмбрионов кошки наблюдал нервные связи между ветвями подъязычного нерва и единичные - в области ветвления языкоглоточного нерва. В этом отношении убедительны также проведенные на большом материале исследования. Также наблюдал перекрестные связи между ветвями язычного, языкоглоточного и подъязычного нервов.

Перекрестная иннервация языка подтверждается и имеющимися клиническими наблюдениями. При заболеваниях тройничного нерва, сопровождающихся потерей и снижением общей чувствительности на одноименной стороне языка, выключение вкуса, однако, не отмечалось.

Вывод

Надо полагать, что имеющиеся данные об отсутствии в некоторых случаях связей между противоположными нервами языка следует рассматривать, как индивидуальные варианты строения нервных стволов языка. Большого внимания заслуживает дальнейшее изучение языка человека и особенностей его иннервации в связи с такой дополнительной функцией языка человека, как функция речи.

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ТАЖРИБАДА АЙРИМ ҲАЙВОНЛАР ХОМИЛАСИДА ТИЛ ИННЕРВАЦИЯСИНИНГ ЎЗИГА ХОС ГИСТОЛОГИК ТУЗУЛИШИ

Аннотация. *Ушбу тадқиқот каламуш ва қуёнлар ҳомиласида тил иннервациясини ўрганишга бағишланган. Барча материал 12% нейтрал формалин эритмасида фиксация қилинди. Музлатувчи микротомда кесилиб, Кампос усули бўйича импрегнация қилинди. Тил ости нервни экспериментал кесишдан сўнг тилни ўрганиш натижасида кесиш томонида тилнинг барча бўлимларида нерв тутамлари ва толаларининг катта қисми дегенерацияга учрагани, қарама-қарши томонда эса дегенерация анча камроқ миқдорда бўлгани аниқланди.*

Калит сўзлар: *эксперимент, каламуш, қуён, мушук, ҳомила, Кампос усули, тил иннервацияси, тил ости нерви, тил-ҳалқум нерви.*

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Abstract. *The article is devoted to the study of the innervation of the tongue in rat and rabbit fetuses. All material was fixed in a 12% solution of neutral formalin, sectioned on a freezing microtome, and impregnated according to the Campos method. The study of the tongue after the hypoglossal nerve section performed by us showed that a large number of nerve bundles and fibers underwent degeneration in all parts of the tongue on the side of the section and to a lesser extent on the contralateral side.*

Keywords: *experiment, rats, rabbits, cats, fetuses, Campos method, all parts of the tongue, glossopharyngeal nerve.*

Кириш

Клиницистларнинг таъм анализатори ҳозиргача етарлича ўрганилмаган деган хулосаси билан рози бўлмаслик мумкин эмас. Бу ҳолат анализаторнинг ҳам марказий, ҳам периферик бўлимига бирдек тегишли. Масалан, тилни иннервация қилувчи алоҳида манбаларнинг функционал аҳамияти ҳақида ҳали ҳам ягона фикр йўқ [1,2]. Энг кўп тарқалган тасаввурга кўра, таъм

ҳиссиётининг ягона ташувчиси тил-ҳалқум нерви ва унинг ноғара товуш толалари орқали тил нерви таркибида ўтувчи шохобчалари ҳисобланади. Шу билан бирга, тил-ҳалқум нерви нафақат таъм нерви, балки умумий сезги ўтказувчиси ҳам эканлиги ҳақидаги даъволар ҳам мавжуд [3,4].

Баъзи муаллифлар тил нервини фақат умумий сезги турларининг ўтказувчиси деб ҳисобласа, бошқалари унинг таъм ҳиссиётини ҳам ўтказишини таъкидлайди. Бунда Гассер тугунини олиб ташлаш тилнинг умумий сезгисини йўқотиш билан бирга, ўша томонда таъм ҳиссиётининг бузилишига ҳам олиб келади, деб далил келтирилади. Тилнинг турли соҳаларида нервларнинг тақсимланиши масаласи ҳам анча баҳслидир [5,6]. Тил-ҳалқум нервининг олдинги шохобчалари фақат тил илдизи ҳудудида эмас, балки терминал чизиқдан ўтиб, тилнинг орқа қисми ва четларига ҳам етиб боради [7,8]. Тил-ҳалқум нерви шохобчалари билан нафақат тилнинг тарновсимон сўрғичлари, балки баргли ва замбуруғсимон сўрғичлар ҳам иннервация қилинади. Тилнинг бой иннервацияси ва уни иннервация қилувчи манбалар ўртасидаги мураккаб ўзаро муносабатлар бу йўналишда янги-янги тадқиқотлар ўтказиш учун муҳим асос бўлиб хизмат қилади.

Тадқиқот мақсади

Айрим ҳайвон турлари ҳомилаларида тил иннервациясининг гистологик хусусиятларини тажрибада ўрганиш.

Материаллар ва тадқиқот усуллари

Тажриба каламуш ва қуёнлар ҳомилаларида тил иннервациясини ўргандик. Баъзи ҳайвонларда (мушуклар) тил нервининг бир томонлама кесилиши, бошқаларида — тил-ҳалқум нервининг, учинчиларда эса тил ости нервининг бир томонлама кесилиши амалга оширилди. Операциядан 3–4–5 сутка ўтгач ҳайвонлар декапутация қилинди. Олиндан материал 12% нейтрал формалин эритмасида фиксация қилинди. Гистологик препаратлар таёрлаш учун музлатувчи микротомда кесилди. Нейрогистологик текширув усулларидан Кампос усули бўйича импрегнация қилинди. Тажриба ҳайвонларида тилнинг барча бўлимлари — илдиз, тана ва уч қисми ўнг ва чап томонларда ўрганилди.

Тадқиқот натижалари

Ўрганилган материал тил нерв стволларининг жуда кучли ривожланганини кўрсатади. Ҳомилалардаёқ бу тутамларни ҳосил қилувчи нерв толаларининг йирик калибри эътиборни тортади. Каламуш ҳомиласи тилида бир-бири билан кўп марта шохланиб, эмбриологик анастомозлар ҳосил қилувчи йирик нерв тутамларининг кўплигини кўриш мумкин. Тадқиқотчиларнинг катта эътиборини тилнинг кесишма иннервацияси масаласи, яъни унинг ўнг ва чап томондаги бир хил нервлари ўртасидаги боғланишлар масаласи жалб этади. Бу масала адабиётда ва ҳозирги вақтда ҳам қарама-қарши ёритилмоқда. Бизнинг лабораториямизда ўтказилган тадқиқотлар шуни кўрсатдики, мушук ва итда тил нервининг бир томонлама кесилишидан кейин қарама-қарши томонда тилда якка-якка дегенерацияланган нерв толалари учрайди. Шунга ўхшаш манзара тил ости

нервининг бир томонлама кесилишидан кейин ҳам кузатилди. Биз бу масалани ҳам эксперимент усулида, ҳам каламуш ва қуён тилларини кумуш билан импрегнация қилиб, серияли ўрганиш йўли билан текширдик.Тил нервини кесгандан кейин кесиш томонида тилнинг учи ва ўрта учдан бир қисмида нерв толалари ва пучкларининг катта қисми дегенерацияга учрагани, қарама-қарши томонда эса ўша бўлимларда якка толалар ва ингичка тутамларнинг парчаланиши кузатилди. Тил-ҳалқум нервини кесгандан кейин ҳам қарама-қарши томонда нерв ўтказувчиларининг дегенерацияси аниқланди. Бунда дегенерацияланган толалар фақат тил илдизида эмас, балки унинг танасида ҳам топилди. Биз томонимиздан ўтказилган тил ости нервини кесишдан кейин тилни ўрганиш шуни кўрсатдики, кесиш томонида тилнинг барча бўлимларида нерв тутамлари ва толаларининг катта миқдори дегенерацияга учраган, қарама-қарши томонда эса камроқ миқдорда дегенерация кузатилган. Бундан ташқари, ўрганаётган ҳайвонлар ҳомилаларида тилнинг ўнг ва чап нервлари ўртасида кўндаланг боғланишлар ҳам мавжудлиги аниқланди. Масалан, қуён ҳомиласида тилнинг уч қисмида қарама-қарши нервлар ўртасида ингичка боғланишлар кўринади. Шунга ўхшаш кузатишлар мушук хомилалари тилида ҳам олинди: тил ости нерви шохобчалари ўртасида нерв боғланишлари ва тил-ҳалқум нерви шохланиши соҳасида якка-якка боғланишлар кузатилди. Бу борада катта материалда ўтказилган тадқиқотлар ҳам ишончлидир. Шунингдек, тил нерви, тил-ҳалқум нерви ва тил ости нерви шохобчалари ўртасида кесишма боғланишлар ҳам қайд этилди. Тилнинг кесишма иннервацияси мавжуд клиник кузатишлар билан ҳам тасдиқланади. Уч шоҳли нерв касалликларида тилнинг бир томонида умумий сезгининг йўқолиши ёки пасайиши кузатилганида таъм ҳиссиётининг йуқолиши қайд этилмаган.

Хулоса

Баъзи ҳолларда тилнинг қарама-қарши нервлари ўртасида боғланишлар йўқлиги ҳақидаги маълумотларни тил нерв тутамлари тузилишининг индивидуал вариантлари сифатида қараш лозим, деб ўйлаш мумкин. Инсон тили ва унинг иннервациясининг хусусиятларини, инсон тилининг нутқ функцияси каби қўшимча вазифаси билан боғлиқ ҳолда янада чуқур ўрганиш катта эътиборга лойиқдир.

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ИСПОЛЬЗОВАНИЕ ВИЗУАЛИЗАЦИИ ПРИ ИЗУЧЕНИИ АНАТОМИИ И ФИЗИОЛОГИИ ЧЕЛОВЕКА В МЕДИЦИНСКОМ КОЛЛЕДЖЕ

Аннотация. *В статье рассматривается проблема повышения эффективности изучения анатомии и физиологии человека в медицинском колледже посредством использования средств визуализации. Раскрывается роль визуального мышления в освоении морфологических и функциональных дисциплин. Анализируются различные виды визуализации (натуральные препараты, муляжи, таблицы, мультимедийные презентации, 3D-модели, анимационные ролики) и их дидактический потенциал. Представлены результаты экспериментальной работы по внедрению комплекса средств визуализации в процесс преподавания анатомии и физиологии человека. Обосновываются методические рекомендации по эффективному использованию визуализации на теоретических и практических занятиях.*

Ключевые слова: *анатомия человека, физиология человека, визуализация, медицинский колледж, наглядные методы обучения, 3D-моделирование, профессиональная подготовка.*

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THE USE OF VISUALIZATION IN THE STUDY OF HUMAN ANATOMY AND PHYSIOLOGY IN A MEDICAL COLLEGE

Abstract. *The article examines the problem of increasing the effectiveness of studying human anatomy and physiology in a medical college through the use of visualization tools. The role of visual thinking in the development of morphological and functional disciplines is revealed. Various types of visualization (natural preparations, dummies, tables, multimedia presentations, 3D models, animated videos) and their didactic potential are analyzed. The results*

of experimental work on the implementation of a set of visualization tools in the process of teaching human anatomy and physiology are presented. Methodological recommendations for the effective use of visualization in theoretical and practical classes are substantiated.

Keywords: *human anatomy, human physiology, visualization, medical college, visual teaching methods, 3D modeling, professional training.*

Изучение анатомии и физиологии человека является фундаментальной основой профессиональной подготовки будущих медицинских работников. Эти дисциплины формируют у студентов целостное представление о строении и функциях организма человека, что необходимо для понимания патологических процессов, диагностики заболеваний и оказания медицинской помощи. Однако анатомия и физиология относятся к числу наиболее сложных для усвоения дисциплин. Это обусловлено большим объемом терминологического материала, необходимостью запоминания пространственного расположения органов и систем, понимания динамических процессов и функциональных взаимосвязей. В связи с этим актуальной становится проблема поиска эффективных методов и средств обучения, способствующих более глубокому и осмысленному усвоению материала. Одним из таких средств является визуализация, которая позволяет перевести абстрактные знания в наглядные образы, облегчающие понимание и запоминание.

Визуализация в образовательном процессе представляет собой совокупность методов и приемов представления учебной информации в наглядно-образной форме. При изучении анатомии и физиологии человека визуализация играет особую роль, поскольку эти дисциплины являются преимущественно визуальными: понимание строения организма невозможно без представления формы, положения и взаимоотношений органов. К средствам визуализации, используемым в преподавании анатомии и физиологии, относятся: натуральные анатомические препараты (влажные препараты, скелет, отдельные кости, органы); муляжи и модели (торс человека, модели сердца, головного мозга, почек); плоскостные наглядные пособия (таблицы, схемы, плакаты, атласы); мультимедийные презентации (фотографии, рисунки, схемы с анимационными эффектами); 3D-модели и программы анатомического атласа (Primal Pictures, Visible Body, Complete Anatomy, «Анатомия. 3D-атлас»); анимационные ролики, демонстрирующие физиологические процессы (кровообращение, дыхание, пищеварение, нервную импульсацию); интерактивные тесты и задания с визуальным компонентом (определение структур на изображении, сопоставление названия и рисунка).

Каждое из перечисленных средств имеет свои дидактические преимущества и ограничения. Натуральные препараты обеспечивают наиболее достоверное представление о строении органов, но их использование ограничено (дефицит, необходимость специального

хранения, эстетические аспекты). Муляжи и модели доступны, безопасны, могут использоваться многократно, но упрощают реальную анатомию. Таблицы и плакаты дают обобщенное схематическое изображение, доступное для восприятия, но статичны. Мультимедийные презентации и 3D-модели позволяют демонстрировать структуры в динамике, вращать, приближать, рассматривать с разных сторон, но требуют технического оснащения. Оптимальным является комплексное использование различных средств визуализации на разных этапах изучения материала.

Для оценки эффективности использования средств визуализации в преподавании анатомии и физиологии человека было проведено экспериментальное исследование на базе ГБПОУ «Армавирский медицинский колледж». В исследовании приняли участие 80 студентов второго курса, обучающихся по специальностям «Лечебное дело» и «Сестринское дело». Были сформированы экспериментальная группа (40 человек), в которой изучение анатомии и физиологии осуществлялось с использованием комплекса средств визуализации (муляжи, 3D-атлас, анимационные ролики, интерактивные задания), и контрольная группа (40 человек), занимавшаяся по традиционной методике (преимущественно лекции с использованием таблиц и муляжей). Длительность эксперимента составила один семестр. Диагностика успеваемости проводилась до начала эксперимента и после его окончания с использованием: тестовых заданий для оценки знаний анатомической терминологии; контрольных работ по разделам (остеология, миология, ангиология); практических заданий по определению структур на муляжах и 3D-моделях; опроса удовлетворенности студентов методами обучения.

Результаты исследования показали следующее. На начальном этапе уровень знаний и умений в экспериментальной и контрольной группах был примерно одинаковым. После окончания эксперимента в экспериментальной группе произошло статистически значимое повышение успеваемости по сравнению с контрольной группой. Средний балл за теоретические тесты в экспериментальной группе повысился с 3,6 до 4,3 (в контрольной – с 3,7 до 3,9). Качество знаний (доля студентов, выполнивших задания на «4» и «5») в экспериментальной группе выросло с 45% до 72% (в контрольной – с 47% до 54%). Наиболее выраженные различия наблюдались при выполнении практических заданий: в экспериментальной группе 85% студентов правильно определили анатомические структуры на муляжах и 3D-моделях, в контрольной – 62%. Студенты экспериментальной группы отмечали, что 3D-модели и анимации помогают лучше представить пространственное расположение органов и динамику физиологических процессов, что делает материал более понятным и запоминающимся.

На основе полученных результатов были разработаны методические рекомендации по эффективному использованию визуализации при изучении анатомии и физиологии человека. На лекционных занятиях рекомендуется: использовать мультимедийные презентации с качественными

иллюстрациями (фотографии препаратов, схемы, 3D-изображения); демонстрировать анимационные ролики физиологических процессов (не более 2-3 минут); сопровождать визуальный ряд комментариями с акцентом на ключевые структуры; чередовать демонстрацию и объяснение для удержания внимания. На практических занятиях рекомендуется: организовывать работу в малых группах с муляжами и моделями; использовать 3D-атлас для демонстрации структур, которые сложно показать на муляжах; проводить интерактивные опросы с определением структур на изображениях; включать задания на сопоставление рисунка и названия, на последовательность анатомических структур. Для самостоятельной работы студентов рекомендуется: создавать наборы 3D-моделей для самостоятельного изучения; разрабатывать визуальные конспекты (схемы, рисунки, обозначения); использовать онлайн-тесты с визуальными заданиями; рекомендовать мобильные приложения с анатомическим атласом.

Таким образом, использование средств визуализации является эффективным методом повышения качества изучения анатомии и физиологии человека в медицинском колледже. Комплексное применение натуральных препаратов, муляжей, таблиц, мультимедийных презентаций, 3D-моделей и анимационных роликов способствует формированию у студентов целостного, наглядного представления о строении и функциях организма человека, облегчает запоминание терминологии и пространственных отношений, повышает интерес к изучению дисциплины. Наиболее эффективно использование визуализации на практических занятиях и при организации самостоятельной работы студентов. Разработанные методические рекомендации могут быть использованы преподавателями анатомии и физиологии медицинских колледжей и вузов. Дальнейшие исследования могут быть направлены на создание интерактивных виртуальных лабораторий по анатомии и физиологии, разработку мобильных приложений для самостоятельного изучения, а также на изучение влияния визуализации на долгосрочную сохранность знаний.

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ЛЕКАРСТВЕННЫЕ РАСТЕНИЯ, СОДЕРЖАЩИЕ ГЛИКОЗИДЫ: ФАРМАКОГНОСТИЧЕСКИЙ АНАЛИЗ И ПЕРСПЕКТИВЫ ПРИМЕНЕНИЯ

Аннотация: *В статье представлен расширенный фармакогностический анализ лекарственных растений, содержащих гликозиды, с рассмотрением их химической природы, классификации, фармакологической активности и практического применения в медицине. Особое внимание уделено сердечным, антрахиноновым, сапониновым, флавоноидным, тиогликозидам и фенольным гликозидам как важнейшим группам биологически активных веществ растительного происхождения. Показано, что гликозиды обладают широким спектром действия, включая кардиотонический, слабительный, противовоспалительный, антиоксидантный, отхаркивающий, антимикробный и иммуномодулирующий эффекты. Установлено, что лекарственные растения, содержащие гликозиды, сохраняют высокую значимость в современной фармации и фитотерапии, однако их применение должно основываться на стандартизации сырья, точном дозировании и учёте возможной токсичности отдельных соединений. Подчёркивается, что дальнейшее изучение новых природных источников гликозидов и разработка безопасных лекарственных форм являются перспективными направлениями фармакогнозии и фармацевтической технологии.*

Ключевые слова: *гликозиды, лекарственные растения, фармакогнозия, сердечные гликозиды, сапонины, флавоноиды, фитотерапия, растительное сырьё, фармакологическая активность.*

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MEDICINAL PLANTS CONTAINING GLYCOSIDES: PHARMACOGNOSTIC ANALYSIS AND PROSPECTS FOR APPLICATION

Abstract*: The article presents an expanded pharmacognostic analysis of medicinal plants containing glycosides, with consideration of their chemical nature, classification, pharmacological activity, and practical application in*

medicine. Particular attention is paid to cardiac, anthraquinone, saponin, flavonoid, thioglycoside, and phenolic glycosides as the most important groups of biologically active substances of plant origin. It is shown that glycosides possess a wide spectrum of action, including cardiotonic, laxative, anti-inflammatory, antioxidant, expectorant, antimicrobial, and immunomodulatory effects. It has been established that medicinal plants containing glycosides retain high significance in modern pharmacy and phytotherapy; however, their use should be based on the standardization of raw materials, accurate dosing, and consideration of the possible toxicity of certain compounds. It is emphasized that further study of new natural sources of glycosides and the development of safe dosage forms are promising directions in pharmacognosy and pharmaceutical technology.

Keywords: *glycosides, medicinal plants, pharmacognosy, cardiac glycosides, saponins, flavonoids, phytotherapy, plant raw materials, pharmacological activity.*

Введение

В настоящее время лекарственные растения занимают важное место в фармацевтической науке, клинической практике и профилактической медицине. Это связано с их природным происхождением, разнообразием химического состава и широкими возможностями терапевтического применения. Среди многочисленных групп биологически активных веществ, содержащихся в лекарственном растительном сырье, особое место занимают гликозиды. Именно эта группа соединений отличается выраженной фармакологической активностью и широко используется при лечении сердечно-сосудистых, желудочно-кишечных, воспалительных и респираторных заболеваний.

Гликозиды представляют собой органические соединения, состоящие из двух компонентов: сахарной части — гликона и несахарной части — агликона. Биологическая активность этих веществ в основном определяется строением агликона, тогда как углеводная часть влияет на растворимость, транспорт и особенности метаболизма соединения в организме. Благодаря способности к гидролизу гликозиды высвобождают активные компоненты, оказывающие фармакологический эффект.

Интерес к растениям, содержащим гликозиды, обусловлен не только их высокой биологической активностью, но и возможностью создания на их основе современных лекарственных препаратов. Вместе с тем использование таких растений требует глубокого фармакогностического анализа, стандартизации сырья и оценки безопасности, поскольку некоторые гликозиды обладают выраженной токсичностью.

Целью данной работы является изучение лекарственных растений, содержащих гликозиды, анализ их химического состава, классификации и фармакологического действия, а также оценка перспектив их применения в современной медицине и фармации.

Методы и материалы

В работе использованы методы анализа научной литературы, сравнительного анализа и фармакогностического исследования лекарственного растительного сырья. Основой для подготовки статьи послужили данные фармакопей, учебной литературы по фармакогнозии, материалов по фитотерапии и фармакологии, а также сведения о лекарственных растениях, содержащих различные группы гликозидов.

В ходе исследования были изучены основные группы гликозидов, встречающихся в растениях, их химическая классификация, особенности фармакологического действия и области клинического применения. Анализ включал сопоставление данных о лекарственных растениях, содержащих сердечные, антрахиноновые, сапониновые, флавоноидные, тиогликозидные и фенольные соединения. Кроме того, была проведена оценка перспектив их дальнейшего использования в фармацевтической практике с точки зрения эффективности, безопасности и возможности создания новых лекарственных форм.

Фармакогностический подход позволил рассмотреть лекарственные растения не только как источник природных веществ, но и как объект комплексного изучения, включающего ботаническую характеристику, химический состав, стандартизацию сырья и медицинское значение.

Результаты

Общая характеристика гликозидов

Проведённый анализ показал, что гликозиды широко распространены в растительном мире и выполняют в самих растениях защитные, регуляторные и метаболические функции. В зависимости от химического строения агликона они подразделяются на несколько основных групп: сердечные, антрахиноновые, сапониновые, флавоноидные, тиогликозиды и фенольные гликозиды. Каждая из этих групп отличается специфическим спектром фармакологической активности и особым практическим значением.

Установлено, что гликозиды являются одной из наиболее значимых групп биологически активных веществ в фармакогнозии, поскольку они лежат в основе действия множества растительных препаратов, применяемых в кардиологии, гастроэнтерологии, пульмонологии и общей терапии.

Сердечные гликозиды

Сердечные гликозиды занимают особое место среди природных соединений благодаря выраженному кардиотоническому действию. Основными растениями, содержащими сердечные гликозиды, являются наперстянка пурпурная (Digitalis purpurea), наперстянка шерстистая (Digitalis lanata), ландыш майский (Convallaria majalis) и горицвет весенний (Adonis vernalis).

Анализ показал, что данные вещества усиливают сократительную способность миокарда, способствуют нормализации сердечного ритма и улучшают кровообращение. Это определяет их применение при хронической

сердечной недостаточности и отдельных формах аритмий. Вместе с тем выявлено, что сердечные гликозиды обладают высокой токсичностью и узким терапевтическим диапазоном, в связи с чем требуют строгого дозирования и медицинского контроля.

Антрахиноновые гликозиды

Антрахиноновые гликозиды характеризуются преимущественно слабительным действием. К основным растениям этой группы относятся сенна (Cassia acutifolia), крушина (Rhamnus frangula), ревень (Rheum palmatum) и алоэ (Aloe vera). Их фармакологический эффект связан со стимуляцией моторики кишечника и усилением перистальтики.

Результаты анализа показали, что препараты данной группы применяются преимущественно при хронических запорах и состояниях, сопровождающихся замедлением кишечного транзита. Однако установлено, что длительное использование антрахиноновых гликозидов может сопровождаться нежелательными эффектами, включая раздражение кишечной стенки, привыкание и нарушение электролитного баланса. Это ограничивает возможность их бесконтрольного применения.

Сапониновые гликозиды

Сапониновые гликозиды обладают широким спектром биологической активности. В исследуемом материале к основным растениям данной группы отнесены солодка (Glycyrrhiza glabra), женьшень (Panax ginseng) и первоцвет (Primula veris). Было установлено, что эти соединения характеризуются отхаркивающим, противовоспалительным и иммуномодулирующим действием.

Наиболее широко сапониновые растения применяются при заболеваниях дыхательных путей, сопровождающихся кашлем, вязкой мокротой и воспалительными явлениями. Кроме того, женьшень и некоторые другие сапонинсодержащие растения рассматриваются как средства, способствующие повышению общей сопротивляемости организма. Это расширяет их возможности применения не только в лечебной, но и в профилактической медицине.

Флавоноидные гликозиды

Флавоноидные гликозиды представляют собой одну из наиболее перспективных групп растительных соединений. Установлено, что растения, содержащие данные вещества, такие как зверобой (Hypericum perforatum), боярышник (Crataegus monogyna) и гинкго билоба (Ginkgo biloba), обладают выраженной антиоксидантной, противовоспалительной и ангиопротекторной активностью.

Результаты анализа показали, что флавоноидные гликозиды укрепляют сосудистую стенку, улучшают микроциркуляцию, снижают окислительный стресс и могут использоваться в комплексной терапии сердечно-сосудистых заболеваний, нарушений кровообращения и некоторых неврологических состояний. Их высокая фармакологическая ценность делает данную группу

перспективной для дальнейших исследований и разработки новых препаратов.

Тиогликозиды и фенольные гликозиды

К важным природным соединениям также относятся тиогликозиды и фенольные гликозиды. Основными растениями, содержащими тиогликозиды, являются горчица чёрная (Brassica nigra) и хрен (Armoracia rusticana), тогда как фенольные гликозиды обнаруживаются, в частности, в иве белой (Salix alba) и толокнянке (Arctostaphylos uva-ursi).

Анализ показал, что данные соединения обладают антимикробным, противовоспалительным и анальгезирующим действием. Это определяет их применение в составе средств для лечения воспалительных заболеваний, инфекционных процессов и болевого синдрома. Фенольные гликозиды, в частности производные салицина, сыграли важную роль в развитии современной противовоспалительной фармакотерапии.

Проведённый анализ подтвердил, что гликозиды являются одной из наиболее значимых групп биологически активных веществ лекарственных растений. Их широкое химическое разнообразие обеспечивает многообразие фармакологических эффектов, что позволяет использовать гликозидсодержащее сырьё в различных областях медицины.

Особенно большое практическое значение имеют сердечные гликозиды, которые сохраняют высокую терапевтическую ценность при лечении сердечной недостаточности. Однако их токсичность существенно ограничивает возможность широкого самостоятельного применения и требует строгого контроля качества сырья, стандартизации лекарственных форм и точного соблюдения дозировок.

Антрахиноновые гликозиды продолжают использоваться как эффективные слабительные средства, но их длительное применение связано с риском побочных реакций. Это подчёркивает необходимость рационального использования препаратов данной группы и поиска более безопасных альтернатив.

Сапониновые и флавоноидные гликозиды представляют особый интерес для современной фармации, поскольку сочетают сравнительно широкий спектр действия с перспективами создания новых комбинированных и стандартизированных фитопрепаратов. Их противовоспалительные, антиоксидантные, иммуномодулирующие и сосудоукрепляющие свойства делают эти соединения ценным объектом для дальнейших фармакологических и технологических исследований.

Следует отметить, что будущее применения гликозидсодержащих растений связано не только с поиском новых природных источников, но и с совершенствованием методов выделения, стандартизации, контроля безопасности и разработки удобных лекарственных форм. Это особенно важно в условиях возрастания интереса к фитотерапии и растительным препаратам.

Заключение

Лекарственные растения, содержащие гликозиды, занимают важное место в современной медицине, фармакогнозии и фармацевтической практике. Они характеризуются широким спектром фармакологической активности и применяются при заболеваниях сердечно-сосудистой, пищеварительной, дыхательной и других систем.

Проведённый анализ показал, что сердечные, антрахиноновые, сапониновые, флавоноидные, тиогликозидные и фенольные соединения обладают различными механизмами действия и практической значимостью. При этом эффективность их применения во многом зависит от правильной стандартизации сырья, рационального дозирования и учёта возможных токсических эффектов.

Перспективы дальнейших исследований связаны с поиском новых источников гликозидов, разработкой безопасных лекарственных форм, снижением токсичности отдельных препаратов и расширением возможностей их клинического применения. Рациональное использование растительного сырья позволит повысить эффективность фитотерапии и расширить потенциал современной фармацевтической промышленности.

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СОВЕРШЕНСТВОВАНИЕ МАРКЕТИНГОВЫХ КОММУНИКАЦИЙ В СФЕРЕ ВЫСШЕГО ОБРАЗОВАНИЯ С ИСПОЛЬЗОВАНИЕМ ГЕНЕРАТИВНОГО ИСКУССТВЕННОГО ИНТЕЛЛЕКТА

Аннотация: *Данное исследование рассматривает, каким образом генеративный искусственный интеллект (GenAI) повышает эффективность маркетинговых коммуникаций в высших учебных заведениях. Используя смешанный исследовательский дизайн, сочетающий данные опроса (n = 214) и экспериментальное A/B-тестирование, в работе оценивается результативность стратегий персонализации, основанных на использовании ИИ. Полученные результаты показывают, что применение GenAI существенно повышает уровень вовлечённости (β = 0,42, p < 0,001) и конверсию, одновременно увеличивая эффективность коммуникаций. Дополнительный медиаторный анализ выявил, что удовлетворённость пользователей частично опосредует связь между использованием ИИ и эффективностью маркетинга. В исследовании предложена концептуальная модель, основанная на данных, интегрирующая аналитические инструменты ИИ, генерацию контента и механизмы обратной связи. Полученные результаты вносят вклад в развитие теории маркетинга в высшем образовании и предоставляют практические рекомендации для университетов, стремящихся повысить свою конкурентоспособность в условиях цифровой среды.*

Ключевые слова: *маркетинг высшего образования, генеративный искусственный интеллект, маркетинговые коммуникации, персонализация, привлечение студентов, цифровой маркетинг.*

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IMPROVING MARKETING COMMUNICATIONS IN HIGHER EDUCATION USING GENERATIVE ARTIFICIAL INTELLIGENCE

Abstract. *This study examines how generative artificial intelligence (GenAI) enhances marketing communications in higher education institutions. Using a mixed-method design that combines survey data (n = 214) with experimental A/B testing, the research evaluates the effectiveness of AI-driven personalization strategies. The findings demonstrate that GenAI significantly improves*

engagement (β = 0.42, p < 0.001) and conversion rates, while increasing communication efficiency. A mediation analysis further reveals that user satisfaction partially mediates the relationship between AI usage and marketing effectiveness. The study proposes a data-driven conceptual framework integrating AI analytics, generative content, and feedback mechanisms. The results contribute to higher education marketing literature and offer practical insights for universities aiming to enhance competitiveness in digital environments.

Keywords: *higher education marketing, generative AI, marketing communications, personalization, student recruitment, digital marketing.*

Введение.

Трансформация рынка высшего образования усилила конкуренцию между университетами, что требует внедрения более сложных и персонализированных стратегий маркетинговых коммуникаций. Традиционные подходы к коммуникации становятся всё менее эффективными в условиях растущих ожиданий цифрово-активных абитуриентов.

Генеративный искусственный интеллект (GenAI) открывает новые возможности для автоматизации создания контента, персонализации коммуникаций и оптимизации маркетинговых процессов. Несмотря на растущее распространение данной технологии, эмпирические исследования её эффективности в маркетинге высшего образования остаются ограниченными.

Целью данного исследования является разработка и эмпирическая валидация модели совершенствования маркетинговых коммуникаций университетов на основе использования генеративного искусственного интеллекта.

Обзор литературы.

Эволюция маркетинга в сфере высшего образования отражает более широкий переход к клиентоориентированным и основанным на данных стратегиям, в рамках которых образовательные учреждения всё чаще функционируют в конкурентной и рыночно ориентированной среде (Kotler & Keller, 2016). Университеты больше не рассматриваются исключительно как поставщики образовательных услуг, а выступают как сервисно-ориентированные организации, которым необходимо активно взаимодействовать с потенциальными студентами через стратегически выстроенные коммуникационные каналы. В этом контексте цифровые маркетинговые инструменты приобретают ключевое значение для повышения эффективности коммуникаций, позиционирования бренда и вовлечённости аудитории (Chaffey & Ellis-Chadwick, 2019).

Использование инструментов Marketing 5.0, таких как ориентация на клиента, персонализация услуг с применением данных и искусственного интеллекта, а также внедрение цифровых технологий для создания ценности и взаимодействия с аудиторией через контент-маркетинг, социальные сети и

образовательные платформы, позволяет образовательным учреждениям повышать свою конкурентоспособность на рынке образовательных услуг (N.K. Mamanazarova, 2026).

Также для внедрения нейромаркетинга образовательные организации должны инвестировать в аналитику и исследования поведения пользователей, создавать эмоционально насыщенные маркетинговые кампании, оптимизировать взаимодействие с пользователями на всех платформах, внедрять персонализированные подходы к каждому учащемуся и быть прозрачными в сборе и использовании данных (N.K. Mamanazarova, 2025).

Современные исследования подчёркивают возрастающую роль клиентского опыта (Customer Experience, CX) в формировании решений студентов. По мнению Lemon и Verhoef (2016), клиентский опыт формируется на различных точках контакта, включая онлайн-платформы, социальные сети и взаимодействие с образовательным учреждением. В условиях высшего образования это предполагает необходимость разработки интегрированных коммуникационных стратегий, обеспечивающих согласованность и персонализацию на всех каналах. Доказано, что персонализированные коммуникации существенно влияют на удовлетворённость студентов, уровень доверия и решения о поступлении (Hemsley-Brown & Oplatka, 2015).

Интеграция аналитики данных в маркетинговую практику усилила переход к принятию решений на основе доказательств. Маркетинговая аналитика позволяет образовательным учреждениям глубже понимать поведение пользователей, прогнозировать спрос и оптимизировать коммуникационные стратегии (Wedel & Kannan, 2016). Данный переход к data-driven маркетингу соответствует более широким процессам цифровой трансформации в системах высшего образования (Verhoef et al., 2021).

Недостаток информационных систем в образовательных организациях проявляется в отсутствии единой базы данных в образовательных учреждениях (о абитуриентах, студентах, рынке труда), в том, что маркетинговые решения часто принимаются не на основе цифрового анализа, а на основе интуиции и опыта, отсутствует полная статистика по рынку труда и спросу-ожиданиям (N.K. Mamanazarova, 2025).

Искусственный интеллект (AI) стал ключевым драйвером этих изменений. Технологии ИИ обеспечивают возможности для продвинутой предиктивной аналитики, автоматизации маркетинговых процессов и принятия решений в режиме реального времени (Huang & Rust, 2021). В частности, алгоритмы машинного обучения позволяют осуществлять более точную сегментацию и таргетинг аудитории, а рекомендательные системы повышают вовлечённость пользователей за счёт предоставления релевантного контента (Davenport et al., 2020).

В последнее время технологии генеративного искусственного интеллекта (GenAI) открывают новые возможности для развития

маркетинговых коммуникаций. В отличие от традиционных систем ИИ, GenAI способен создавать контекстно-ориентированный контент, адаптировать стиль коммуникации и генерировать персонализированные сообщения в масштабируемом формате (Dwivedi et al., 2023). Эти возможности особенно актуальны для сферы высшего образования, где абитуриенты ожидают индивидуализированного и интерактивного взаимодействия. Исследования также показывают, что персонализация на основе ИИ существенно повышает уровень вовлечённости и эффективность маркетинга (Bleier & Eisenbeiss, 2015).

Несмотря на указанные преимущества, применение генеративного искусственного интеллекта в маркетинге высшего образования остаётся недостаточно изученным. Существующие исследования в основном сосредоточены на коммерческих секторах, таких как розничная торговля и финансы, что формирует пробел в понимании того, каким образом данные технологии могут быть эффективно адаптированы к образовательной среде (Kshetri, 2023). Кроме того, наблюдается дефицит эмпирических исследований, анализирующих влияние AI-ориентированных коммуникационных стратегий на поведение студентов и показатели деятельности образовательных учреждений.

В этой связи данное исследование направлено на восполнение указанного научного пробела путём разработки и эмпирической валидации модели интеграции генеративного искусственного интеллекта в систему маркетинговых коммуникаций университетов. Объединяя теоретические подходы маркетинга, искусственного интеллекта и управления высшим образованием, работа вносит вклад как в развитие научной литературы, так и в практическую реализацию современных коммуникационных стратегий.

Методология.

В исследовании применяется смешанный методологический подход, объединяющий количественные и экспериментальные методы, что обеспечивает надёжную валидацию полученных результатов.

Сбор данных осуществлялся на основе опроса 214 респондентов (потенциальных студентов и абитуриентов), а также анализа цифровой аналитики маркетинговых кампаний университетов.

Для более строгой оценки эффективности генеративного искусственного интеллекта в маркетинговых коммуникациях был использован экспериментальный метод A/B-тестирования. Данный дизайн позволил провести контролируемое сравнение между традиционными коммуникационными стратегиями и персонализированными сообщениями, созданными с использованием ИИ.

Участники исследования были случайным образом распределены на две группы:

Группа A (контрольная группа): получала традиционные маркетинговые коммуникации, включая стандартизированные электронные письма, статический контент веб-сайта и типовые рекламные материалы.

Данные коммуникации основывались на универсальном подходе «один для всех» и не предусматривали персонализации или адаптивных элементов.

Группа В (экспериментальная группа): получала персонализированные коммуникации, созданные с использованием технологий генеративного искусственного интеллекта. Контент формировался динамически с учётом индивидуальных характеристик пользователей, таких как демографические данные, поведенческие паттерны в сети, интересы и предыдущий опыт взаимодействия.

Для группы А коммуникационные материалы разрабатывались вручную маркетинговыми специалистами и распространялись одинаково среди всей целевой аудитории.

Для группы В генеративный искусственный интеллект использовался для:

- создания индивидуализированных электронных сообщений;
- адаптации тона и стиля коммуникации в соответствии с профилем пользователя;
- рекомендации релевантных образовательных программ;
- генерации персонализированных призывов к действию (call-to-action).

Обе группы получали коммуникации через идентичные каналы (электронная почта, веб-сайт и социальные сети), что обеспечило сопоставимость условий эксперимента и корректность полученных результатов.

Участниками исследования выступили потенциальные студенты и текущие абитуриенты университетов. Сбор данных осуществлялся посредством онлайн-опросов, а также анализа цифровой аналитики маркетинговых кампаний.

Предложенная концептуальная модель направлена на совершенствование маркетинговых коммуникаций в высших учебных заведениях за счёт интеграции технологий генеративного искусственного интеллекта (GenAI). Данная модель основана на принципах data-driven маркетинга, теории клиентского опыта (Customer Experience) и современных подходах к принятию решений с использованием искусственного интеллекта. Она представляет собой динамическую и итеративную систему, обеспечивающую непрерывную оптимизацию эффективности коммуникаций.

Модель включает пять взаимосвязанных компонентов:

1. сбор данных (CRM-системы, веб-аналитика, социальные сети);
2. аналитика на основе искусственного интеллекта;
3. генерация контента с использованием GenAI;
4. мультиканальные коммуникации;
5. обратная связь и цикл оптимизации.

Этап «Data Collection Layer» (сбора данных) включает агрегирование и интеграцию информации из различных источников, таких как системы управления взаимоотношениями с клиентами (CRM), веб-аналитика

(поведенческие данные пользователей, клики), социальные сети и системы управления обучением (LMS). Основной целью данного уровня является формирование единого информационного пространства, позволяющего обеспечить точное профилирование пользователей и их сегментацию.

На этапе «AI-Based Analytics Layer» (аналитики на основе искусственного интеллекта) применяются алгоритмы искусственного интеллекта и машинного обучения для выявления поведенческих закономерностей, прогнозирования предпочтений пользователей, сегментации аудитории на значимые группы, а также построения предиктивных моделей принятия решений студентами. Данный аналитический уровень преобразует необработанные данные в практически значимые инсайты, которые служат основой для персонализированных коммуникаций.

На следующем этапе используются *инструменты генеративного искусственного интеллекта* (например, большие языковые модели) для создания персонализированных электронных сообщений, генерации адаптированного контента веб-сайта, разработки гибких маркетинговых сообщений, а также настройки тона, стиля и содержания коммуникации в зависимости от профиля пользователя. В отличие от традиционных подходов к созданию контента, данный уровень обеспечивает масштабируемую и оперативную персонализацию в режиме реального времени.

Сгенерированный контент распространяется через *различные каналы коммуникации,* включая системы email-маркетинга, официальные веб-сайты университетов, социальные сети, а также чат-боты и виртуальные ассистенты. Интеграция данных каналов обеспечивает согласованность, непрерывность и целостность коммуникации на всех точках взаимодействия с пользователем, формируя единый и последовательный пользовательский опыт.

Контур ***обратной связи и оптимизации (Feedback and Optimization Loop)*** обеспечивает непрерывное совершенствование системы за счёт сбора данных о результативности (вовлечённость, конверсия, удовлетворённость), анализа пользовательских реакций, обновления моделей искусственного интеллекта и совершенствования коммуникационных стратегий. Данный механизм обратной связи превращает модель в адаптивную систему, способную к самооптимизации.

Эффективность модели основана на следующей причинно-следственной цепочке:

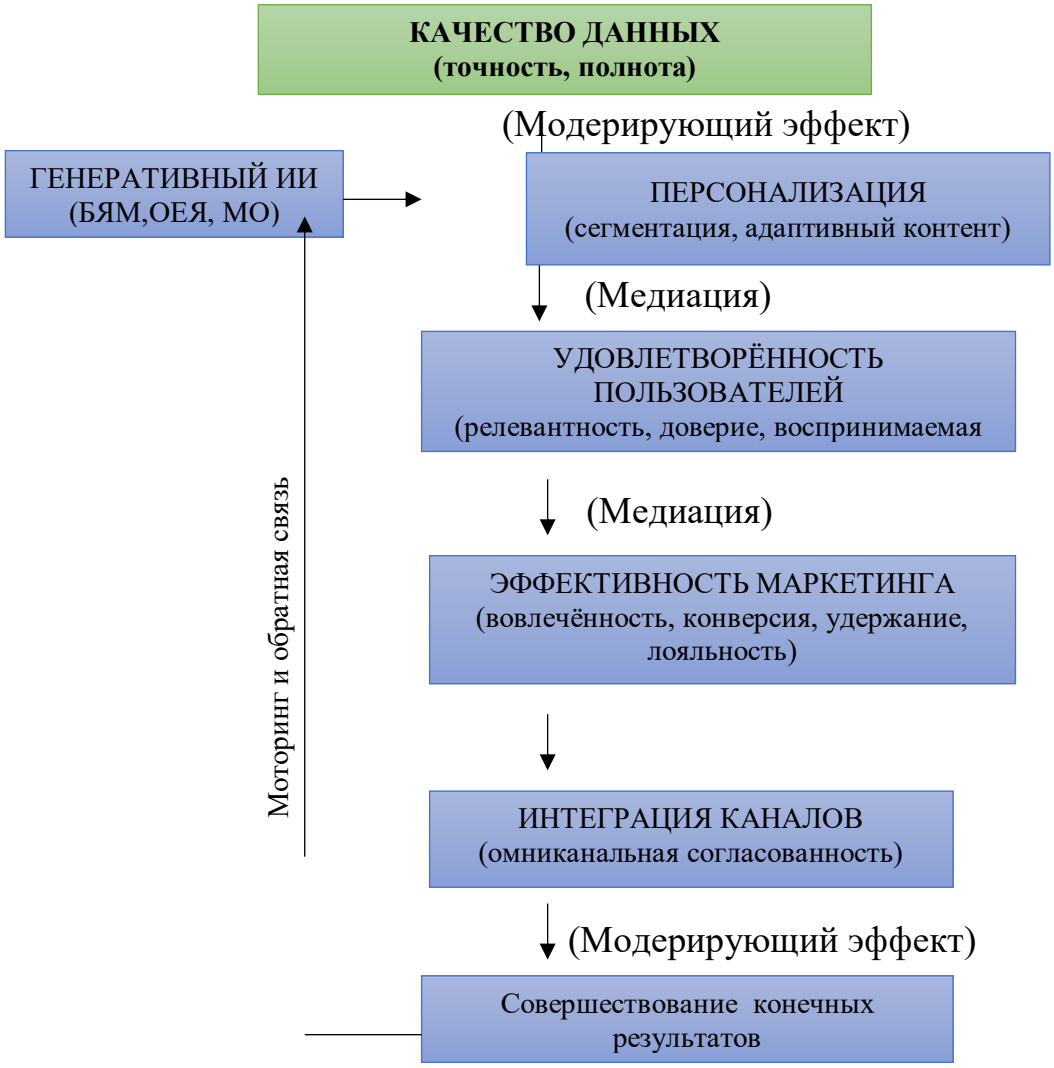

Рисунок 1. Интегрированная модель маркетинговых коммуникаций в высшем образовании на основе генеративного искусственного интеллекта.

Рисунок 1 иллюстрирует концептуальную основу данного исследования. Представленная модель отражает многоуровневую систему, в которой генеративный искусственный интеллект выступает в качестве ключевого технологического драйвера процессов маркетинговых коммуникаций в высшем образовании. Однако его влияние на конечные результаты не является прямым, а реализуется через последовательную систему медиирующих механизмов.

На начальном этапе генеративный ИИ обеспечивает расширенные возможности обработки данных, предиктивной аналитики и автоматизированного создания контента. Эффективность данного этапа определяется качеством данных, которое выступает в роли модератора взаимосвязи между использованием ИИ и персонализацией. Высокое

качество данных повышает точность результатов работы ИИ, тогда как низкое качество снижает их релевантность.

Следующий этап связан с персонализацией, которая выступает в качестве первого медиирующего механизма. На данном уровне аналитические выводы, полученные с помощью ИИ, трансформируются в адаптированные коммуникационные стратегии, учитывающие индивидуальные предпочтения и поведенческие особенности пользователей.

Далее формируется удовлетворённость пользователей как медиатор второго порядка, отражающий восприятие релевантности, ясности и полезности коммуникаций. Удовлетворённость играет ключевую роль в преобразовании персонализированных коммуникаций в измеримые поведенческие результаты.

На заключительном этапе достигается эффективность маркетинга, которая операционализируется через ключевые показатели результативности, такие как вовлечённость, конверсия и удержание аудитории.

Важно отметить, что данная взаимосвязь дополнительно усиливается фактором интеграции каналов, который выступает в роли модератора связи между удовлетворённостью пользователей и эффективностью маркетинга. Интегрированные коммуникационные каналы усиливают влияние удовлетворённости, обеспечивая целостный и согласованный пользовательский опыт, тогда как фрагментированные каналы, напротив, ослабляют этот эффект.

В совокупности представленная модель демонстрирует логически выстроенную причинно-следственную цепочку, в рамках которой генеративный искусственный интеллект способствует персонализации, персонализация повышает удовлетворённость пользователей, а удовлетворённость, в свою очередь, приводит к росту эффективности маркетинга. Такая последовательная взаимосвязь подчёркивает стратегическую значимость интеграции передовых технологий с ориентированными на пользователя подходами для достижения устойчивого конкурентного преимущества в сфере маркетинга высшего образования.

Для повышения объяснительной способности предложенной модели она дополнительно расширена за счёт включения системы взаимосвязанных медиирующих и модерирующих механизмов, которые в совокупности определяют эффективность маркетинговых коммуникаций, основанных на использовании искусственного интеллекта в высшем образовании.

В основе модели генеративный искусственный интеллект выступает в качестве ключевого технологического драйвера, однако его влияние на результаты коммуникации не является ни прямым, ни однородным. Напротив, это влияние реализуется через последовательность взаимосвязанных процессов. В частности, персонализация выступает первым медиирующим механизмом, преобразующим технологические возможности ИИ в контекстно релевантную и ориентированную на пользователя

коммуникацию. Это означает, что эффективность ИИ напрямую зависит от его способности генерировать контент, соответствующий индивидуальным профилям пользователей, их предпочтениям и поведенческим особенностям. При отсутствии такого соответствия потенциальные преимущества использования ИИ остаются нереализованными.

Дальнейшее развитие модели связано с тем, что удовлетворённость пользователей выступает медиатором второго порядка, связывающим персонализацию с эффективностью маркетинга. Персонализированная коммуникация повышает воспринимаемую релевантность и полезность информации, что, в свою очередь, способствует формированию удовлетворённости. Удовлетворённость выполняет роль психологического механизма, через который коммуникация влияет на поведенческие реакции пользователей, такие как вовлечённость, конверсия и долгосрочная лояльность. Таким образом, связь между персонализацией и эффективностью маркетинга носит опосредованный характер и реализуется через оценочное восприятие пользователями коммуникационного процесса.

В то же время сила указанных медиированных взаимосвязей не является постоянной и зависит от ряда контекстуальных условий. В частности, качество данных выступает ключевым модерирующим фактором на начальном этапе модели, влияя на эффективность персонализации, основанной на ИИ. Высококачественные, структурированные и полноценно представленные данные повышают точность аналитики и генерации контента, тем самым усиливая влияние ИИ на персонализацию. Напротив, низкое качество или неполнота данных ослабляют данную связь, приводя к снижению точности таргетинга и релевантности коммуникации.

Параллельно с этим интеграция каналов выступает модератором на завершающем этапе модели, определяя степень трансформации удовлетворённости пользователей в маркетинговую эффективность. При высокой степени интеграции и координации коммуникационных каналов пользователь получает целостный и последовательный информационный поток, что усиливает влияние удовлетворённости на показатели вовлечённости и конверсии. В противоположном случае, при фрагментированной или слабо синхронизированной коммуникации, нарушается целостность взаимодействия, что снижает общий эффект даже при наличии высокого уровня персонализации и удовлетворённости.

В совокупности данные взаимосвязи формируют целостную многоуровневую систему, в рамках которой генеративный искусственный интеллект влияет на маркетинговые результаты посредством последовательной медиации (персонализация → удовлетворённость → эффективность), при этом сила этих связей определяется модерирующими переменными (качество данных и интеграция каналов). Данный интегрированный подход подчёркивает, что эффективность использования ИИ в маркетинговых коммуникациях определяется не только технологическими возможностями, но и является результатом

динамического взаимодействия между качеством данных, восприятием пользователей и организационной инфраструктурой коммуникаций.

Эффективность маркетинга в сфере высшего образования может быть количественно оценена с помощью ключевых показателей эффективности, таких как коэффициент конверсии (Conversion Rate, CR) и уровень вовлечённости (Engagement Rate, ER). Эти показатели отражают различные этапы взаимодействия пользователя и обеспечивают комплексную оценку результативности коммуникаций. Эффективность маркетинга может быть измерена с использованием следующих индикаторов:

$$КК = \frac{Абитуриенты}{Потенциальных\ студенты} \times 100$$

Коэффициент конверсии (КК) измеряет долю потенциальных студентов (лидов), которые совершают целевое действие, например, подают заявку на поступление.

Абитуриенты – это те, кто фактически подал заявление (заявку на поступление).

Потенциальных студенты – это потенциальные абитуриенты (например, посетители сайта, зарегистрированные пользователи).

Таким образом, коэффициент конверсии (КК) показывает, насколько эффективно маркетинговые коммуникации преобразуют интерес в реальные действия.

$$УВ = \frac{Интеграция}{Просмотры} \times 100$$

Уровень вовлечённости (УВ) измеряет степень участия пользователей во взаимодействии с маркетинговым контентом.

Интеграция — действия пользователей (клики, лайки, комментарии, переходы).

Просмотры — количество просмотров (показы, охват).

Уровень вовлечённости (УУ) показывает, насколько контент привлекает внимание и стимулирует активность пользователей.

В совокупности показатели CR и ER обеспечивают многомерную оценку эффективности маркетинга, отражая как поведенческую вовлечённость, так и конечные результаты принятия решений. Если ER характеризует непосредственную реакцию пользователей на коммуникацию, то CR демонстрирует итоговую результативность маркетинговых усилий по преобразованию интереса в конкретные действия. Эти показатели подтверждают наличие измеримых улучшений при использовании коммуникационных стратегий, основанных на искусственном интеллекте.

Результаты и обсуждение

Результаты опроса (n = 214) показывают выраженное предпочтение респондентов к персонализированным и адаптивным маркетинговым коммуникациям в сфере высшего образования.

В частности, 78% респондентов указали на явное предпочтение персонализированных коммуникаций, подчеркнув важность адаптации сообщений к индивидуальным потребностям, интересам и академическим целям. Данный результат свидетельствует о том, что традиционные стандартизированные подходы к коммуникации становятся всё менее эффективными в условиях современных, цифрово-активных аудиторий.

Кроме того, 64% респондентов положительно оценили контент, сгенерированный с использованием искусственного интеллекта. Это указывает на достаточно высокий уровень принятия генеративного ИИ как инструмента коммуникации в образовательной среде. Вместе с тем более низкий показатель по сравнению с предпочтением персонализации свидетельствует о том, что пользователи в большей степени ценят результаты применения ИИ (например, релевантность и своевременность), нежели саму технологию.

В совокупности данные результаты демонстрируют, что как персонализация, так и коммуникации, основанные на использовании искусственного интеллекта, играют значимую роль в формировании восприятия пользователей и их поведенческой активности.

Таблица 1.

Влияние генеративного искусственного интеллекта на показатели вовлечённости и конверсии в маркетинге высшего образования

Показатель	Традиционные методы	Генерация ИИ	Изменение
Уровень вовлечённости	5.2%	7.8%	+50%
Коэффициент конверсии	8.1%	10.5%	+29%

Экспериментальный анализ, основанный на дизайне A/B-тестирования, предоставляет убедительные эмпирические доказательства эффективности генеративного искусственного интеллекта в повышении результативности маркетинговых коммуникаций в высших учебных заведениях. Были сопоставлены две группы: одна, получавшая традиционные коммуникации, и другая — персонализированные сообщения, созданные с использованием ИИ.

Результаты показывают существенное улучшение ключевых показателей эффективности в экспериментальной группе, использующей генеративный ИИ. В частности, уровень вовлечённости увеличился с 5,2% в группе традиционных коммуникаций до 7,8% в группе с использованием ИИ, что соответствует относительному росту на 50%. Данный значительный прирост свидетельствует о том, что персонализированный контент, сгенерированный ИИ, более эффективно привлекает внимание

пользователей и стимулирует их взаимодействие. Это подтверждает, что адаптивные сообщения, создаваемые с помощью генеративного ИИ, в большей степени соответствуют ожиданиям и поведенческим особенностям аудитории.

Аналогичным образом коэффициент конверсии вырос с 8,1% до 10,5%, что соответствует увеличению на 29%. Этот результат имеет особое значение, поскольку конверсия отражает более высокий уровень вовлечённости и готовности к принятию решений. Рост данного показателя подтверждает, что коммуникации, основанные на ИИ, не только привлекают внимание, но и оказывают влияние на процесс принятия решений. Таким образом, персонализированные сообщения, генерируемые ИИ, усиливают убедительность маркетинговых коммуникаций.

В совокупности полученные результаты подтверждают гипотезу о том, что генеративный искусственный интеллект существенно повышает показатели вовлечённости и конверсии в контексте маркетинга высшего образования.

Для оценки статистической значимости выявленных различий были проведены t-тесты для независимых выборок, сравнивающие традиционные и AI-ориентированные коммуникационные группы. Результаты показали, что различия как по уровню вовлечённости, так и по коэффициенту конверсии являются статистически значимыми на уровне 0,05 ($p < 0,05$). Это подтверждает, что наблюдаемые улучшения в группе с использованием ИИ не являются случайными и обусловлены внедрением технологий генеративного искусственного интеллекта.

Более того, величина различий указывает не только на статистическую, но и на практическую значимость результатов, что свидетельствует о том, что внедрение AI-ориентированных коммуникационных стратегий способно привести к существенному повышению эффективности маркетинга.

Полученные результаты дополнительно подтверждают валидность предложенной концептуальной модели, в частности положение о том, что генеративный искусственный интеллект повышает эффективность маркетинга за счёт улучшения персонализации и усиления механизмов вовлечённости пользователей.

Персонализация выступает ключевым фактором, определяющим эффективность коммуникаций. Это подтверждает предложенную концептуальную модель, в которой персонализация играет роль медиирующего механизма между использованием искусственного интеллекта и пользовательскими результатами. Полученные данные свидетельствуют о том, что пользователи с большей вероятностью взаимодействуют с контентом, отражающим их индивидуальные характеристики, что подчёркивает важность стратегий коммуникации, основанных на данных.

Во-вторых, положительная, но сравнительно более низкая реакция на контент, сгенерированный ИИ, указывает на условный характер принятия технологии. Пользователи реагируют не столько на сам факт использования ИИ, сколько на ценность, которую он обеспечивает. Этот вывод подтверждает интерпретацию, согласно которой генеративный искусственный интеллект выступает как инструмент, эффективность которого зависит от его способности повышать уровень персонализации и релевантности.

В-третьих, комплексная интерпретация результатов выявляет последовательную взаимосвязь между ИИ, персонализацией и восприятием пользователя, что соответствует предложенной медиированной модели. Генеративный ИИ способствует улучшению коммуникационных результатов прежде всего за счёт влияния на персонализацию, которая, в свою очередь, формирует удовлетворённость пользователей и уровень их вовлечённости.

С теоретической точки зрения данные результаты расширяют существующие исследования, демонстрируя, что эффективность ИИ в маркетинговых коммуникациях опосредуется пользовательскими факторами, а не определяется исключительно технологическими возможностями. С практической точки зрения результаты указывают на необходимость для высших учебных заведений сосредоточить внимание на интеграции технологий ИИ с персонализированными стратегиями и системами управления качественными данными.

В целом полученные результаты подтверждают валидность предложенной концептуальной модели и обеспечивают эмпирическую поддержку роли генеративного искусственного интеллекта в повышении эффективности маркетинга в сфере высшего образования.

Заключение

Данное исследование демонстрирует, что генеративный искусственный интеллект (GenAI) способен существенно повысить эффективность маркетинговых коммуникаций в высшем образовании за счёт масштабируемой персонализации и принятия решений на основе данных. Полученные результаты показывают, что коммуникационные стратегии, основанные на ИИ, улучшают ключевые показатели эффективности, в частности уровень вовлечённости и коэффициент конверсии. При этом важно отметить, что влияние GenAI не является прямым, а реализуется через такие медиирующие механизмы, как персонализация и удовлетворённость пользователей.

Предложенная модель представляет собой практическую основу для интеграции GenAI в маркетинговые системы университетов, акцентируя внимание на значимости качества данных и интеграции каналов как ключевых условий успешной реализации. Полученные выводы свидетельствуют о необходимости применения комплексного подхода, сочетающего технологические инновации с пользовательски-ориентированными стратегиями коммуникации.

В целом генеративный искусственный интеллект выступает стратегическим инструментом повышения конкурентоспособности образовательных учреждений в условиях усиливающейся цифровизации и ориентации на потребности студентов.

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ВОЗМОЖНОСТИ ПРИМЕНЕНИЯ КОМПЕТЕНТНОСТНОГО ПОДХОДА ПРИ ОТБОРЕ ПЕРСОНАЛА В ОРГАНИЗАЦИЮ

Аннотация: *в статье раскрывается применение компетентностного подхода как инструмента стратегического управления персоналом современных организаций. Авторами проанализированы ограничения традиционных методов найма и обоснованы преимущества использования моделей компетенций для повышения качества отбора человеческих ресурсов.*

Ключевые слова: *отбор персонала, компетенции, модель компетенций.*

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POSSIBILITIES OF USING A COMPETENCE-BASED APPROACH IN HUMAN RESOURCES SELECTION FOR AN ORGANIZATION

Abstract: *The article reveals the application of the competence approach as a tool for strategic personnel management in modern organizations. The authors analyze the limitations of traditional recruitment methods and justify the benefits of using competence models to improve the quality of human resource selection.*

Keywords: *staff selection, competencies, and the competency model.*

Условия стремительной цифровизации, автоматизации и замены простых операций, которые выполняли люди искусственным интеллектом,

вносят свои коррективы в структуру занятости. Там, где искусственный интеллект берет на себя рутинную часть работы, человек сосредотачивается на задачах, где важны творчество, эмпатия и стратегическое мышление. В связи с этим, мы можем говорить о том, что прежние методы отбора персонала в организацию, где диплом о профессиональном образовании и стаж работы играли решающую роль, больше не работают, поскольку они игнорируют личностные и поведенческие характеристики, определяющие успех сотрудника в конкретной организационной культуре.

На современном этапе HR-менеджеру нужен более эффективный инструмент, позволяющий минимизировать финансовые и косвенные риски (снижение производительности труда, ухудшение психологического климата в коллективе, потенциальные угрозы безопасности производства, и др.) при отборе персонала. Компетентностный подход к отбору персонала предлагает интегративную модель, позволяющую объединить профессиональные знания и умения, личностные качества и ценностные установки.

Компетентностный подход в управлении персоналом – это концепция, при которой фокус внимания смещается с вопроса «Что человек знает?» на вопрос «Как человек действует для достижения результата?». Согласно Р. Бояцис компетенция представляет собой основную характеристику личности, которая лежит в основе эффективного или превосходного выполнения работы.[63] Л. Спенсер утверждает, что компетенция является качеством индивидуума, и имеет отношение к высокоэффективному и наилучшему выполнению работы.[64] Таким образом, мы можем утверждать, что компетенция, являющаяся базовым качеством индивида, имеет причинно-следственную связь с эффективным выполнением работы.

В начале XXI века компетентностный подход получил широкое распространение в практике управления человеческими ресурсами. Разрабатываются различные модели компетенций для разных отраслей и должностей, создаются инструменты для оценки и развития компетенций.[65]

Эволюция компетентностного подхода отражает понимание факторов, влияющих на эффективность человека в рабочей среде, и переход от фокуса на отдельные элементы к целостным поведенческим характеристикам.

В управлении человеческими ресурсами компетентностный подход становится эффективным методологическим инструментом и применяется в различных процессах, таких как планирование персонала, отбор, обучение и развитие, управление карьерой.

В современной практике принято выделять четыре блока компетенций (см. рисунок 1).

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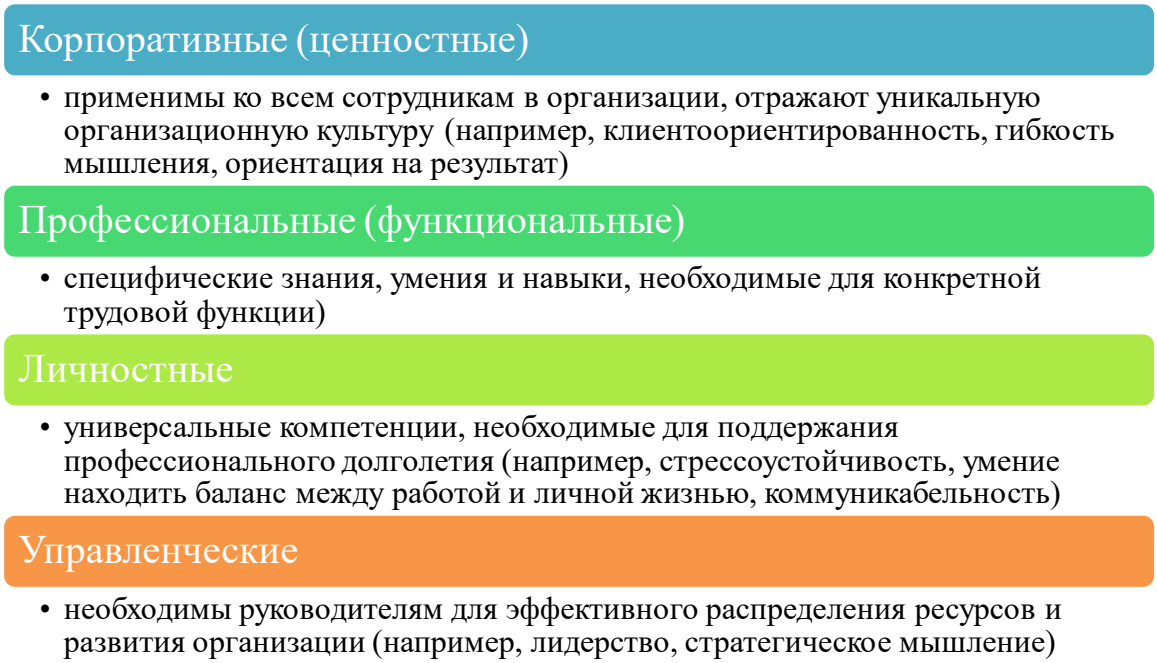

Рисунок 1 – Блоки компетенций

Корпоративные компетенции определяются на основе ценностей, декламируемых организацией.

Личностные компетенции формируются на основе условий профессии. Так, например, сфера «человек-человек», к которой относятся все профессии, где основным предметом труда являются другие люди, предполагает наличие стрессоустойчивости, эмоционального интеллекта, конфликтологической компетентности и др. Тогда, как сфера «человек-техника» предполагает, что сотрудник должен обладать другим набором личностных компетенций: аналитическое мышление, быстрая обучаемость, внимательность к деталям и т.д.

Блок управленческих компетенций может зависеть от контекста и среды, в которой работает руководитель. Для высшего руководства наиболее важными компетенциями являются стратегическое мышление и управление изменениями. Для руководителя сферы продаж – правила ведения переговоров и заключения сделок, для руководителя проекта – умение разделять стратегию на тактические задачи.

Профессиональные компетенции должны выстраиваться на основе профессиональных стандартов.

Приведем пример компетенций для должности специалиста по подбору и отбору персонала. Компетенции нами определены на основе профессионального стандарта «Специалист по управлению персоналом» утвержденного приказом Министерства труда и социальной защиты

Российской Федерации от 9 марта 2022 г. N 109н., вступившего в силу с 1 сентября 2022 г. и действующего до 1 сентября 2028 г.[66]

Обобщенная трудовая функция профессионального стандарта «Деятельность по обеспечению персоналом» (код B), разбивается на следующие трудовые функции:

– сбор информации о потребностях организации в персонале (код B/01.6);

– поиск, привлечение, подбор и отбор персонала (код B/02.6);

– администрирование процессов обеспечения персоналом и соответствующего документооборота (код B/03.6).

На основе этих трудовых функций можно определить следующие профессиональные компетенции (ПК) для должности «специалист по подбору и отбору персонала», которые представлены в таблице 1.

Модель компетенций для каждой должности строится на необходимости и достаточности тех компетенций, набор которых позволит специалисту эффективно выполнять свою работу, и наполняется кейсами, тестами, заданиями, оценивающими уровень владения той или иной компетенцией.

Таблица 1.

Профессиональные компетенции (ПК) для должности специалист по подбору и отбору персонала

Шифр профессиональной компетенции	Наименование профессиональной компетенции
ПК-1	Способность составлять объявление о вакантной должности
ПК-2	Способность применять технологии и методики поиска кандидатов на вакантные должности в соответствии с их спецификой
ПК-3	Способность анализировать резюме
ПК-4	Способность организовывать и проводить собеседование
ПК-5	Способность соблюдать нормы этики делового общения
ПК-6	Способность вести деловую переписку
ПК-7	Способность вести документооборот по вопросам обеспечения персоналом

Таким образом, возможности компетентностного подхода при отборе персонала выходят далеко за рамки простого найма. Это инструмент формирования стратегической устойчивости организации. Создание системы отбора, ориентированной на компетенции, позволяет не просто закрывать вакансии, а подбирать людей, способных развиваться вместе с организацией, обеспечивая ее конкурентоспособность в ближайшей и долгосрочной перспективе.

[66]Приказ Минтруда и социальной защиты РФ от 09.03.2022 N 109Н «Об утверждении профессионального стандарта «Специалист по управлению персоналом» (Зарегистрировано в Минюсте России 8 апреля 2022 г. N 68136)

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ПУБЛИЧНОСТЬ, СОСТЯЗАТЕЛЬНОСТЬ И НОРМАТИВНОСТЬ ГРЕЧЕСКОГО ПОЛИСА

Аннотация: *В статье рассматривается влияние особенностей социальной организации греческого полиса на формирование теоретического мышления в Древней Греции. В исследовании использованы историко-философский и сравнительно-аналитический методы. Установлено, что публичность полисной жизни, состязательность гражданского взаимодействия и ориентация на общую норму выступали важнейшими предпосылками становления теоретического мышления.*

Ключевые слова: *греческий полис, теоретическое мышление, античная философия, социальная организация, рациональность*

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PUBLICITY, COMPETITIVENESS, AND NORMATIVITY OF THE GREEK POLIS

Abstract: *The article examines the influence of the social organization of the Greek polis on the formation of theoretical thinking in Ancient Greece. The study employs historical-philosophical and comparative-analytical methods. It is established that the public nature of polis life, the competitiveness of civic interaction, and the orientation toward a common norm constituted the most important prerequisites for the emergence of theoretical thinking.*

Keywords: *Greek polis, theoretical thinking, ancient philosophy, social organization, rationality*

Введение

Актуальность исследования обусловливается фактом того, что происхождение теоретического мышления в Древней Греции невозможно объяснить только внутренним развитием философских идей. Важно учитывать и социальные условия, в рамках которых формировалась

интеллектуальная деятельность, прежде всего особенности организации самого греческого полиса [1]. Полис являлся не только формой политического объединения, но и, в том числе, пространством публичного обсуждения общих дел, где развивались навыки аргументации, сравнения, сопоставления позиций и запросы к общезначимым знаниям и основаниям [2]. В этой связи целью статьи является выявление влияния социальной организации греческого полиса на формирование теоретического мышления. В рамках исследования, проводимого в статье, рассматриваются публичность жизни в полисе Древней Греции, состязательность гражданского взаимодействия, влияние общей нормы как предпосылки формирования теоретического мышления.

Методы исследования

В рамках статьи применялись историко-философский и сравнительно-аналитический методы. Применение историко-философского метода позволило рассмотреть греческий полис как социокультурную среду становления античной рациональности. Сравнительно-аналитический метод применялся для выявления связей между особенностями полисной организации и переходом от традиционного и мифологического способов к теоретическому способу мышления. Помимо этого, применялась понятийная реконструкция, позволяющая соотнести формы общественной жизни с основными признаками теоретического мышления.

Результаты исследования

Ключевой особенностью греческого полиса была публичность общественной жизни. Внутри полисной организации вопросы, имеющие значимый для общины характер, не оставались в пределах замкнутой традиции или сакрального авторитета, напротив, выносились в пространство коллективного обсуждения. Это означало, что гражданин не только имеет право высказать свою позицию, но и должен представить ее в форме, доступной для понимания, оценки, дискуссии и возможного оспаривания внутри сообщества форума. В данных условиях слово обретало новое значение: оно являлось уже не только средством сохранения обычая, но и инструментом для убеждения, пояснения и рационального обоснования. Именно благодаря практике публичного обсуждения сформировалась установка на логическую связность высказывания, на разделение мысли и на поиск фактов и доводов, которые могли бы быть признаны другими участниками общения. Именно эта полисная публичность формировала наиважнейшую предпосылку перехода от образно-традиционного мышления к мышлению, понятийно оформленному и аргументированному [3].

Не менее сильное влияние на формирование полисной культуры оказывала состязательность. Для гражданской жизни Древней Греции были характерны дискуссия, соперничество, судебная полемика, политические дебаты и постоянные прения позиций. В такой среде опираться на происхождение мнения или на силу привычки было недостаточно. Необходимо было доказательство состоятельности выдвигаемой позиции

или точки зрения. Это способствовало постепенному укреплению интеллектуальной установки, при которой ценность мысли определялась не ее возрастом или авторитетом носителя, а степенью ее обоснованности, доказательной базой. Состязательность полисной жизни приводила к росту дисциплины мышления, приучала к последовательному раскрытию аргумента и к различению слабых и сильных доводов. В результате этого сформировались культурные условия, под влиянием которых развивалась способность к рациональным дискуссиям, к необходимости критического подхода в проверке утверждений и к осознанному, последовательному построению позиций. Это формирует одну из существеннейших предпосылок формирования теоретического мышления как мышления доказательного и рефлексивного [4].

Еще одной важной чертой древнегреческого полиса была ориентированность на общепринятую норму, выражавшуюся в законе и порядке гражданской жизни. Полис предполагал существование пространства, внутри которого индивидуальные интересы будут соотноситься с интересами всей общины, а частное решение — с общим основанием. Данная социальная логика поспособствовала постепенному выходу мышления за пределы единичного случая, требовалось обращение и поиск устойчивого принципа, применимого к множеству ситуаций. Иными словами, сама практика полисной жизни требовала стремления от частного к общему, от отдельного мнения к универсальному тезису. Именно эта ориентация на общую значимость имела принципиальное значение для становления теоретического мышления, ведь теория по собственной природе стремится не к выявлению случайного и единичного, а к существенному и общему. Исходя из этого можно утверждать, что полис формировал не только политические формы совместной жизни общины, но и интеллектуальные привычки, которые поспособствовали развитию абстрактного и понятийного мышления [5].

Заключение

На основе проведенного анализа можно сделать вывод о том, что формирование теоретического мышления в Древней Греции было основано не только на развитии познавательной деятельности, но и на особенностях социальной организации древнегреческого полиса. Публичный характер общественной жизни формировал условия для открытых и прозрачных дискуссий, для рационального обоснования позиций. Состязательный характер гражданского взаимодействия формировал установку на доказательность и критическую проверку заявлений. Ориентированность на общую норму привела к формированию способности мыслить в категориях существенного и общего. Таким образом, древнегреческий полис выступал не только политической формой объединения, но и уникальной социокультурной средой, внутри которой сложились предпосылки к переходу от традиционно-мифологического сознания к теоретическому способу мышления. Следовательно, особенности социальной организации

полиса необходимо рассматривать как один из важнейших факторов становления античной философии и рационального мышления в целом.

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РОЛЬ ДИСТАНЦИОННОГО ОБУЧЕНИЕ В ПРЕПОДАВАНИИ РУССКОГО ЯЗЫКА: СОВРЕМЕННЫЕ ТЕНДЕНЦИИ, ПРОБЛЕМЫ И ПУТИ ИХ РЕШЕНИЯ

Аннотация: *В данной статье рассматривается роль дистанционных и смешанных технологий обучения в преподавании русского языка, их значение и эффективность в современном образовательном процессе. Анализируются принципы организации уроков в цифровой образовательной среде, структура учебного процесса, а также интерактивные и коммуникативные подходы. Наряду с преимуществами дистанционного обучения рассматриваются существующие проблемы и пути их решения на научной основе.*

Ключевые слова: *дистанционное обучение, русский язык, цифровые технологии, смешанное обучение, коммуникативный подход, педагогический процесс, интерактивные методы, электронные ресурсы, учебная мотивация, современное образование.*

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THE ROLE OF DISTANCE LEARNING IN TEACHING THE RUSSIAN LANGUAGE: CURRENT TRENDS, PROBLEMS AND THEIR SOLUTIONS

Annotation*: This article examines the role of distance and blended learning technologies in teaching the Russian language, as well as their significance and effectiveness in the modern educational process. It analyzes the principles of organizing lessons in a digital educational environment, the structure of the learning process, and interactive and communicative approaches. Along with the advantages of distance learning, existing problems and ways to solve them on a scientific basis are also considered.*

Key words*: distance learning, Russian language, digital technologies, blended learning, communicative approach, pedagogical process, interactive methods, electronic resources, learning motivation, modern education.*

В настоящее время технологии дистанционного обучения рассматриваются как инновационные средства обучения, призванные изменить педагогический процесс в лучшую сторону, а также предоставить

неограниченные возможности для развития учащихся. Привлечение дистанционных технологий решает задачу индивидуализации образовательного процесса, которая является необходимым условием углубленного обучения.

Проблему важности и перспективности учебного процесса нельзя решить, если не рассматривать лингвометодический принцип в речевом развитии, так как именно совокупность принципов позволяет формировать методическую основу урока по русскому языку.

Выделим основные принципы моделирования урока по русскому языку:

– учет индивидуальных и психологических особенностей обучающихся;

–включение обучающихся в совместное осуществление образовательного процесса;

– взаимное уважение, доверие и партнерство.

Исходя из вышесказанного, структура современного урока по русскому языку должна включать в себя следующие компоненты:

1) диагностику;
2) организацию;
3) отбор обучаемых в группы;
4) мотивацию обучающихся;
5) контроль качества усвоения материала.

Принимая во внимание особенности образовательных технологий, следует выделить оптимальные формы проведения занятий:

1) групповая форма образовательного процесса;
2) интегрированная форма урока;
3) дидактическая форма обучения;
4) индивидуальные направления освоения программы.

Главной целью урока русского языка является развитие речевой деятельности учащихся. Урок прежде всего направлен на формирование умений обновлять предметные знания, организовывать учебный процесс в соответствии с современными требованиями образования и систематизировать учебный материал. Современный урок русского языка ориентирован на достижение более высокого уровня владения языком. Важным компонентом урока является осознанное понимание возможностей языка и рациональное использование языковых средств.

Современный урок русского языка имеет особенности в области устной речи, которая должна включать различные формы: чтение, обсуждение, пересказ и другие виды деятельности. Деятельностный характер обучения обеспечивается за счёт введения практических заданий в форме решения лингвистических задач, а также проведения лингвистических экспериментов.

Наиболее эффективным методом является формирование орфографических и пунктуационных навыков, таких как диктант, письмо и

списывание, направленные на раскрытие взаимосвязи значения слова и его правописания.

Важным компонентом современного урока русского языка является развитие у учащихся понятийного мышления: овладение научной речью и понимание логики построения текста. В систему занятий должны быть включены задания, направленные на развитие умения «говорить» на лингвистические темы, поскольку такие задания способствуют лучшему пониманию языковых явлений и ориентированию в них.

Нельзя игнорировать значение культурного анализа, в связи с чем появляется необходимость в рассмотрении культурного подхода работы с текстом, а также разрабатываются системы упражнений. Без сомнения, наиболее актуальным трендом современного образования признается дистанционное и онлайн-обучение. Стоит отметить, что активное применение данного обучения произошло из-за пандемии коронавирусной инфекции. Во время пандемии именно гибридный формат обучения позволил сохранить безопасность для обучающихся и обеспечил им доступность к учебному процессу. Внедрение смешанной формы обучения в особенности актуально для изучения русского языка.

Рассмотрим практику преподавания русского языка в смешанном формате обучения в общеобразовательных учреждениях. Данная форма обучения выявила свои преимущества, но потребовала от учителя адаптации к различным методам взаимодействия с учащимися и решения возникающих трудностей. Наиболее эффективной является модель, основанная на коммуникативно-деятельностном подходе, где общение направлено на практическое действие.

В этом формате обучающиеся получают необходимую учебную информацию, а преподаватель оперативно корректирует их ошибки. При работе с текстами активно используется поиск информации в интернете с последующим пересказом или комментированием. Особое внимание уделяется практическим заданиям, где оценивание осуществляется сразу после выполнения упражнений. Также эффективно развивается навык письма через организацию переписки, что способствует его практическому формированию.

На основании введения смешанного вида обучения русскому языку можно выделить следующие преимущества дистанционного обучения: мотивация обучающихся и формирование у них автономности в процессе онлайн-обучения; возможность загружать множество образовательных ресурсов, экономя время обучающихся и самих преподавателей; формирование учебного процесса путем выстраивания «дорожной карты» обучения для каждого обучающегося; стимулирование процесса самообучения за счет выполнения заданий и их проверки вне класса. Применение данной формы учебного процесса улучшило усвоение материала обучающимися, а также усовершенствовало общение между обучающимися в онлайн-режиме.

Стоит отметить, что образовательный процесс при переходе к гибридному формату обучения следует разбить на четыре этапа.

1. Анализ, оценка и расстановка приоритетов. Данный этап представляет собой необходимую реальность — ответом на данную необходимость служит онлайн-обучение.

2. Первые шаги. На данном этапе видится пространство с соблюдением требований к безопасности и предоставление обучающимся доступа в данное пространство и равных возможностей.

3. Совершенство. На данном этапе формируется модель гибридного обучения как полноценного учебного процесса.

4. Развитие решения. На данном этапе видится глубокое совершенствование образовательного процесса, связанного с поддержкой обучающихся и преподавателей. Таким образом, применение гибридной формы обучения помогло во время пандемии поддержать мотивацию школьников и вовлечь их в образовательный процесс.

Выделим также принципы методических познаний:

– культурно-исторический аспект преподавания языка;

– изучение практики преподавания;

– моделирование урока при учете общедидактических принципов обучения;

– применение научных познаний в области методики преподавания русского языка;

– совершенствование научного аппарата преподавания.

Необходимо отметить, что планировать и строить урок по русскому языку необходимо на основе продуктивной обучающей культуры: обучение должно быть безопасным, открытым, предоставлять обучающимся равные возможности и по максимуму применять разного рода пути коммуникации.

Несмотря на рост популярности дистанционного обучения, в общеобразовательных учреждениях наблюдается эффект «расхолаживания», что приводит к снижению качества и эффективности обучения. У современных учащихся отмечается низкий уровень саморегуляции и стрессоустойчивости, в результате чего дистанционное обучение не всегда повышает их уверенность, а иногда, напротив, снижает её. Кроме того, часть обучающихся сталкивается с техническими трудностями (отсутствие стабильного доступа к интернету, использование только мобильного телефона, отсутствие компьютера или ноутбука), что затрудняет качественную подготовку к занятиям. Низкая мотивация и недостаточные навыки самоорганизации также негативно влияют на учебный процесс, приводя к снижению уровня знаний и общей результативности обучения.

В заключение необходимо отметить, что тренды современного образования требуют от учителя высокого уровня владения навыками дистанционного обучения, а также использования электронных ресурсов, что приводит к необходимости повышения уровня цифровых компетенций преподавателей.

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РЕГЕНЕРАЦИЯ ЩИТОВИДНО-ПОДЪЯЗЫЧНОЙ СВЯЗКИ В ЭКСПЕРИМЕНТЕ

Аннотация. *В данной статье изучено щитовидно-подъязычные связки (справа и слева), которые полностью рассекались поперек у кошек. Через различные сроки (от 3 дней до 3 месяцев) связки брались для гистологического исследования. Срезы окрашивались гематоксилином Караччи и эозином, пикрофуксином по Ван-Гизон, орсенном, а также на кислые мукополисахариды по Стидмену и по Хэлу. В основном дефект замещен рубцовой тканью. Слабое развитие эластических волокон связано, по-видимому, с ограниченной функциональной нагрузкой. В межклеточном веществе количество кислых мукополисахаридов постепенно снижается.*

Ключевые слова: *Эксперимент, кошки, щитовидно-подъязычные связки, мукополисахариды, пикрофуксином по Ван-Гизон, орсенном, рубец.*

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REGENERATION OF THE THYROHYOID LIGAMENT IN AN EXPERIMENT

Abstract. *This study investigates the thyrohyoid ligaments (right and left), which were completely transected transversely in cats. At various time intervals (from 3 days to 3 months), the ligaments were collected for histological*

examination. Tissue sections were stained with Karacci hematoxylin and eosin, Van Gieson's picrofuchsin, orcein, and were also tested for acidic mucopolysaccharides using Steedman's and Hale's methods.

The defect was mainly replaced by scar tissue. The weak development of elastic fibers appears to be associated with limited functional load. The amount of acidic mucopolysaccharides in the intercellular substance gradually decreased over time.

Keywords: *Experiment, cats, thyrohyoid ligaments, mucopolysaccharides, Van Gieson's picrofuchsin, orcein, scar tissue.*

Введение.

Последствия продленной интубации трахеи остаются одной из актуальных проблем современной детской оториноларингологии и хирургии. С каждым годом неуклонно увеличивается число пациентов, которым требуется проведение длительной респираторной поддержки [1,2]. Однако развитие интенсивной терапии и реанимации позволило не только значительно повысить выживаемость пострадавших, но и привело к увеличению количества больных с постреанимационной патологией гортани и трахеи. Тактика лечения хронических стенозов гортани и трахеи развивается в двух направлениях: совершенствуются методики хирургического лечения, и продолжается активный поиск новых факторов воздействия на ткани человека, способствующих оптимальному процессу ранозаживления [3,4]. Восстановлению связок после повреждения уделяют внимание многие авторы [5]. Однако морфологические исследования в этой области немногочисленны [6]. Относительно восстановления щитовидно-подъязычной связки сведений в литературе не найдено, что и послужило поводом для настоящей работы.

Цель исследования

Изучить регенерация щитовидно-подъязычной связки в эксперименте.

Материалы и методы исследования

Эксперимент был поставлен на щитовидно-подъязычных связках 20 кошек. Через кожный разрез по средней линии передней поверхности шеи обнажался щитовидный хрящ. Боковые мышцы шеи тупо расслаивались и обнажались щитовидно-подъязычные связки (справа и слева), которые полностью рассекались поперек. Через различные сроки (от 3 дней до 3 месяцев) связки брались для гистологического исследования. Материал фиксировался в 10% формалине, жидкости Карнуа, заливался в парафин. Срезы окрашивались гематоксилином Караччи и эозином, пикрофуксином по Ван-Гизон, орсенном, а также на кислые мукополисахариды по Стидмену и по Хэлу.

Результаты исследования

У кошек верхний рог щитовидного хряща и большой рог подъязычной кости соединены (справа и слева) двумя щитовидно-подъязычными связками - верхней и нижней. Изучение места повреждения верхней щитовидно-

подъязычной связки на третьи-четвертые сутки после операции показало, что в зоне разреза клетки не видны, ядра отсутствуют. В зоне повреждения начинает разрастаться рыхлая соединительная ткань. Клетки располагаются беспорядочно. Коллагеновые волокна тонкие, извитые. Эластические волокна единичные. Кислых мукополисахаридов много в межклеточном веществе. На 10-12 день после операции дефект в верхней щитовидно-подъязычной связке оказывается полностью замещенным рыхлой соединительной тканью. Клеточные элементы располагаются беспорядочно. Встречаются фигуры деления фиброцитов. Эластические волокна единичные тонкие и располагаются косопродольно. Коллагеновые волокна несколько утолщаются и имеют извитой ход. Количество кислых мукополисахаридов в основном веществе снижается. В нижней щитовидно-подъязычной связке на месте ее повреждения также разрастается рыхлая соединительная ткань. Видны фигуры прямого и непрямого деления клеток. Эластических волокон несколько больше, чем в верхней связке, и располагаются они беспорядочно. Коллагеновые волокна толще эластических и имеют извитой ход. Кислых мукополисахаридов в основном веществе содержится небольшое количество.

Через один-полтора месяца после операции непрерывность верхней щитовидно-подъязычной связки восстанавливается, хотя дефект в основном замещен рыхлой соединительной тканью. Однако отчетливо видны и элементы плотной оформленной соединительной ткани, что свидетельствует о частичном восстановлении клеточных и волокнистых структур самой связки. Клетки продолжают делиться. Эластические волокна единичные тонкие, слегка извитые. Коллагеновых волокон выявляется больше, чем в предыдущем сроке регенерации. Они утолщаются, становятся длиннее, заметно извиты. В основном веществе содержание кислых мукополисахаридов заметно не меняется. Спустя два-три месяца после операции ширина верхней щитовидно-подъязычной связки несколько увеличивается. Дефект замещен главным образом рыхлой соединительной тканью, однако ранее возникшие волокна самой связки заметны более отчетливо. Из клеточных элементов преобладают фиброциты, расположенные беспорядочно и местами продольно. Кровеносных сосудов становится меньше. Эластических волокон по-прежнему выявляется мало. Они тонкие, имеют извитой ход и располагаются косо-продольно. Коллагеновые волокна преобладают над эластическими. Количество кислых мукополисахаридов в межклеточном веществе снижается.

В нижней связке место повреждения также заполнено рыхлой соединительной тканью. Клеточные элементы располагаются более рыхло. Встречаются жировые клетки. Эластических волокон больше, чем в верхней связке. Они более толстые, извитые, располагаются беспорядочно и косо-продольно. Среди тонких коллагеновых волокон встречаются и более толстые. Кислые мукополисахариды распределены неравномерно.

Вывод

Исходя из приведенных данных, следует, что сближение краев поврежденной связки приводит к частичному ее восстановлению. В основном дефект замещен рубцовой тканью. Слабое развитие эластических волокон связано, по-видимому, с ограниченной функциональной нагрузкой. В межклеточном веществе количество кислых мукополисахаридов постепенно снижается.

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КОМПЛЕКС БОЛЕЗНЕЙ АЙВЫ И СИСТЕМА ФИТОСАНИТАРНЫХ МЕРОПРИЯТИЙ

Аннотация: *В статье проанализирован комплекс основных заболеваний айвы (Cydonia oblonga Mill.), встречающихся на насаждениях, их распространение и степень вредоносности. Освещены биологические особенности грибных и бактериальных болезней, широко распространённых в садах айвы, а также условия их эпифитотического развития. Кроме того, представлен комплекс фитосанитарных мероприятий, включающий агротехнические, профилактические и химические методы, направленные на предотвращение и ограничение распространения заболеваний.*

Ключевые слова: *айва, болезнь, эпифитотия, фитосанитарные мероприятия, комплекс заболеваний, особенности распространения, степень вредоносности, агротехнические мероприятия, химическая защита, урожайность, качество плодов.*

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COMPLEX OF QUINCE DISEASES AND SYSTEM OF PHYTOSANITARY MEASURES

Abstract: *The article analyzes the complex of major diseases affecting quince (Cydonia oblonga Mill.) plantations, their distribution, and the degree of harmfulness. The biological characteristics of fungal and bacterial diseases widely spread in quince orchards, as well as the conditions for their epiphytotic development, are highlighted. In addition, a set of phytosanitary measures, including agrotechnical, preventive, and chemical methods aimed at preventing and limiting the spread of diseases, is presented.*

Keywords: *quince, diseases, epiphytosis, phytosanitary measures, disease complex, distribution characteristics, degree of harmfulness, agrotechnical measures, chemical protection, yield, fruit quality.*

Введение

В последние годы сельское хозяйство Республики Узбекистан занимает важнейшее место в национальной политике устойчивого развития экономической системы страны. В условиях глобальных проблем, связанных с обеспечением продовольственной безопасности, повышение продуктивности и защита сельскохозяйственных растений становятся ключевыми задачами государственной стратегии.

Узбекистан в настоящее время занимает третье место в мире по объёму производства айвы (Cydonia oblonga), уступая лишь Турции и Китаю, что подчёркивает его важную роль в мировом айводстве. По данным международной и национальной статистики, ежегодный объём производства айвы в республике в последние годы составляет в среднем 85–96 тыс. тонн, при этом в отдельные периоды он превышал 100 тыс. тонн. Айва возделывается на площади около 3,6–3,7 тыс. га, а средняя урожайность достигает 25–26 т/га, что является одним из наиболее высоких показателей в мире. Такая продуктивность обусловлена благоприятными почвенно-климатическими условиями, традициями садоводства и применением интенсивных агротехнологий. Несмотря на определённые колебания валового сбора по годам, связанные с погодными факторами и структурными изменениями в садоводстве, Узбекистан стабильно сохраняет позиции одного из ведущих мировых производителей айвы, что делает культуру экономически и научно значимой для дальнейших исследований и развития плодоводства страны.

Эффективная защита плодовых насаждений от болезней и вредителей требует комплексного подхода, включающего агротехнические, биологические и химические методы. Особое внимание уделяется изучению эпифитотических процессов, которые определяют скорость распространения патогенов, а также разработке фитосанитарных мероприятий, направленных на снижение вредоносности заболеваний и обеспечение стабильной урожайности. В связи с этим исследование комплекса болезней айвы и оценка эффективности систем защиты приобретает практическую значимость для обеспечения устойчивого развития садоводства и повышения качества плодов.

Материалы и методы исследования

В условиях Ферганской долины айва (Cydonia oblonga Mill.) подвержена широкому спектру заболеваний, которые оказывают значительное влияние на продуктивность и качество плодов. Наиболее распространёнными являются мучнистая роса, парша, монилиоз и ряд других патогенов, способствующих эпифитотическим вспышкам. Климатические условия региона — умеренно континентальный с жарким летом и сравнительно влажной весной — создают благоприятную среду для развития грибных и бактериальных болезней. В этих условиях применение комплекса фитосанитарных мероприятий, включая агротехнические, профилактические и химические методы защиты, является необходимым для поддержания здоровых насаждений и обеспечения стабильного урожая.

Таким образом, исследования в Ферганской долине демонстрируют необходимость комплексного и адаптированного подхода к защите айвы. Комбинация наблюдений, анализа биохимических и морфологических особенностей растений, а также внедрение современных методов профилактики и лечения грибковых заболеваний создают прочную основу для разработки эффективных стратегий защиты плодовых культур в условиях Центральной Азии.

Цитоспороз является одним из распространённых заболеваний и возбудители, относящиеся к роду Cytospora, поражают кору и побеги, вызывая некрозы, язвенные поражения и постепенное усыхание ветвей, особенно у ослабленных растений. Развитию цитоспороза способствуют абиотические стрессовые факторы, такие как засуха, перепады температур, солнечные ожоги и механические повреждения, через которые патоген проникает в ткани растения, что позволяет рассматривать их как потенциально опасный компонент фитопатогенного комплекса айвы.

Айва (Cydonia oblonga Mill.) в целом отличается относительной устойчивостью к мучнистой росе, однако при благоприятных для патогена условиях заболевание может проявляться и на данной культуре. Возбудителями мучнистой росы являются сумчатые грибы порядка Erysiphales, преимущественно представители рода Podosphaera. Поражение айвы носит, как правило, ограниченный характер и проявляется в виде беловатого мучнистого налёта на молодых листьях и побегах, сопровождающегося их деформацией и угнетением роста. Массового развития заболевания, аналогичного у яблони, на айве обычно не наблюдается.

Наблюдения также позволили оценить эффективность мер защиты айвы от грибковых патогенов. Применение фунгицидов, соблюдение агротехнических приёмов, включая санитарную обрезку и своевременную уборку опавших листьев, существенно снижает интенсивность поражения. В регионах комплексные мероприятия позволяют значительно ограничить распространение инфекций, повышая здоровье растений и качество плодов.

Сравнительный анализ данных показал, что несмотря на различия в климатических и агротехнических условиях, стратегически важными остаются одинаковые меры: мониторинг состояния листьев и плодов, своевременное выявление симптомов поражения и применение защитных средств на ранних стадиях развития патогенов. Такой подход позволяет снизить ущерб от грибковых заболеваний и поддерживать продуктивность садов на стабильном уровне.

Современные исследования фитопатогенов айвы (Cydonia oblonga Mill.) подчёркивают важность мониторинга фитосанитарного состояния садов для предотвращения эпифитотических вспышек. В 2023 году в Южной Корее были идентифицированы грибы Diplodia parva и Diplodia crataegicola как возбудители черной гнили айвы, подтверждённые молекулярной идентификацией.

Патоген Colletotrichum clavatum, впервые зарегистрированный в Европе, вызывает антракноз айвы, проявляющийся некротическими очагами на плодах и приводящий к их гниению, что подчёркивает необходимость адаптированных фитосанитарных мероприятий с использованием агротехники и химических средств.

Кроме того, монолиоз, вызываемый Monilinia fructigena, проявляется как бурое гниение плодов, сопровождающееся мягкостью, водянистостью тканей и образованием склероций, обеспечивающих перезимовку патогена. Для эффективного контроля этих заболеваний критически важно внедрение комплексного мониторинга фитосанитарного состояния садов, раннее выявление симптомов и применение интегрированных защитных мер, включая агротехнику, биологические и химические методы, адаптированные к местным условиям

В Ферганской долине айва подвержена различным грибковым и бактериальным заболеваниям, которые оказывают значительное влияние на здоровье растений и урожайность. Наиболее распространенной болезнью является парша, возбудителем которой является Venturia cydoniae. Заболевание поражает листья и плоды, особенно в период с мая по июнь, когда наблюдается высокая влажность и умеренные температуры, благоприятные для размножения гриба. Частота встречаемости парши составляет 25–30 %. Мучнистая роса, вызываемая Podosphaera tridactyla, проявляется на листьях и побегах белым налетом и наиболее активна в апреле–мае, встречается у 15–20 % растений.

Цитоспороз, возбудителем которого является Cytospora cydoniae, проявляется в виде язв и трещин на ветках, особенно в июле–августе, когда деревья подвержены стрессу из-за жары или механических повреждений, частота встречаемости составляет 10–15 %. Монилиоз (Monilinia fructigena и Monilinia laxa) является одной из наиболее опасных болезней, поражающих плоды и цветки, вызывая бурую гниль; пик заражения наблюдается с июля по сентябрь, встречаемость составляет 20–25 %.

Кроме того, бактериальная пятнистость, вызываемая Pseudomonas syringae, проявляется на листьях и побегах в виде коричневых пятен и может приводить к опаданию листьев, чаще всего в весенний период, с частотой 5–8 %. Таким образом, учитывая климатические особенности Ферганской долины, грибковые и бактериальные болезни развиваются преимущественно в весенне-летний период, при этом монилиоз и цитоспороз достигают максимальной активности в июле–августе, когда условия способствуют заражению плодов и ослаблению деревьев.

Результаты и обсуждения

Грибковые заболевания айвы имеют устойчивый характер и требуют постоянного мониторинга. Использование аналитического подхода и количественной оценки поражённости позволяет более точно разрабатывать регионально адаптированные меры защиты, направленные на снижение фитопатологической нагрузки и повышение продуктивности садов.

Применение биопрепарата Спорагин, в.к. (1500 ЕА/г) в условиях Ферганской долины обеспечивало высокую защиту айвы от комплекса основных заболеваний, включая монилиоз, цитоспороз, паршу, мучнистую росу и бактериальный рак. Обработка деревьев препаратом в оптимальной дозе 4,5 л/га способствовала значительному снижению поражённости листьев, плодов и древесины, замедляла развитие некротических очагов на ветвях и новках, уменьшала количество поражённых листьев и плодов, а также препятствовала образованию мучнистой росы на поверхности плодов. В то же время, в отношении бактериального рака биопрепарат проявлял умеренный бактериостатический эффект, замедляя прогрессирование заболевания и снижая интенсивность некротических очагов, что способствовало общему укреплению фитосанитарного состояния насаждений.

Влияние биопрепарата Спорагин на фитосанитарное состояние и урожайность айвы

№	Варианты опыта	Поражённость листьев, %	Поражённость плодов, %	Развитие болезни, %	Урожайность, ц/га	Биологическая эффективность, %
1.	Контроль (без обработки)	57,0	55,0	24,5–25,5	98,0	–
2.	СПОРАГИН, в.к. 4,0 л/га	12,0	10,5	3,5–4,0	112,0	85–88
3.	СПОРАГИН, в.к. 4,5 л/га	10,5	9,0	2,5–3,0	126,0	88–92

В результате применения Спорагина наблюдалось сокращение степени поражения монилиозом на листьях и плодах на 85–92 %, уменьшение поражённости ветвей цитоспорозом до 70–85 %, снижение проявлений

парши на 65–80 % и снижение интенсивности мучнистой росы на поверхности плодов, при этом бактериальный рак развивался медленнее, что в совокупности повышало биологическую эффективность фитосанитарных мероприятий и способствовало увеличению урожайности при сохранении высокого товарного вида плодов.

В контрольном варианте (без обработки) поражённость листьев составила 57,0%, поражённость плодов — 55,0%, развитие болезни находилось в пределах 24,5–25,5%. Урожайность при этом составила 98,0 ц/га.

Применение препарата Спорагин, в.к. в норме расхода 4,0 л/га способствовало резкому снижению уровня заболевания. Поражённость листьев уменьшилась до 12,0%, плодов — до 10,5%, а развитие болезни снизилось до 3,5–4,0%. Урожайность повысилась до 112,0 ц/га. Биологическая эффективность препарата в данном варианте составила 85–88%.

При увеличении нормы расхода до 4,5 л/га наблюдался ещё более выраженный эффект. Поражённость листьев снизилась до 10,5%, плодов — до 9,0%, развитие болезни составило всего 2,5–3,0%. Урожайность достигла 126,0 ц/га, что значительно превышает контрольный показатель. Биологическая эффективность препарата в этом варианте составила 88–92%.

Таким образом, применение биопрепарата Спорагин, в.к. обеспечило существенное улучшение фитосанитарного состояния растений айвы, значительное снижение развития болезни и достоверное повышение урожайности, причём наибольшая эффективность отмечена при норме расхода 4,5 л/га.

Заключение

Проведённый анализ грибковых заболеваний айвы (Cydonia oblonga Mill.) в Ферганской долине показал, что фитопатогенная нагрузка на культуру остаётся значительной и оказывает прямое влияние на продуктивность и качество плодов. В условиях долины формируется устойчивый комплекс грибковых патогенов, среди которых доминирующее положение занимает монилиоз возбудителем которого является Monilia *cydonia*. Обработка препаратом способствовала значительному снижению поражённости листьев и плодов, а также уменьшению степени развития болезни по сравнению с контрольным вариантом. Наиболее высокий защитный эффект отмечен при норме расхода 4,5 л/га, где биологическая эффективность достигала 88–92%, а развитие болезни снижалось до минимальных значений. Использование Спорагина обеспечило не только стабилизацию фитосанитарной обстановки, но и существенное повышение урожайности.

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ИНТЕГРАТИВНЫЙ ПОДХОД К МЕТОДИКЕ ПРЕПОДАВАНИЯ РАЗДЕЛА «ОПТИКА»

Аннотация: *В данной статье исследованы интеграционный анализ совершенствования методики преподавания физики, где при сохранении традиционной формы урока используются современные инновационные технологии. На основе интегративного подхода рассматривается развитие компетенции логического мышления учащихся, оценка их знаний, умений и навыков, а также контроль за ними.*

Ключевые слова: *интегративный подход, логическое мышление, интеграция, склера, радужная оболочка, зрительный нерв, аккомодация, фоторецептор, роговица, линза.*

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INTEGRATIVE APPROACH TO THE METHODOLOGY OF TEACHING THE SECTION “OPTICS”

Abstract: *This article explores the integrative analysis of improving the methodology of teaching physics, where modern innovative technologies are applied while maintaining the traditional lesson format. Based on the integrative approach, the development of students’ logical thinking competence is examined, along with the evaluation of their knowledge, skills, and abilities, as well as monitoring processes.*

Keywords: *integrative approach, logical thinking, integration, sclera, iris, optic nerve, accommodation, photoreceptor, cornea, lens.*

Известно, что интегративный подход в современном образовательном процессе является методической основой, направленной на комплексное формирование знаний, умений и навыков учащихся. В этом подходе важное место занимает межпредметная связь, гармоничное сочетание теоретических знаний с практикой и развитие творческого мышления. Основная задача

интегративного подхода - формирование у учащихся комплексного мышления, обучение применению теоретических знаний в жизненных ситуациях и развитие профессиональных компетенций. Такая методика делает образовательный процесс более эффективным, интересным и инновационным.

При преподавании раздела «Оптика» с использованием интегративного подхода ученик осваивает не только законы физики, но и получает возможность применять знания, связанные с математикой, биологией, химией и информатикой.

При применении интегративного подхода преподаватель должен учитывать существующие противоречия. Если рассматривать интегративный подход как единство цели, содержания и принципов, то результатом этого процесса станет формирование у будущих специалистов новой, целостной системы знаний и навыков [1].

Вопрос интеграции был поднят ещё в древние времена, когда из философии начали выделяться естественные науки. Именно вследствие дифференциации возникла проблема объединения знаний. Причина заключается в том, что при разделении отдельных наук нарушается естественная связь между явлениями и дисциплинами[6]. Применение интегративного подхода в образовательном процессе позволяет решить эту проблему.

В настоящее время в реформировании образовательного процесса уделяется большое внимание интегративному подходу. Интегративные методы, согласовывая профессиональные и личные стремления, способствуют подготовке высококомпетентных специалистов. Если в каждой сфере будут кадры, обладающие не только компетентностью в своей специальности, но и интегративными знаниями, это станет основным фактором в построении развитого государства и общества[2]. Конечная цель интегративного подхода в образовании заключается именно в этом.

С развитием общества развиваются также наука и техника. В нашей стране предоставляемые молодёжи свободы и возможности, безусловно, побуждают их к изменениям в науке. Педагогические кадры, стремясь воспитать совершенных личностей - будущее нашей Родины, должны уделять особое внимание методике преподавания и межпредметной интеграции.

При преподавании физики связь с профессиональными дисциплинами относится к внутренним связям[4]. При изучении раздела «Оптика» существуют как межпредметные, так и внутрипредметные связи, и эта взаимосвязь показана на схеме (Рис. 1).

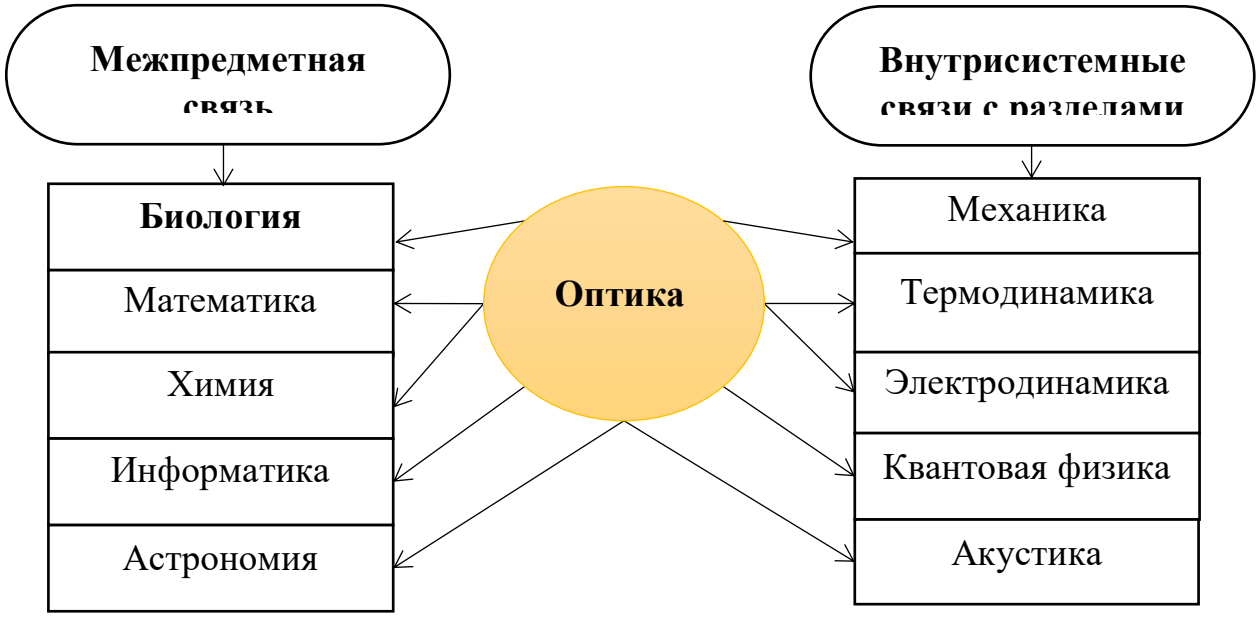


Рис.1. Схема межпредметных связей оптики в цикле общепрофессиональных дисциплин

Оптика как область науки развивается не только в физике, но и в биологии, здоровье человека, химии, а в основе этого гарантируется развитие всего мира. При объяснении темы «Глаз и зрение, аккомодация глаза» связь с биологией даёт хороший результат[7]. Итак, как можно объяснить эту тему в физике с биологической точки зрения?

Давайте изучим строение глаз рис.2.

Биологически мы знаем, что каждая часть глаза выполняет свою особую функцию.

Склера – это наружная оболочка глаза, основная её задача заключается в том, чтобы удерживать глаз в округлой форме.

Роговица – расположена в передней части склеры, является прозрачным телом. С точки зрения оптики прозрачные тела хорошо пропускают свет.

Зрительный нерв (кровеносные сосуды) – обеспечивает поступление питательных веществ и кислорода к глазу.

Радужная оболочка – находится в передней части сосудистой оболочки и выполняет основную функцию совместно с зрачком. Радужка состоит из мышц, обладающих свойством сокращаться и расширяться. Днём, когда на радужку попадает избыток света, она расширяется, а зрачок сужается; ночью наоборот – радужка сужается, зрачок расширяется, и площадь попадания света увеличивается[3].

Сетчатка – это часть глаза, состоящая из фоторецепторов, основная функция которых (фото – свет, рецептор – воспринимающий) заключается в приёме световых лучей и передаче их к радужной оболочке.

У учащихся при изучении физики естественно возникает вопрос: мы видим предметы благодаря отражению света от них, но как же так, что в темноте, когда свет не падает, мы всё равно можем что-то различать?

Именно фоторецепторы сетчатки выполняют эту задачу. Их клетки делятся на два типа:

Колбочковидные фоторецепторы – их основная функция заключается в различении цветов, что напрямую связано со световыми лучами. Как мы различаем цвет? На предмет падает свет, и отражённый, а не поглощённый им световой луч определяет его цвет. Таким образом, эти клетки выполняют свою функцию в условиях хорошего освещения.

Палочковидные фоторецепторы необходимы для движения в темноте, так как они способны собирать даже слабый свет и передавать его через хрусталик.

Хрусталик глаза выполняет функцию выпуклой линзы: он собирает отражённые от предметов световые лучи в одной точке и формирует изображение. Как это происходит? Изображение формируется на жёлтом пятне в перевёрнутом виде.

Если рассматривать предмет вблизи, кривизна хрусталика увеличивается, он становится более округлым, фокусное расстояние уменьшается, и изображение формируется ближе (рис. 3-а). Это явление называется **спазм аккомодации**[4].

Если предмет находится вдали, кривизна хрусталика уменьшается, фокусное расстояние увеличивается, и изображение формируется дальше (рис. 3-б).

В нормальном глазе изображение формируется чётко на жёлтом пятне. Оно получается уменьшенным и перевёрнутым, и именно это является основным признаком нормального зрения.

Близорукость – это распространённая проблема зрения, при которой возникают нарушения в восприятии радужной оболочкой.

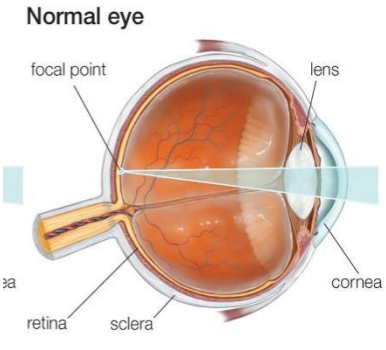


Рис.3 a.

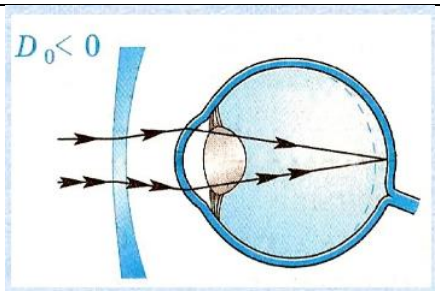
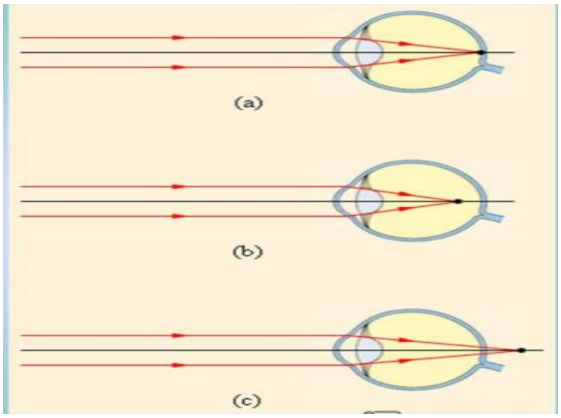


Рис.3 b.

Форма хрусталика становится более округлой, чем форма выпуклой линзы. Световой луч, проходя через хрусталик, собирается до жёлтого пятна и изображение формируется в неправильном месте, поэтому сигнал не достигает мозга. Для уточнения изображения используется очки с вогнутыми линзами, которые увеличивают фокусное расстояние.



Дальнозоркость. В этом случае изображение формируется позади жёлтого пятна, фокусное расстояние увеличивается, и для улучшения зрения применяются очки с выпуклыми линзами.

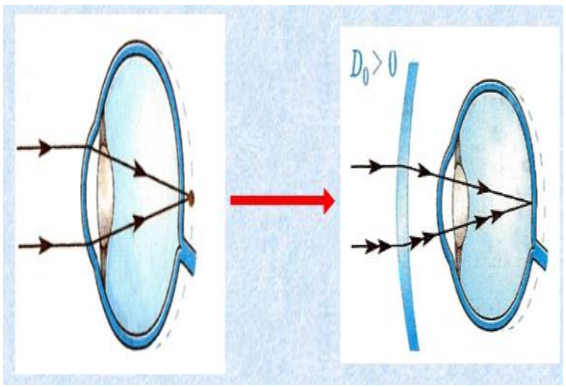


Рис.4.

У глазные заболевания чаще встречаются: у пожилых людей - дальнозоркость, а у молодых - близорукость. При объяснении этой темы связь с биологией помогает учащимся лучше представить процессы, глубже понять законы оптики и осознать их значение.

Заключение

Таким образом, методика преподавания раздела «Оптика» на основе интегративного подхода способствует объединению теоретических знаний, практических навыков и творческого мышления студентов. Эта методика не только делает обучение физике более эффективным, но и развивает

компетенции логического мышления учащихся. При междисциплинарной интеграции каждая наука рассматривает тему со своей точки зрения, поэтому внедрение интегративного подхода в образование является достаточно сложной задачей. По этой причине данная технология должна реализовываться педагогами, обладающими глубокими знаниями и опытом в своей области. В результате возникает необходимость решения проблемы нехватки компетентных специалистов для осуществления интегративного образования.

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МЕЖДУНАРОДНОЕ СОТРУДНИЧЕСТВО В ОБЕСПЕЧЕНИИ ЭКОЛОГИЧЕСКОЙ УСТОЙЧИВОСТИ В НИЖНЕМ ТЕЧЕНИИ АМУДАРЬИ

Аннотация. *В статье рассматриваются экологические проблемы, возникшие в регионе Нижней Амударьи в результате постепенного высыхания Аральского моря, а также меры, направленные на устранение их экологических и социально-экологических последствий. Освещаются вопросы создания гидротехнических сооружений в регионе и пути их эффективного использования. Предложены конструктивные подходы и рекомендации по смягчению остроты экологической ситуации в Нижнем Приамударье. Особое внимание уделено научным исследованиям, проводимым в рамках международного сотрудничества, направленным на реализацию фитомелиоративных мероприятий на основе передовых технологий, а также на создание водоёмов. Подробно изложены сведения о совместных научно-исследовательских и практических работах, осуществляемых в регионе.*

Ключевые слова: *гидротехнические сооружения, фитомелиоративные мероприятия, конструктивные меры, экологические проблемы, реконструкция, генофонд населения.*

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INTERNATIONAL COOPERATION IN ENSURING ENVIRONMENTAL SUSTAINABILITY IN THE LOWER AMUDARYA RIVER

Abstract. *This article examines the environmental problems that have arisen in the Lower Amu Darya region as a result of the gradual desiccation of the Aral Sea, as well as measures aimed at eliminating their environmental and socio-environmental consequences. The article also highlights the construction of hydraulic structures in the region and ways to effectively utilize them. Constructive approaches and recommendations for mitigating the environmental situation in the Lower Amu Darya region are proposed. Particular attention is paid to scientific research conducted within the framework of international cooperation aimed at implementing phytomeliorative measures based on advanced technologies, as well as creating reservoirs. Detailed information on joint research and practical work carried out in the region is presented.*

Keywords: *hydraulic structures, phytomeliorative measures, constructive measures, environmental problems, reconstruction, population gene pool.*

Введение

На современном этапе проблема Аральского моря и Приаралья, трансформировавшаяся из региональной экологической проблемы в глобальную, привлекает внимание не только стран Центральной Азии, но и мировой общественности в целом. В настоящее время в результате отступления Аральского моря на его месте сформировались своеобразные новые ландшафты на площади около пяти миллионов гектаров, представленные песчано-солончаковыми территориями. В этой связи изучение и анализ природно-географических изменений, происходящих в акватории бывшего Аральского моря, является актуальной научной и практической задачей.

С момента возникновения проблемы Арала и Приаралья данный регион стал объектом многочисленных исследований различной направленности. Выполнено значительное количество научных работ, посвящённых изучению отдельных природных особенностей региона. В частности, геология высохшего дна Аральского моря освещена в исследованиях Б.И. Пинхонова (2002, 2006, 2009), вопросы почвообразования — в работах Т.Ф. Некрасова (1999), Б. Джоллибекова (1991, 1995, 2002) и др., тогда как изучением состояния растительного покрова занимались Л.Я. Курочкова (1984), С.К. Кабулов (1985), Ж. Жолдасбаев (1995), Т.Т. Разимова (2008) и другие исследователи.

Проблемами формирования природно-географических комплексов на высохшем дне Аральского моря занимались Н.Ф. Моржайдев (1979), М.И. Ишанкylov (1980), А. Рафиков (1982), А.К. Курбонниязов (2001, 2006) и другие учёные.

Климатические условия региона изучались Т.И. Малосновой, О.И. Суботиной, С.Г. Чанышевой (1987) и др.В последние годы значительный вклад в изучение Нижнего Приамударья внесли преподаватели Самаркандского государственного университета, в частности профессора В. Равиков, К. Ярашев, доценты Д. Хурсандов и другие.

Источники и методы исследования

Постепенное высыхание Аральского моря оказывает существенное воздействие на регион Нижней Амударьи, что приводит к возникновению острых геоэкологических проблем. Экологические проблемы региона, в свою очередь, обуславливают появление социально-экологических трудностей. Это требует от международного сообщества консолидации усилий в изучении региона Аральского моря и Нижнего течения Амударьи, а также в разработке и реализации необходимых мер.

Организация Объединённых Наций, включая такие структуры, как ЮНЕСКО, ЮНЕП, а также ряд других международных организаций, ведут научно-исследовательскую и организационную деятельность, направленную на преодоление экологических проблем Аральского моря и Нижнего Приамударья и достижение экологической устойчивости региона.

Начиная с 1990-х годов государства, испытывающие на себе последствия Аральской катастрофы, при поддержке Организации Объединённых Наций, а также других международных и региональных организаций, последовательно привлекают внимание мирового сообщества к проблеме Арала и её тесной взаимосвязи с региональной и глобальной безопасностью. На 48-й сессии Генеральной Ассамблеи ООН (28 сентября 1993 года) и на 50-й сессии (24 октября 1995 года) представители государств Центральной Азии обратились к мировому сообществу с призывом оказать содействие в спасении Аральского моря и Приаралья, подчеркнув, что решение данной проблемы невозможно без участия международных финансовых институтов, развитых стран и под эгидой ООН.

В целях решения указанных проблем предпринимаются практические меры как на региональном, так и на национальном уровнях. Ярким примером является Международный фонд спасения Арала (МФСА), созданный в 1993 году при участии Казахстана, Кыргызстана, Таджикистана, Туркменистана и Узбекистана.

Ключевыми задачами Фонда определены сохранение биофонда Приаралья, снижение разрушительного воздействия экологического кризиса на окружающую среду и, прежде всего, на жизнедеятельность населения региона.

Одним из важнейших результатов деятельности МФСА на современном этапе стало принятие трёх программ оказания помощи странам бассейна Аральского моря (ПБАМ–1, ПБАМ–2, ПБАМ–3).

Республика Узбекистан, являясь одним из учредителей МФСА, вносит значительный вклад в укрепление деятельности организации. В период председательства в МФСА (1997–1999 гг.) Узбекистан активно содействовал совершенствованию нормативно-правовой базы Фонда, а также развитию сотрудничества с международными организациями и финансовыми институтами в целях обеспечения устойчивого развития бассейна Аральского моря.

В октябре 1997 года в городе Ташкенте состоялась международная встреча доноров по техническим вопросам, по итогам которой было начато осуществление международного проекта «Управление окружающей средой и водными ресурсами в бассейне Аральского моря».

В 2008 году по инициативе Республики Узбекистан в Ташкенте была проведена международная конференция по проблемам Арала, что стало важным импульсом для широкого обсуждения данной проблемы на международном уровне. В работе конференции приняли участие представители более 60 международных организаций, крупных финансовых институтов Японии, Германии, Китайской Народной Республики и арабских государств, а также специалисты ведущих научно-исследовательских центров. По итогам конференции были приняты Ташкентская декларация и План действий, направленные на реализацию проектов по смягчению тяжёлых последствий Аральской катастрофы общей стоимостью 1,5 млрд долларов США.

На национальном уровне Республика Узбекистан реализует комплекс широкомасштабных мер по борьбе с негативными последствиями высыхания Аральского моря. С 1990-х годов реализованы сотни программ и проектов.

В 2013 году утверждён план стоимостью, эквивалентной 1,3 млрд долларов США, направленный на финансирование таких мероприятий, как создание малых водоёмов в дельте Амударьи в Приаралье, строительство водоотводящих сооружений с опреснительными установками, создание защитных лесных насаждений, а также проведение орнитологического мониторинга в Южном Приаралье.

С августа 2013 года председательство в МФСА перешло к Республике Узбекистан. 16 сентября 2013 года по инициативе Республики Узбекистан и действующего Президента МФСА в качестве официального документа 68-й сессии Генеральной Ассамблеи ООН была распространена «Программа мер по ликвидации последствий высыхания Аральского моря и предотвращению катастрофы экосистемы Приаралья». Данная программа получила всестороннюю поддержку со стороны Генерального секретаря ООН Пан Ги Муна.

«Программа мер по ликвидации последствий высыхания Аральского моря и предотвращению катастрофы экосистемы Приаралья» предусматривает реализацию следующих приоритетных направлений:

I. Создание условий для проживания населения в Приаралье, восстановление и сохранение генофонда населения;

II. Совершенствование системы управления водными ресурсами и их рационального использования, сохранение системы естественных водоёмов в акватории Аральского моря.

III. Осуществление широкомасштабных мероприятий по созданию лесных насаждений на территории высыхающего дна Аральского моря и предотвращению процессов опустынивания региона;

IV. Сохранение биоразнообразия, восстановление биологических ресурсов, охрана животного и растительного мира;

V. Дальнейшее совершенствование институциональных основ МФСА, укрепление сотрудничества стран региона в рамках данной организации, а также привлечение внимания мирового сообщества к решению проблем, связанных с Аральской катастрофой.

Вместе с тем, с учётом нарастающей остроты экологических, социально-экономических и гуманитарных последствий высыхания Аральского моря, а также углубляющегося кризиса условий жизни населения Нижнего Приамударья, становится всё более очевидным, что решение данной глобальной проблемы невозможно без серьёзной поддержки со стороны ООН и мирового сообщества.

В целях мобилизации усилий международного сообщества по реализации программ и проектов, направленных на улучшение экологической и социально-экономической ситуации в регионе Аральского моря, а также для дальнейшего развития международного сотрудничества и снижения последствий экологической катастрофы, 28–29 октября 2014 года в городе Ургенче состоялась международная конференция на тему «Развитие сотрудничества по смягчению последствий экологической катастрофы в регионе Аральского моря». Проблема Аральского моря остаётся одной из наиболее актуальных, и международное сотрудничество играет ключевую роль в её смягчении.

По итогам международной конференции были подписаны соглашения и контракты на общую сумму 3 млрд долларов США, направленные на

реализацию национальных и региональных проектов. При этом около 200 млн долларов США составили грантовые средства.

24 марта 2015 года в Ташкенте были обсуждены вопросы создания фонда и укрепления его деятельности. Было предусмотрено выделение средств в размере 200 млн долларов США. Кроме того, 12–17 апреля 2015 года в городах Тэгу и Кёнджу (Республика Корея) в рамках 7-го Всемирного водного форума были организованы специальные сессии, посвящённые проблемам Арала.

Республика Узбекистан активно участвует в деятельности Международного фонда спасения Арала и в тесном сотрудничестве с донорскими организациями реализует ряд мероприятий, направленных на решение данной проблемы.

В настоящее время миллионы людей на планете сталкиваются с проблемой доступа к чистой питьевой воде, что особенно остро проявляется в странах с засушливым климатом. Ухудшение экологической ситуации в Приаралье привело к нарушению экологического равновесия, усилению дефицита водных ресурсов и, как следствие, к серьёзному ухудшению здоровья населения. Это оказывает негативное влияние на социально-экономическое развитие региона, условия жизни населения и состояние биологического разнообразия. В связи с этим возникает необходимость дальнейшего укрепления сотрудничества между государствами региона и международными организациями.

В последние годы был выдвинут ряд инициатив по решению проблемы Арала. В частности, налажена деятельность Межгосударственной комиссии по развитию Приаралья, а также координационных структур. В 1993 году главами пяти государств Центральной Азии был создан Международный фонд спасения Арала, а также подписано соглашение о совместных действиях по экологическому оздоровлению региона и его социально-экономическому развитию. В 1995 году была принята Нукусская декларация, направленная на расширение сотрудничества стран Центральной Азии в данной сфере. В рамках этих инициатив реализуется совместная программа по бассейну Аральского моря.

В Республике Узбекистан вопросы смягчения последствий экологического кризиса решаются на государственном уровне на комплексной основе. Приняты законы, регулирующие использование природных ресурсов и охрану окружающей среды. Страна присоединилась к ключевым международным соглашениям, включая Конвенцию по охране и использованию трансграничных водотоков и международных озёр. Последовательно реализуются масштабные программы, направленные на социально-экономическое развитие Республики Каракалпакстан и Хорезмской области, входящих в Приаральский регион.

Кроме того, поэтапно реализуется ряд целевых проектов, направленных на улучшение экологического состояния территорий региона Аральского моря, предотвращение деградации земель и повышение

сельскохозяйственного потенциала, оздоровление населения, обеспечение водоснабжения, а также создание условий для получения дополнительных доходов за счёт развития малого бизнеса и частного предпринимательства, фермерства и народных ремёсел. При этом особое внимание уделяется расширению социальной защиты населения, прежде всего женщин и детей. Созданы десятки современных учреждений образования и здравоохранения.

На высохшей части Аральского моря проводятся масштабные работы по закреплению песков, освоению территорий путём посадки засухо- и солеустойчивых растений. Это создаёт возможности для использования ранее неосвоенных земель в качестве пастбищ и, в конечном итоге, способствует развитию животноводства. В дельте Амударьи формируются водоёмы общей площадью свыше 150 тыс. гектаров, где уже начали функционировать рыбохозяйственные предприятия. Все эти меры способствуют экономическому развитию региона, повышению занятости населения, восстановлению биоразнообразия и улучшению климатических условий.

Многие международные организации, в том числе агентства системы ООН, а также финансовые институты — Всемирный банк, Азиатский банк развития и другие — оказывают содействие стабилизации ситуации в Приаралье. В частности, при поддержке Глобального экологического фонда Нукусским филиалом Международного фонда спасения Арала разработано 22 проекта, большинство из которых уже реализовано.

Как отмечалось, значительная часть проблем, связанных с экологическим кризисом в Нижнем течении Амударьи, не может быть решена усилиями одной страны. В этой связи, как подчёркивалось на международных форумах, необходимо совершенствовать систему управления и использования водных ресурсов бассейна Аральского моря в рамках действующих межгосударственных соглашений. Развитие такого сотрудничества должно осуществляться с учётом общепризнанных международных норм и правил. Существенную роль в этом процессе играет присоединение всех стран региона к международным правовым актам по охране трансграничных водотоков и озёр и рациональному использованию их водных ресурсов.

Высыхание Аральского моря напрямую связано с рациональным использованием водных ресурсов рек Амударьи и Сырдарьи. Любые изменения объёма и режима стока этих рек представляют серьёзную угрозу для хрупкого экологического баланса Центральной Азии.

Именно по этой причине ряд подходов к использованию водных ресурсов в регионе Центральной Азии вызывает обоснованные возражения. В частности, любые попытки строительства в верховьях этих рек крупных гидротехнических сооружений, несущих значительные экологические, социальные и технологические риски, являются потенциально опасными и нежелательными.

Игнорирование данных серьёзных вызовов может поставить под угрозу развитие и жизнедеятельность миллионов людей, проживающих в Узбекистане, Казахстане и Туркменистане.

Заключение

На основе проведённого анализа научных исследований и организационных мер можно сделать вывод о том, что определены основные направления обеспечения экологической устойчивости посредством оптимизации климатических и экологических проблем, вызванных высыханием Аральского моря и ухудшением экологической ситуации в Нижнем течении Амударьи.

Высыхание Аральского моря оказало значительное воздействие как на общество, так и на природную среду прилегающих территорий. Проблема Арала носит международный характер, что подтверждается большим количеством научных публикаций и проведённых международных конференций.

В 1995 году состоялась международная конференция ООН, посвящённая проблеме Арала, по итогам которой была принята Нукусская декларация. Однако до настоящего времени данная проблема не получила окончательного решения. В октябре 2014 года в городе Ургенче прошла очередная международная конференция, посвящённая Аральскому морю, ключевой темой которой стало развитие международного сотрудничества в целях смягчения последствий экологической катастрофы.

В рамках конференции особое внимание было уделено изучению природных и социально-экономических последствий высыхания Аральского моря, а также влиянию данного процесса на изменение местного климата. Установлено, что в результате высыхания моря усилились такие природные явления, как пыле-солевые бури, оказывающие значительное негативное воздействие на экосистемы Приаралья.

Так, исследования, проведённые в Восточном Устюрте, показали, что после пылевых бурь на расстоянии 30–40 км от бывшей береговой линии растения покрываются тонким слоем соли, что приводит к их гибели. Кроме того, наблюдается сокращение численности лекарственных растений. Подобные негативные изменения отмечаются и в других природных компонентах.

Исходя из текущей экологической ситуации в регионе Аральского моря, представляется целесообразным применение комплекса практических мер. В частности, высокая эффективность отмечена при реализации фитомелиоративных мероприятий. В районах с эоловыми формами рельефа положительные результаты достигаются за счёт закрепления песков путём высадки псаммофитных растений.

На высохшем дне моря на территории Узбекистана ежегодно осуществляется посадка саженцев чёрного саксаула, кандыма, черкеза, юльгуна и других кустарников на площади не менее 25 тыс. гектаров. Насаждения, созданные ещё в 1980-е годы, достигли значительных размеров

и играют важную роль в закреплении песков на обширных территориях. Аналогичный подход может быть эффективно применён и на остаточных солончаковых землях с учётом особенностей местного рельефа, преимущественно с использованием галофитных растений (чёрный саксаул, юльгун, чёрная барак).

В качестве ещё одной важной рекомендации следует отметить необходимость создания водоёмов в Приаралье, которые могут способствовать смягчению климатических условий. В перспективе расширение сети водоёмов и развитие зон фитомелиорации в регионе будут иметь важное значение для улучшения экологической ситуации и социально-экономического развития территории.

Таким образом, реализация комплекса мер, направленных на оптимизацию экологической ситуации в Нижнем течении Амударьи, является одной из неотложных задач современности и необходимым условием обеспечения экологической устойчивости региона.

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ВЛИЯНИЕ ПАРАМЕТРОВ МАРШРУТНОЙ СЕТИ И ОСТАНОВОЧНОЙ ИНФРАСТРУКТУРЫ НА ПРИВЛЕКАТЕЛЬНОСТЬ АВТОБУСНЫХ ПЕРЕВОЗОК В ГОРОДЕ ТАШКЕНТЕ

***Аннотация**: цель исследования состоит в аналитической оценке того, как параметры маршрутной сети и состояние остановочной инфраструктуры связаны с привлекательностью автобусных перевозок в Ташкенте. Информационную базу составили открытые статистические, нормативные и аналитические материалы за 2021-2025 годы, интерпретированные с использованием сравнительного и индикаторного подходов. Под привлекательностью в работе понимается совокупность характеристик, влияющих на удобство выбора автобуса по критериям доступности, ожидания, комфорта посадки и пересадок. Анализ показывает, что при крупном масштабе сети ее потребительская ценность снижается из-за ограниченной фактической доступности остановок, неудовлетворительного состояния посадочной инфраструктуры, интервалов движения и нерегулярности сообщения. Сделан вывод, что для Ташкента более значимым становится не дальнейшее количественное расширение сети, а повышение качества остановок, развитие пересадочных узлов и оценка доступности по реальной пешеходной сети.*

***Ключевые слова**: автобусные перевозки, маршрутная сеть, остановочная инфраструктура, привлекательность общественного транспорта, Ташкент, пешеходная доступность, интервалы движения.*

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INFLUENCE OF ROUTE NETWORK PARAMETERS AND STOP INFRASTRUCTURE ON THE ATTRACTIVENESS OF BUS SERVICES IN TASHKENT

***Abstract**: the purpose of the study is to provide an analytical assessment of how route network parameters and the condition of stop infrastructure are related to the attractiveness of bus services in Tashkent. The evidence base includes open statistical, regulatory, and analytical materials for 2021-2025 interpreted through comparative and indicator-based approaches. In this paper, attractiveness is understood as a set of characteristics influencing the convenience of choosing the bus in terms of accessibility, waiting time, boarding comfort, and transfer conditions. The analysis indicates that, despite the large scale of the network, its user value is reduced by limited actual stop accessibility, insufficient boarding infrastructure, service intervals, and irregularity. The paper concludes that for Tashkent the priority lies not in further quantitative expansion of the network, but in improving stop quality, developing transfer hubs, and assessing accessibility along the actual pedestrian network.*

***Keywords**: bus services, route network, stop infrastructure, attractiveness of public transport, Tashkent, pedestrian accessibility, service intervals.*

Введение

Привлекательность автобусных перевозок в крупных городах определяется не только числом маршрутов и подвижного состава, но и параметрами сети, качеством остановочной инфраструктуры, временем ожидания и удобством пересадок. Для Ташкента эта проблема особенно значима, поскольку при высоком уровне ежедневной мобильности доля общественного транспорта в модальном распределении в 2021 году составляла лишь 21 %, а суточный объем поездок на общественном транспорте оценивался в 1,3 млн, из которых около 0,5 млн приходилось на метро [1]. По более поздним оценкам, на территории города и его повседневной агломерации совершается около 9 млн поездок в сутки, из них 6 млн с использованием транспорта, при этом около 1,7 млн поездок приходится на общественный транспорт и 4,3 млн на легковые автомобили [2].

Открытые источники фиксируют одновременно крупный масштаб сети и сохранение проблем ее фактической доступности. По данным International Transport Forum, в городской системе общественного транспорта насчитывается 216 маршрутов общей протяженностью 3884 км и 2349 остановок [1]. В специализированных материалах по автобусной подсистеме приводятся 165 действующих автобусных маршрутов, 1661 ежедневно выпускаемый на линию автобус, 25 181 рейс в сутки и 2453 промежуточные автобусные остановки [2]. Такое расхождение не является противоречием, поскольку речь идет о разных объектах учета и разных моментах фиксации данных, что требует их раздельной интерпретации.

Государственная транспортная политика прямо связывает рост привлекательности общественного транспорта с модернизацией сети и остановочной инфраструктуры. Постановлением Президента Республики Узбекистан от 2 февраля 2022 года № ПП-111 предусмотрены увеличение

доли общественного транспорта до 43 %, рост суточного пассажиропотока до 2,7 млн человек, создание 16 транспортно-пересадочных узлов и реконструкция 1160 автобусных остановок [3]. В перспективе до 2030 года поставлены ориентиры доведения доли пользования общественным транспортом до 60 % и роста средней скорости движения автобусов с 18 до 24 км/ч [4]. Цель статьи состоит в аналитической оценке того, как параметры маршрутной сети и состояние остановочной инфраструктуры связаны с привлекательностью автобусных перевозок в Ташкенте. Вклад работы состоит в систематизации открытых данных по сети, остановкам и параметрам обслуживания в единой аналитической рамке, ориентированной на оценку факторов привлекательности автобусного сообщения.

Материалы и методы

Информационную базу исследования составили открытые материалы международных организаций, официальные нормативные документы Республики Узбекистан, концептуальные документы по развитию общественного транспорта Ташкента, а также научные публикации, посвященные пространственной доступности остановок, качеству автобусного обслуживания и параметрам городской автобусной сети [1-9]. В основную выборку включались источники, одновременно отвечающие четырем критериям: официальный или рецензируемый статус, наличие количественных данных по Ташкенту, сопоставимость показателей сети и инфраструктуры, а также актуальность для периода 2021-2025 годов. Более ранние исследования использовались как методологическая база для интерпретации, а не как источник прямых оценок по городу.

Под привлекательностью автобусных перевозок в работе понимается совокупность характеристик, повышающих вероятность выбора автобуса пассажиром по сравнению с альтернативными способами передвижения. В операционном плане эта категория раскрывается через четыре блока индикаторов: параметры сети, состояние остановочной инфраструктуры, параметры обслуживания и результирующие показатели для пассажира. В структуру анализа включены пространственный охват сети, пешеходная доступность остановок, интервалы и регулярность движения, качество остановочного обустройства, доступность для маломобильных групп и удобство пересадок. При интерпретации качества сервиса использованы международные подходы, в которых ключевыми атрибутами выступают доступность, время, информация, комфорт и безопасность [5].

Для оценки доступности остановок учтен распространенный ориентир 400 м, или примерно 5 минут пешего подхода при средней скорости ходьбы 1,3 м/с [8]. В то же время открытые материалы по Ташкенту не позволяют выполнить полноценный GIS-расчет фактического охвата населения по реальной пешеходной сети, поэтому результаты трактуются как аналитическая систематизация факторов привлекательности и инфраструктурных ограничений, а не как строгая причинная модель спроса.

Таблица 1.
Система индикаторов, использованных для анализа привлекательности автобусных перевозок в Ташкенте

Блок	Индикатор	Ед. изм.	Значение	Аналитический смысл
Сеть ОТ	Маршруты ОТ	ед.	216	Пространственный охват системы ОТ
Сеть ОТ	Протяженности линий ОТ	км	3884	Плотность сети и связность
Сеть ОТ	Остановки системы ОТ	ед.	2349	Масштаб остановочной сети
Автобусная подсистема	Действующие автобусные маршруты	ед.	165	Масштаб автобусной сети
Автобусная подсистема	Выпуск автобусов на линию	ед./сутки	1661	Интенсивность обслуживания
Автобусная подсистема	Рейсы автобусов	рейсов/ сутки	25 181	Предложение перевозок
Автобусная подсистема	Промежуточные автобусные остановки	ед.	2453	Масштаб автобусных остановок
Сервис	Интервалы движения автобусов	мин.	10-12	Время ожидания и предсказуемость
Пассажирский результат	Доля общественного транспорта в модальном распределении	%	21	Результат привлекательности
Пассажирский результат	Уровень удобного доступа населения к ОТ	%	около 15	Косвенная оценка доступности
Нормативные ориентиры	Цели развития до 2025-2030 гг.	-	43 % ОТ; 16 ТПУ; 1160 остановок; 60 %; 24 км/ч	Целевая рамка повышения привлекательности

Источник: составлено по данным [1; 2; 3; 4; 6; 7; 10].

Результаты и обсуждение

Сопоставление индикаторов, представленных в таблице 1, показывает, что крупный формальный масштаб системы не трансформируется автоматически в высокую привлекательность автобусных перевозок. При наличии разветвленной сети и значительного предложения перевозок доля общественного транспорта в модальном распределении остается сравнительно низкой, а уровень удобного доступа населения к нему оценивается примерно в 15 % [6; 7; 10]. Следовательно, ключевой проблемой выступает не только количественный охват, но и качество условий доступа, ожидания и посадки.

Наиболее наглядно это проявляется в состоянии остановочной инфраструктуры. По данным обследования 2453 промежуточных автобусных остановок 560 остановок, или 22,8 %, не имеют сооружения, 767, или 31,3 %, не имеют посадочной площадки, 1687, или 68,8 %, не оборудованы специальной зоной остановки, 683, или 27,8 %, не имеют

пешеходного подхода, 1552, или 63,3 %, лишены дорожного знака, 568, или 23,2 %, не имеют навеса, 579, или 23,6 %, не оборудованы местами для сидения, 2337, или 95,3 %, не имеют пандуса, а 1014, или 41,3 %, не обеспечены урнами [2]. Тем самым наиболее критичные дефициты связаны с доступностью для маломобильных пассажиров, организацией зоны остановки и базовой навигацией, что снижает фактическую потребительскую ценность даже при наличии остановки на схеме.

Методологически важен и вопрос пешеходной доступности. Международная практика исходит из допустимого подхода к остановке в пределах 400 м, однако исследования показывают, что оценка охвата по круговым буферам способна завышать реальную доступность, если не учитывать конфигурацию улично-пешеходной сети и физические барьеры [8]. Для Ташкента этот вывод принципиален: даже при среднем шаге остановок в центральной части порядка 300-600 м [1] отсутствие подходов к 683 остановкам и пандусов к 2337 остановкам означает, что фактическая доступность сети ниже, чем следует из ее геометрических параметров.

Отдельным фактором привлекательности выступают интервалы и регулярность движения. По имеющимся данным, фактические интервалы на автобусных маршрутах Ташкента составляют 10-12 минут [2]. Однако для пассажира существенен не только средний интервал, но и его устойчивость: исследования нерегулярного движения показывают, что разброс интервалов может увеличивать среднее время ожидания на 15-25 % по сравнению с регулярным режимом [9]. Поэтому интервальность и надежность движения целесообразно рассматривать как прямые параметры привлекательности, а не как вторичные эксплуатационные характеристики.

Структура планируемой новой маршрутной сети также подтверждает смещение акцента от простого увеличения числа маршрутов к их функциональной реорганизации. В рамках реформы предусмотрено внедрение 159 маршрутов, включая 11 магистральных, 14 кольцевых, 92 соединительных и 42 подвозящих [3]. Такая иерархия ориентирована на снижение дублирования, повышение связности и более рациональную организацию пересадок. В сочетании с целями создания 16 транспортно-пересадочных узлов и роста средней скорости автобусов до 24 км/ч [4] это указывает на переход к качественной оптимизации сети.

Таким образом, использованные открытые данные не позволяют построить строгую статистическую модель зависимости спроса от параметров сети и инфраструктуры, однако они последовательно указывают на то, что привлекательность автобусных перевозок в Ташкенте определяется совокупным действием четырех взаимосвязанных механизмов: пространственным охватом, фактической доступностью остановок, временной надежностью поездки и качеством пересадочной организации. В этом состоит основной аналитический результат работы.

Заключение

Проведенный анализ открытых источников и системы индикаторов позволяет заключить, что привлекательность автобусных перевозок в Ташкенте определяется не столько абсолютным числом маршрутов и остановок, сколько качеством их пространственной и инфраструктурной организации. Для города более существенными барьерами выступают фактическая недоступность части остановок, низкая оснащенность посадочной инфраструктуры, интервальность и нерегулярность движения, а также разрыв между формальным охватом сети и реальными условиями ожидания и посадки.

Практический вывод состоит в том, что повышение привлекательности автобусных перевозок требует смещения акцента с простого наращивания сети на качественную оптимизацию ее параметров. Первоочередное значение имеют реконструкция остановок, развитие транспортно-пересадочных узлов, повышение регулярности движения и применение более точных методов оценки доступности по реальной пешеходной сети. Вклад работы состоит в систематизации и аналитической интерпретации открытых данных о параметрах маршрутной сети, остановочной инфраструктуры и обслуживания автобусов в Ташкенте для выявления ключевых факторов, ограничивающих привлекательность автобусных перевозок.

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ВЛИЯНИЕ ФАКТОРОВ СРЕДЫ НА БИОХИМИЧЕСКИЕ ПОКАЗАТЕЛИ КРОВИ

Аннотация: *В данном исследовании изучается влияние различных средовых стресс-факторов на биохимические показатели крови человека. Кортизол, являясь основным гормоном стресса, играет ключевую роль в регуляции адаптивного ответа организма при воздействии неблагоприятных факторов окружающей среды. В ходе эксперимента были проанализированы изменения четырёх биохимических показателей (кортизол, глюкоза, АЛТ, мочевина) у людей под влиянием средовых стресс-факторов, с целью выявления степени их воздействия на метаболические процессы.*

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INFLUENCE OF ENVIRONMENTAL FACTORS ON BLOOD BIOCHEMICAL PARAMETERS

Abstract: *This study examines the influence of various environmental stress factors on human blood biochemical parameters. Cortisol, as the main stress hormone, plays a key role in regulating the body's adaptive response to adverse environmental factors. The experiment analyzed changes in four biochemical parameters (cortisol, glucose, ALT, urea) in humans under the influence of environmental stress factors in order to identify the extent of their impact on metabolic processes.*

Цель исследования

Оценить влияние средовых стресс-факторов на биохимические показатели крови человека (кортизол, глюкоза, АЛТ, мочевина) и выявить характер и выраженность их изменений при стрессе.

Результаты

Показатель	Контроль (норма)	Под влиянием средовых стресс-факторов	Изменение, %
Кортизол, нмоль/л	44,2 ± 0,33	358,3 ± 111,1**	+710,6%
Глюкоза, ммоль/л	4,4 ± 0,2	15,4 ± 1,8**	+250%
АЛТ, Ед/л	25,0 ± 1,5	68,3 ± 5,9**	+173%
Мочевина, ммоль/л	5,0 ± 0,3	11,5 ± 0,9**	+130%

В ходе проведённого исследования установлено, что под влиянием средовых стресс-факторов происходит значительное изменение всех четырёх изучаемых биохимических показателей крови: уровень кортизола повысился на 710,6%, уровень глюкозы увеличился на 250%, активность АЛТ повысилась на 173%, уровень мочевины увеличился на 130% по сравнению с контролем. Таким образом, средовые стресс-факторы вызывают выраженные изменения всех четырёх биохимических показателей, наиболее значительный прирост отмечен для кортизола.

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АНАТОМИЧЕСКИЕ ОСОБЕННОСТИ СТРОЕНИЯ КРОВЕНОСНЫХ СОСУДОВ ТОНКОГО КИШЕЧНИКА КРОЛИКОВ

Аннотация. *В данной статье изучено об экстраорганных сосудах тонкой кишки кролики. Для исследования служили препараты тонкой кишки 15 кролики, сосуды которых были инъецированы рентгено-контрастными - массами. Гистологические срезы аркадных сосудов окрашивались гематоксилин-эозином. Сосудистые аркады тонкой кишки кролики, независимо от того, входят ли они в состав малых или больших сегментов, находятся на одном уровне от брыжеечного края кишки в отличие от сосудистых аркад тонкой кишки человека, которые находятся на различных уровнях в брыжейке кишки.*

Ключевые слова: *кролик, тонкой кишки, гематоксилин-эозин, верхняя брыжеечная артерия, сосудистые аркады, интраорганный сосуды.*

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ANATOMICAL FEATURES OF THE BLOOD VESSELS STRUCTURE IN THE SMALL INTESTINE OF RABBITS

Abstract. *This study investigated the extraorgan blood vessels of the small intestine in rabbits. The material for the research consisted of small intestine specimens from 15 rabbits, the vessels of which were injected with radiopaque masses. Histological sections of the arcade vessels were stained with hematoxylin-eosin.*

The vascular arcades of the rabbit small intestine, regardless of whether they belong to small or large segments, are located at the same level from the mesenteric border of the intestine. This differs from the vascular arcades of the human small intestine, which are situated at different levels within the mesentery.

Keywords: *rabbit, small intestine, hematoxylin-eosin, superior mesenteric artery, vascular arcades, intraorgan vessels*

Введение

Хирургические маневры при выполнении сосудистого этапа расширенной операции на органах билиопанкреатодуоденальной зоны включают различные формы нарушения магистрального кровотока по верхним брыжеечным сосудам: временное прекращение венозного оттока, временное прекращение артериального и венозного кровотока, временное и окончательное интраоперационное шунтирование, интраоперационная артериовенозная перфузия тонкой кишки [1,2]. В настоящее время сроком максимальной допустимой переносимой тотальной ишемии кишечника считается один час, однако ранние морфологические изменения регистрируются уже при 5-10 минутной ишемии [3,4]. В литературе отсутствуют данные о сроках переносимой ишемии, не сопровождающейся развитием системного воздействия факторов, запускающих синдром системного воспалительного ответа. Именно этот временной интервал можно определить как безопасный с точки зрения профилактики генерализованной системной воспалительной реакции и полиорганной недостаточности в послеоперационном периоде [5] . Наиболее полные данные об экстраорганных сосудах тонкой кишки кролики, основного экспериментального животного, приведены в работах очень мало инфармации [6]. Однако и в них отсутствуют данные о взаимоотношениях артериальных на и венозных сосудов, о распределении прямых сосудов венозных протяжении кишки и о строении стенки артериальных и аркадных сосудов.

Цель исследования

Изучить особенности анатомического строения кровеносных сосудов тонкого кишечника у кроликов

Материалы и методы исследования

Материалом нашего исследования служили препараты тонкой кишки 15 кролики, сосуды которых были инъецированы рентгено-контрастными - массами. Гистологические срезы аркадных сосудов окрашивались гематоксилин-эозином.

Результаты исследования

Верхняя брыжеечная артерия кролики отходит самостоятельным стволом от вентральной поверхности брюшной аорты на уровне с надпочечниковыми артериями, несколько ниже чревного ствола. Ход ее дугообразный, обращен выпуклостью к брыжеечному краю кишки, длина 80-120 мм. Величина изгиба весьма непостоянна: при незначительном изгибе верхняя брыжеечная артерия лежит вблизи корня брыжейки, при выраженном изгибе - она располагается у брыжеечного края кишки. Наиболее часто на наших препаратах верхняя брыжеечная артерия находилась в корне брыжейки. От выпуклой поверхности брыжеечной

артерии отходят 10- 17 кишечных артерий длиной от 30 до 100 мм, диаметром 1000-1500 мкм. Они располагаются между листками брыжейки в сопровождении кишечных вен диаметром 1500-2500 мкм. Артерии лежат ближе к одному из листов брыжейки, вены - к другому. В топографии кишечных артерий и вен нет строгого соответствия: кишечные вены короче кишечных артерий, они могут сопровождаться парой артерий, причем, возможно расположение артерии на стенке вены или на значительном удалении от нее. Артерия на протяжении своего хода может менять положение по отношению к сопровождающей вене. На расстоянии 25-60 мм от брыжеечного края кишки кишечные артерии делятся под углом 35-70° на две первичные ветви: каудальную и краниальную. В свою очередь последние еще раз делятся на две ветви на расстоянии 15-25 мм от брыжеечного края кишки. Трехкратное деление кишечных артерий наблюдалось крайне редко. Первичные ветви кишечных артерий анастомозируют с аналогичными ветвями смежных кишечных артерий, вторичные - между собой. Кишечные артерии и их аркадные анастомозы формируют большие сегменты, вторичные - малые сегменты, расположенные в месте бифуркации кишечных артерий. Таким образом, сосудистые аркады тонкой кишки кролики, независимо от того, входят ли они в состав малых или больших сегментов, находятся на одном уровне от брыжеечного края кишки в отличие от сосудистых аркад тонкой кишки человека, которые находятся на различных уровнях в брыжейке кишки. Протяженность аркадных сосудов различна и варьирует от 35-50 мм в проксимальном - до 65-80 мм дистальном отделах кишки. Нарушение непрерывности артериальных аркад наблюдалась нами в двух случаях (13,3%). От артериальных аркад отходят прямые артерии, являющиеся промежуточным звеном между экстра-и интраорганными сосудами тонкой кишки. Протяженность их до вступления в стенку кишки от 8,5 до 25-30 мм. Диаметр прямых сосудов 150-850 мкм. Поэтому мы различаем по протяженности длинные и короткие, а по калибру крупные и тонкие прямые артерии. Число прямых артерий, отходящих от аркад больших сегментов варьирует от 6 до 12. Однако плотность прямых артерий в проксимальном отделе кишки выше, чем в среднем и дистальном, поскольку и протяженность аркадных сосудов в проксимальном отделе значительно выше, чем в остальных отделах брыжейки.

Вывод

Таким образом, в проксимальном отделе одна прямая артерия кровоснабжает участок кишки длиной 3,5-5,0 мм, тогда как в среднем и в дистальном отделах длина участка увеличивается до 7,2-12 мм. Основной ствол прямой артерии, пройдя от 2,0 до 5,0 мм от брыжеечного края подсерозной, прободает мышечную оболочку и вступает в подслизистый слой, сохраняя при этом первоначальный диаметр. От прямых артерий ответвляют две ветви диаметром 100-120 мкм, одна из которых вступает в брыжеечный край противоположной стенки кишки, а другая направляется в сторону брыжейки и анастомозирует с ее терминальными сосудами.

Изучение гистологических срезов аркадных сосудов позволило обнаружить на протяжении каждой артериальной аркады 2-3 участка протяженностью 3-4 мм, где определялось продольное расположение гладкомышечных клеток. Более эффективном сужении артериальных сосудов в местах продольного расположения мышечного слоя.

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ФОРМИРОВАНИЕ КОММУНИКАТИВНЫХ НАВЫКОВ У ДЕТЕЙ С ОСОБЫМИ ПОТРЕБНОСТЯМИ

Аннотация. *В статье рассматриваются педагогические условия формирования коммуникативных навыков у детей с особыми потребностями. Подчеркивается значение индивидуального подхода, коррекционно-развивающей среды, адаптированных методов обучения и взаимодействия педагога с семьей. Делается вывод о необходимости комплексной организации работы, направленной на социализацию, речевое развитие и включение ребенка в образовательную среду.*

Ключевые слова. *коммуникативные навыки, дети с особыми потребностями, специальная педагогика, социализация, речевое развитие, инклюзивное обучение, коррекционная работа, педагогическая поддержка.*

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DEVELOPING COMMUNICATION SKILLS IN CHILDREN WITH SPECIAL NEEDS

Abstract*. This article examines the pedagogical conditions for developing communicative skills in children with special needs. It emphasizes the importance of an individualized approach, a corrective-developmental environment, adapted teaching methods, and cooperation between teachers and families. The article concludes that comprehensive support is necessary for socialization, speech development, and successful inclusion in the educational environment.*

Keywords*. communicative skills, children with special needs, special pedagogy, socialization, speech development, inclusive education, corrective work, pedagogical support.*

Введение

Формирование коммуникативных навыков у детей с особыми потребностями относится к числу приоритетных задач современной специальной педагогики. В условиях обновления образовательной системы возрастает необходимость не только в передаче учебных знаний, но и в обеспечении полноценного общения ребенка с окружающими. Коммуникация выступает основой познавательной активности,

эмоционального развития, включения в коллектив и успешной адаптации к социальным требованиям. Для детей с особыми потребностями трудности общения нередко становятся одной из главных причин ограничения учебной успешности и социальной интеграции. Это связано с особенностями речевого, сенсорного, интеллектуального, эмоционально-волевого или моторного развития, которые затрудняют выражение мыслей, понимание обращенной речи, участие в совместной деятельности и установление устойчивых контактов со сверстниками и взрослыми. В связи с этим педагогическая наука все более активно обращается к поиску эффективных способов формирования коммуникативной компетентности на основе комплексного и дифференцированного подхода. Для педагогического вуза данная проблема имеет особое значение, поскольку будущий специалист специального педагогического направления должен владеть научно обоснованными методами развития общения у разных категорий детей. Эффективность данной работы определяется не отдельными упражнениями, а целостной организацией коррекционно-педагогического процесса, в котором учитываются индивидуальные возможности ребенка, его образовательные потребности, семейная ситуация и особенности социальной среды.

Основная часть

Коммуникативные навыки у детей с особыми потребностями формируются значительно успешнее в том случае, если образовательная работа носит системный, последовательный и практико-ориентированный характер. Прежде всего педагог должен рассматривать коммуникацию не только как развитие устной речи, но и как способность вступать во взаимодействие, понимать намерения собеседника, использовать вербальные и невербальные средства общения, соблюдать очередность в диалоге, реагировать на эмоциональные сигналы и выражать собственное состояние доступным способом. Именно поэтому работа по развитию общения требует сочетания речевых, психологических и социальных компонентов.

Важным условием выступает создание специальной коммуникативно-развивающей среды. Такая среда предполагает использование наглядных материалов, карточек, пиктограмм, предметных опор, игровых ситуаций, сюжетно-ролевых упражнений и моделей повседневного общения. Для детей с нарушениями речи, интеллекта, слуха, аутистического спектра или опорно-двигательного аппарата особенно значимы методы, которые делают коммуникацию конкретной, понятной и эмоционально подкрепленной. Существенную роль играет повторяемость речевых моделей, постепенное усложнение заданий, формирование навыков просьбы, ответа, согласия, отказа, приветствия, благодарности и выражения эмоций.

Не менее значимым фактором является профессиональная позиция педагога. Специалист должен не просто контролировать речевую активность ребенка, а создавать условия для естественной потребности в общении. Этому способствует доброжелательная атмосфера, совместная деятельность,

поощрение инициативы, организация работы в парах и малых группах, а также постоянное включение семьи в коррекционно-воспитательный процесс. Родители, владеющие элементарными приемами речевой стимуляции, способны поддерживать сформированные навыки в повседневной жизни, что значительно усиливает педагогический результат. Следовательно, развитие коммуникативных навыков у детей с особыми потребностями представляет собой комплексную задачу, решаемую на пересечении специальной педагогики, психологии, логопедии и социальной практики.

Заключение

Таким образом, формирование коммуникативных навыков у детей с особыми потребностями следует рассматривать как стратегически важное направление специального педагогического сопровождения. От уровня развития общения во многом зависят учебная активность ребенка, качество его межличностных контактов, эмоциональное благополучие и возможность включения в общественную жизнь. Проведенный анализ показывает, что наиболее результативными являются те педагогические подходы, которые основаны на индивидуализации обучения, систематической коррекционной поддержке, сочетании речевых и социальных упражнений, а также на активном взаимодействии образовательной организации и семьи. Коммуникативная компетентность не формируется стихийно, особенно у детей, испытывающих различные ограничения в развитии. Она требует специально организованной среды, профессиональной помощи, многократной практики и педагогической чуткости. В условиях педагогического вуза особую значимость приобретает подготовка будущих специалистов, способных применять современные методы развития общения и строить образовательный процесс на принципах уважения, включенности и поддержки. Перспективность данной проблемы связана с дальнейшим совершенствованием инклюзивной и специальной практики, направленной на обеспечение каждому ребенку возможностей для полноценного общения, самовыражения и социальной самореализации.

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БЕЗОПАСНОСТЬ ПРИМЕНЕНИЯ ВИТАМИННО-МИНЕРАЛЬНЫХ КОМПЛЕКСОВ У БЕРЕМЕННЫХ

Аннотация: *Беременность сопровождается значительным увеличением потребности организма женщины в витаминах и минеральных веществах, что связано с интенсивными метаболическими изменениями, ростом плода и формированием плаценты. Недостаточное поступление микронутриентов в этот период может привести к развитию анемии, нарушению обменных процессов, осложнениям беременности и неблагоприятным последствиям для внутриутробного развития плода. В связи с этим применение витаминно-минеральных комплексов рассматривается как одно из важных направлений профилактики дефицитных состояний у беременных.*

В данной работе рассматриваются вопросы безопасности применения витаминно-минеральных комплексов в период беременности, анализируются современные научные данные, рекомендации международных организаций, а также возможные преимущества и потенциальные риски их использования. Особое внимание уделено значению фолиевой кислоты, железа, витамина D и других микронутриентов, играющих важную роль в нормальном течении беременности и профилактике осложнений у матери и плода. Подчёркивается необходимость рационального и индивидуализированного подхода к назначению витаминно-минеральных препаратов с учётом физиологического состояния женщины, срока беременности и наличия сопутствующих факторов риска.

Ключевые слова: *беременность, витаминно-минеральные комплексы, безопасность, микронутриенты, фолиевая кислота, железо, витамин D, профилактика, дефицит витаминов, фармакология, анемия, развитие плода.*

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SAFETY OF VITAMIN-MINERAL COMPLEX USE IN PREGNANT WOMEN

Abstract. *Pregnancy is accompanied by a significant increase in the female body's requirement for vitamins and minerals due to intensive metabolic changes, fetal growth, and placental development. Insufficient intake of micronutrients during this period may lead to anemia, metabolic disorders, pregnancy complications, and adverse outcomes for fetal development. In this regard, the use of vitamin-mineral complexes is considered one of the important approaches for preventing deficiency states in pregnant women.*

This paper examines the safety of using vitamin-mineral complexes during pregnancy, analyzes current scientific data, recommendations of international organizations, as well as the possible benefits and potential risks associated with their use. Particular attention is paid to the role of folic acid, iron, vitamin D, and other micronutrients that are essential for the normal course of pregnancy and for the prevention of complications in both the mother and the fetus. The need for a rational and individualized approach to prescribing vitamin-mineral supplements is emphasized, taking into account the woman's physiological condition, gestational age, and the presence of concomitant risk factors.

Keywords: *pregnancy, vitamin-mineral complexes, safety, micronutrients, folic acid, iron, vitamin D, prevention, vitamin deficiency, pharmacology, anemia, fetal development.*

Введение

Беременность является особым физиологическим состоянием, при котором организм женщины испытывает повышенную нагрузку. Для нормального развития плода требуется достаточное количество микронутриентов. Дефицит витаминов и минералов может привести к осложнениям беременности.

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Беременность является особым физиологическим состоянием, при котором организм женщины испытывает повышенную нагрузку. Для нормального развития плода требуется достаточное количество микронутриентов. Дефицит витаминов и минералов может привести к осложнениям беременности.

Роль микронутриентов

Микронутриенты играют ключевую роль в формировании органов и систем плода. Железо необходимо для профилактики анемии, фолиевая кислота предотвращает дефекты нервной трубки, йод важен для развития щитовидной железы и мозга плода. Витамин D участвует в формировании костной ткани.[1]

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Эффективность витаминно-минеральных комплексов

Многочисленные исследования показывают, что применение витаминно-минеральных комплексов способствует снижению риска осложнений. Отмечается уменьшение частоты преждевременных родов и улучшение общего состояния беременных женщин.

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Безопасность применения

При соблюдении рекомендованных доз витаминно-минеральные комплексы считаются безопасными. Однако важно учитывать индивидуальные особенности организма женщины. Назначение должно проводиться врачом.

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Риски передозировки

Избыточное потребление некоторых витаминов может привести к негативным последствиям. Например, избыток витамина А может вызвать врожденные аномалии, а избыток железа — нарушения пищеварения.

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Практические рекомендации

Беременным женщинам рекомендуется принимать витаминные комплексы только по назначению врача. Необходимо соблюдать дозировку и учитывать особенности питания.

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Заключение

Витаминно-минеральные комплексы являются важным элементом профилактики дефицитов у беременных. Их применение должно быть обоснованным и контролируемым.

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ПРИМЕНЕНИЕ ЭСТЕТИЧЕСКОГО АСПЕКТА ПРИ РЕШЕНИИ АСТРОНОМИЧЕСКИХ ЗАДАЧ СТУДЕНТАМИ ПЕДАГОГИЧЕСКИХ ВУЗОВ

Аннотация*: Данная статья исследует применение эстетического аспекта, при решении задач по астрономии студентами педагогических вузов на практических занятиях по астрономическим дисциплинам. В статье приведены примеры авторских задач по астрономии с эстетическим содержанием, эти задачи формируют и развивают у студентов педагогических вузов – эстетические чувства, тем самым углубляя и расширяя их знания по астрономической науке.*

Ключевые слова: *эстетический аспект, астрономические задачи, студенты, астрономические дисциплины, педагогические вузы.*

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APPLICATION OF AESTHETIC ASPECT IN SOLVING ASTRONOMICAL PROBLEMS BY STUDENTS OF PEDAGOGICAL UNIVERSITIES

Abstract*: This article explores the application of aesthetics to solving astronomy problems by students of pedagogical universities during practical classes in astronomical disciplines. The article provides examples of original astronomy problems with aesthetic content. These problems develop and foster aesthetic sensibilities in students of pedagogical universities, thereby deepening and expanding their knowledge of astronomy.*

Keywords: *aesthetics, astronomical problems, students, astronomical disciplines, pedagogical universities.*

Актуальность темы

Астрономия, как дисциплина, способствует формированию у обучающихся глубокого уважения к природе и пониманию уникальности и красоты космических явлений и небесных тел. При обучении астрономии студентов педагогических вузов, на практические занятия, отводиться значительная часть учебных часов, согласно учебной программе, по

образовательному направлению «Физика и астрономия». При решении астрономических задач, студентами закрепляются знания об определённых астрономических процессах и физических условиях на различных небесных телах. На практических занятиях по астрономическим дисциплинам преподавателем создаются и решаются проблемные ситуации для студентов, формируются их практические навыки и умения [1]. В процессе решения задач по астрономии, у студентов формируются такие качества характера, как целеустремлённость, настойчивость, внимательность, а также включатся творческие способности.

Решение астрономических задач для студентов педагогических вузов, не редко вызывает низкую мотивацию, одна из причин которой – недооценка воспитательной и развивающей функции. В данной статье, мы рассмотрим эстетический аспект при обучении студентов педагогических вузов – астрономии. Мы считаем, что именно через практические занятия по астрономическим дисциплинам, на основе приоритетных современных технологий обучения, можно развивать эстетическое восприятие астрономии, как науки, через развитие творческих способностей студентов [2].

В настоящее время повышается значимость именно эстетического аспекта в восприятии и познании Вселенной студентов педагогических вузов средствами астрономических дисциплин.

Существующие астрономические задачи довольно однообразны, и выделяются отсутствием эстетической составляющей, связью с наукой и жизнью, что снижает познавательный интерес студентов к изучению астрономических дисциплин в целом, и в частности решению задач [3].

Мы предлагает в нашей статье астрономические задачи, составленные с тщательным отбором задачного материала, ориентированных на эстетическую составляющую, так как содержание задач, является одним из средств воспитания и мотивации студентов педагогических вузов.

Говоря об эстетическом аспекте, мы имеем в виду, формирование эстетических чувств, способности студентов к эстетическому созерцанию астрономических объектов и процессов, происходящих в Космосе, а также эстетической творческой деятельности. Например В.Я. Лыков выделяет наглядно- декоративные, вербально-акустические и структурно- логические средства эстетического воспитания обучающихся [4].

Красивые и эффектно созданные технические средства обучения, применяемые в обучении студентов астрономическим дисциплинам, это например подвижная карта звёздного неба, 3D-модели небесных объектов, научный парадокс об огромной плотности нейтронных звёзд, все они, используемые в творческом синтезе могут быть источниками содержания астрономических задач [5]. Перечисленные средства обучения способствуют формированию эстетических чувств студентов, а также глубокому усвоению навыков решения задач по астрономии с эстетическим содержанием.

Фото Плеяд, разных видов галактик, туманностей и звёздных ассоциаций – содержит торжество законов Вселенной, а также способствуют воспитанию глубоких эстетических чувств и красоты звёздного неба, несут эмоционально-чувственный отклик у студентов педагогических вузов на занятиях по астрономии [6]. Их красота, передаёт информацию об объективном устройстве Вселенной, эстетических и физических законов, которые описывают астрономические явления и небесные объекты. Вышеизложенная информация, подводит нас к выводу, что эстетический аспект имеет немаловажное значение в дисциплинарной области при составлении астрономических задач для студентов, которые изучают астрономию в педагогических вузах.

Внешняя эстетика, привлекает студентов к активному решению астрономической задачи, на основе эстетических средств, тем самым обеспечивая им непроизвольное реагирование с полным включением в процессе решения, на уровне подсознания [7]. Происходит тесная связь у студентов в плане эмоционального и рационального познания Космоса.

В задачах по астрономии - эстетическое содержание, может проявляться в симметрии и красоте фото небесных объектов (звёзды, галактики, планеты и т.д.). Мы провели отбор содержания астрономических задач, с эстетической составляющей, а также их решений, которые возможно применять на практических занятиях по астрономическим дисциплинам. То есть те задачи, которые формируют и развивают у студентов педагогических вузов – эстетические чувства, при просмотре задачи, её прочитывании и решении, тем самым углубляя и расширяя свои знания по астрономической науке [8].

Вот определённые критерии, под которые подходят астрономические задачи с эстетическим аспектом обучения и воспитания студентов, и их краткие характеристики:

- занимательность, которая обеспечивает познавательную активность студентов педагогических вузов к астрономическим дисциплинам;

- привлечение к решению задач по астрономии активного творческого воображения, в процессе решения которых, у студентов происходит ассоциация и аналогия, сопоставление неизвестных астрономических понятий с известными научными данными, что в итоге создаёт креативный продукт мыслительной деятельности или рандомной научной идеи;

- наличие положительного воздействия астрономической задачи на психическое и эмоциональное состояние студента, включение его в активный поиск решения задачи;

- описание реальных и трудно представляемых астрономических явлений или процессов, учитывая личный опыт студента, например при астрономических наблюдениях в телескоп небесных объектов.

- креативный стиль формулирования содержания задачи и разные формы её представления студентам (видео, аудио, задачи с фото и другие);

- особый литературный стиль языка, задача в стихах, включающая в себя эмоциональную образность, основанные на научной основе астрономии для студентов педагогических вузов [9].

В нашей статье, мы представляем авторские задачи по астрономии с эстетическим содержанием для студентов направления «Физика и астрономия» педагогических вузов:

►Задача 1: Туманность Ориона

На реальных снимках Туманность Ориона выглядит, как светящееся розово-фиолетовое облако газа.

Условие:

Расстояние до туманности ≈ 1344 световых года.

Сколько времени летит свет от неё до Земли? И сколько это в секундах?

Рис.1. Туманность Ориона

□ Задача 2: Луна над горизонтом

На фотографиях Луна у горизонта кажется огромной и оранжевой.

Условие:

Среднее расстояние до Луны — 384 400 км.

За сколько времени свет доходит от Луны до Земли?

Рис.2. Луна над горизонтом Земли

 Задача 3: О небесном скитальце

Эта задача посвящена объекту, который иногда «заглядывает» во внутреннюю часть Солнечной системы.

Хвост распустила из пыли и льда,
К Солнцу спешит сквозь века и года.
Светит недолго, пугая народ,
Снова во тьму совершив поворот.

Вопрос: О каком небесном теле идет речь и почему у него появляется «хвост» только при приближении к Солнцу?

 Задача 4: Галактика Андромеды

На потрясающих фото Галактика Андромеды — это огромное спиральное облако света.

Условие:

Расстояние ≈ 2.5 млн световых лет.

Мы видим её такой, какой она была когда?

Рис. 3. Галактика Андромеда

 Задача 5: Красная соседка

В этих строках скрыта загадка четвертой планеты.

Ржавым железом покрыты равнины,
Ветры бушуют, вздымая пылины.
Гору Олимп на плечах он несет,
Тонким азотом дышать не дает.
Фобос и Деймос — два верных пажа,
Рядом летают, покой сторожа.

Вопрос: Как называется эта планета и какая особенность её рельефа (упомянутая в стихе) является самой высокой в Солнечной системе?

Рис. 4. Фото Марса в телескоп

Мы проанализировали различные учебные пособия, и содержащимися в них астрономических задач, и сделали вывод по результатам анализа, что особое место в них занимают задачи с эстетическим содержанием, которые возможно успешно применять на практических занятиях по астрономическим дисциплинам для студентов педагогических вузов [10].

Эстетика, как отдельная наука, содержит большой систематизированный материал, как именно у студентов происходит чувственное освоение действительности, который возможно успешно применять при составлении эстетических задач по астрономии.

Мы делаем вывод, что актуализация целей и задач применения эстетического аспекта в учебном процессе по астрономическим дисциплинам для студентов педагогических вузов, расширяет новые возможности интерпретирования и объяснения основ астрономии.

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2-ТИП ҚАНДЛИ ДИАБЕТДА КОГНИТИВ БУЗИЛИШЛАРНИНГ КЛИНИК-БИОКИМЁВИЙ ХУСУСИЯТЛАРИ

Аннотация: *Мақолада 2-тур қандли диабет билан оғриган 82 нафар беморда когнитив бузилишларнинг клиник ва биокимёвий хусусиятлари ўрганилган. MoCA балларининг ҲбA1c, глюкоза ва липид профили билан сезиларли тескари корреляцияси аниқланди (n<0,001). Когнитив етишмовчилик касалликнинг оғирлиги билан боғлиқ.*

Калит сўзлар: *2-тур қандли диабет, когнитив бузилишлар, MoCA, ҲбA1c, гипергликемия, дислипидемия.*

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CLINICAL AND BIOCHEMICAL FEATURES OF COGNITIVE IMPAIRMENT IN TYPE 2 DIABETES MELLITUS

Abstract: *The article examines clinical and biochemical features of cognitive impairment in 82 patients with type 2 diabetes mellitus. A strong inverse correlation of MoCA scores with HbA1c, glucose and lipid parameters was established (p<0.001). Cognitive deficit correlates with disease severity.*

Keywords: *type 2 diabetes mellitus, cognitive impairment, MoCA, HbA1c, hyperglycemia, dyslipidemia.*

Кириш

Қандли диабет 2-типи (ҚД2) — глобал миқёсда тарқалган сурункали метаболик касаллик бўлиб, Жаҳон соғлиқни сақлаш ташкилоти маълумотларига кўра, XXI асрнинг етакчи муаммоларидан бирига айланган. Ушбу касалликнинг макро- ва микрососудли асоратлари қаторида сўнгги ўн йилликларда нейрокогнитив дисфункция алоҳида ўрин эгаллаб, ҳаёт сифатининг сезиларли пасайишига олиб келмоқда. Эпидемиологик тадқиқотларга кўра, ҚД2 билан оғриган беморларда деменция ривожланиш хавфи соғлом популяцияга нисбатан 1,5–2,5 баравар юқори.

Когнитив бузилишларнинг патогенетик асосида сурункали гипергликемия, инсулин резистентлиги, оксидатив стресс, нейровоспаление, гематоэнцефалик тўсиқнинг шикастланиши ҳамда церебрал микроангиопатия каби механизмлар ётади. Глюкозанинг доимий юқори

даражаси нейронал митохондрияларда оксидатив фосфорланишни бузиб, апоптозни кучайтиради ва гиппокампал атрофияга олиб келади.

Тадқиқотнинг мақсади — Фарғона вилояти аҳолиси ўртасида ҚД2 билан оғриган беморларда когнитив бузилишларнинг клиник ва биокимёвий хусусиятларини ўрганиш ҳамда уларнинг касаллик оғирлиги билан боғлиқлигини баҳолашдан иборат.

Материал ва текширув услублари

Тадқиқот 2024–2025 йилларда Фарғона вилоят эндокринологик диспансери ҳамда Республика шошилинч тиббий ёрдам илмий маркази Фарғона филиали базасида ўтказилди. Кесма-таҳлилий дизайнидаги текширувга жами 127 нафар текширилувчи жалб этилди, уларнинг ёш диапазони 45 дан 59 ёшгача (ўртача ёш — 52,3 ± 4,1 йил) ташкил этди.

Беморлар икки гуруҳга бўлинди. Асосий гуруҳга ҚД2 ташхиси клиник ва лаборатор жиҳатдан тасдиқланган 82 нафар бемор киритилди: уларнинг 42 нафари ўрта оғирликдаги когнитив бузилиш билан, 40 нафари эса оғир даражали когнитив бузилиш билан намоён бўлди. Назорат гуруҳини углевод алмашинуви бузилмаган 45 нафар амалий соғлом шахс ташкил этди. Гуруҳлар ёш ва жинс бўйича таққосланувчан эди ($p>0,05$).

Тадқиқот натижалари ва уларнинг муҳокамаси

Тадқиқот натижаларига кўра, асосий гуруҳдаги беморларда когнитив фаолият кўрсаткичлари назорат гуруҳига нисбатан сезиларли даражада паст эканлиги аниқланди. Ўрта оғирликдаги беморларда MoCA баллари ўртача 23,1 ± 1,4 ни ташкил этди, оғир даражали беморларда эса бу кўрсаткич 18,6 ± 1,8 гача пасайди (назорат гуруҳида 27,4 ± 1,2; $p<0,001$). Когнитив дефицит, айниқса, диққат, ишчи хотира ва ижроий функциялар соҳаларида ёрқин намоён бўлди.

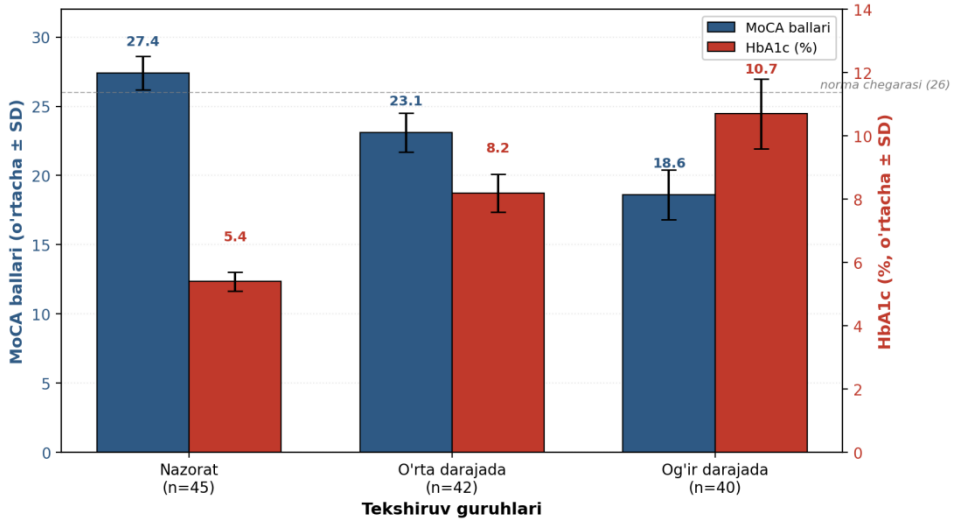
Биокимёвий таҳлил натижалари когнитив бузилиш чуқурлиги билан метаболик носозликнинг параллел ривожланишини тасдиқлади. HbA1c кўрсаткичи назорат гуруҳида 5,4 ± 0,3% ни ташкил этган бўлса, ўрта оғирликдаги беморларда у 8,2 ± 0,6%, оғир беморларда эса 10,7 ± 1,1% гача кўтарилди. Очлик глюкозаси кўрсаткичлари мос равишда 5,1 ± 0,4 ммоль/л; 8,9 ± 1,2 ммоль/л ва 11,8 ± 1,7 ммоль/л ни ташкил этди. Дислипидемия — умумий холестерин, LDL-C ва триглицеридларнинг ошиши — оғир беморлар гуруҳида энг кучли намоён бўлди.

1-жадвал.
Текширилувчиларнинг клиник ва биокимёвий кўрсаткичлари (M ± SD)

Кўрсаткич	Назорат (n=45)	Ўрта оғирликдаги (n=42)	Оғир даражали (n=40)
Ёш, йил	51,8 ± 4,2	52,5 ± 3,9	53,1 ± 4,3
MoCA, балл	27,4 ± 1,2	23,1 ± 1,4*	18,6 ± 1,8*†
Очлик глюкозаси, ммоль/л	5,1 ± 0,4	8,9 ± 1,2*	11,8 ± 1,7*†
HbA1c, %	5,4 ± 0,3	8,2 ± 0,6*	10,7 ± 1,1*†
Умумий холестерин, ммоль/л	4,6 ± 0,5	5,8 ± 0,7*	6,7 ± 0,9*†
LDL-C, ммоль/л	2,7 ± 0,4	3,6 ± 0,5*	4,3 ± 0,6*†
Триглицеридлар, ммоль/л	1,3 ± 0,3	2,2 ± 0,5*	2,9 ± 0,7*†
С-реактив оқсил, мг/л	2,1 ± 0,6	4,8 ± 1,1*	7,2 ± 1,5*†

*Изоҳ: * — назорат гуруҳига нисбатан фарқ ишончли (p<0,001); † — ўрта оғирликдаги гуруҳга нисбатан фарқ ишончли (p<0,001).*

Корреляцион таҳлил MoCA баллари билан HbA1c (r = –0,78; p<0,001), очлик глюкозаси (r = –0,71; p<0,001), LDL-C (r = –0,54; p<0,01) ҳамда С-реактив оқсил (r = –0,62; p<0,001) ўртасида кучли тескари боғлиқликни кўрсатди. Бу натижалар сурункали гипергликемия ва тизимли яллиғланиш нейрокогнитив бузилишларнинг ривожланишида етакчи омил эканлигини тасдиқлайди.



1-расм. Гуруҳлар бўйича MoCA баллари ва HbA1c кўрсаткичларининг қиёсий таҳлили (M ± SD).

1-расмда келтирилган маълумотлар когнитив фаолият билан гликемик назорат орасидаги тескари боғлиқликни визуал тарзда тасдиқлайди. HbA1c қанчалик юқори бўлса, MoCA баллари шунчалик пасайиб боради; бу диабетик нейрокогнитив дисфункция концепциясига мос келади. Бундан ташқари, оғир беморлар гуруҳида С-реактив оқсилнинг 3,4 баравар ошиши тизимли яллиғланиш марказий нерв системасига тўғридан-тўғри таъсир кўрсатишини кўрсатади.

Хулоса

Тадқиқот натижалари 2-тип қандли диабет билан оғриган беморларда когнитив бузилишларнинг касаллик оғирлиги ва биокимёвий кўрсаткичлар билан тўғридан-тўғри боғлиқ эканлигини тасдиқлайди. Айниқса, HbA1c, дислипидемия ва С-реактив оқсилнинг ошиши когнитив дефицитнинг прогностик маркерлари сифатида хизмат қилиши мумкин. Эндокринологик амалиётда MoCA скрининг тестини рутинли қўллаш диабетик нейрокогнитив бузилишларни эрта аниқлаш ва тегишли мультидисциплинар коррекция стратегиясини ишлаб чиқиш имконини яратади.

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АНАЛИТИЧЕСКИЙ ОБЗОР АРХИТЕКТУРНЫХ РЕШЕНИЙ РЕЗУЛЬТАТИВНОСТИ РОБОТИЗИРОВАННЫХ МАНИПУЛЯТОРОВ С ИНТЕГРАЦИЕЙ ТЕХНОЛОГИЙ ИСКУССТВЕННОГО ИНТЕЛЛЕКТА И ВИЗУАЛЬНОГО РАСПОЗНОВАНИЯ ОБЪЕКТОВ

Аннотация: *В настоящей работе представлен аналитический обзор структурных и алгоритмических основ функционирования автоматизированных манипуляционных систем, оснащённых модулями искусственного интеллекта (далее — ИИ) и средствами компьютерного зрения. Детально описан замкнутый цикл управления, включающий этапы восприятия сцены, семантического анализа изображения глубокими свёрточными нейронными сетями и генерации управляющих воздействий на исполнительные механизмы. Рассмотрена трехуровневая архитектура «сенсор — нейросетевое вычислительное ядро — исполнительное устройство». Приведены количественные данные о состоянии мирового рынка промышленной робототехники за 2024— 2025 гг., а также верифицированные технические показатели эффективности систем визуального распознавания. На основе анализа научных публикаций и отраслевых отчётов сделан вывод о ключевой роли интеграции ИИ и компьютерного зрения в реализации концепции «Индустрия 4.0» (Industry 4.0 — четвёртая промышленная революция).*

Ключевые слова: *нейросетевое зрение, глубокие свёрточные сети, промышленный манипулятор, адаптивная роботизация, технико-экономическая эффективность, умное производство.*

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ANALYTICAL REVIEW OF ARCHITECTURAL SOLUTIONS FOR THE PERFORMANCE OF ROBOTIC MANIPULATORS INTEGRATING ARTIFICIAL INTELLIGENCE AND VISUAL OBJECT RECOGNITION TECHNOLOGIES

Abstract: *This paper presents an analytical review of the structural and algorithmic foundations of automated manipulation systems equipped with artificial intelligence (AI) modules and computer vision tools. A closed-loop*

control system is described in detail, including the stages of scene perception, semantic image analysis using deep convolutional neural networks, and the generation of control actions on actuators. A three-tier architecture consisting of a sensor, a neural network computing core, and an actuator is examined. Quantitative data on the global industrial robotics market for 2024–2025 is presented, along with verified technical performance indicators for visual recognition systems. Based on an analysis of scientific publications and industry reports, the key role of integrating AI and computer vision in implementing the Industry 4.0 concept (the fourth industrial revolution) is concluded.

Keywords: *neural network vision, deep convolutional networks, industrial manipulator, adaptive robotics, technical and economic efficiency, smart manufacturing.*

Современный этап цифровой трансформации промышленного производства характеризуется активным внедрением киберфизических систем, объединяющих физические исполнительные механизмы с вычислительными платформами на основе алгоритмов искусственного интеллекта [1]. Количественным свидетельством этого процесса служат данные Международной федерации робототехники (International Federation of Robotics, IFR): в 2024 году глобальный объём установок промышленных роботов достиг 542 000 единиц, а общий эксплуатационный парк составил 4 664 000 единиц при годовом росте в 9 % [4, 5]. Одним из наиболее динамично развивающихся направлений является создание роботизированных манипуляторов, способных автономно воспринимать производственную среду посредством оптических сенсоров, идентифицировать объекты по визуальным признакам и адаптировать пространственные траектории в реальном масштабе времени [2].

Принцип работы и техническая реализация системы «зрение — управление»

Функционирование современного манипулятора с интегрированным модулем AI— зрения (от англ. Artificial Intelligence — искусственный интеллект) может быть представлено в виде замкнутого кибернетического цикла, состоящего из трёх последовательных фаз: восприятие сцены, семантический анализ и генерация управляющего воздействия.

1.1. Восприятие сцены (сенсорный уровень). Входным информационным потоком служат данные, поступающие с оптических сенсоров. В отличие от классических систем технического зрения с жёстко фиксированной над конвейером камерой, в передовых разработках применяется технология On-Arm Vision (от англ. — «зрение на руке») — установка 3D-камеры непосредственно на подвижном звене манипулятора [6]. Такой подход обеспечивает непрерывное обновление информации о рабочей сцене в процессе движения и позволяет компенсировать механические вибрации. Для построения трёхмерной карты глубины используются методы структурированного подсвета либо стереозрения,

формирующие облако точек с плотностью, достаточной для вычисления пространственной ориентации объекта.

1.2. Семантический анализ (нейросетевое вычислительное ядро). Полученное изображение или облако точек передаётся на вычислительный модуль, реализующий алгоритмы глубокого обучения. В задачах промышленной робототехники, критичных ко времени отклика, предпочтение отдаётся одноэтапным детекторам семейства YOLO (от англ. You Only Look Once — «ты смотришь лишь однажды»). В частности, в работе [3] использована облегчённая архитектура YOLOv5s (You Only Look Once version 5 small — пятая версия алгоритма YOLO, облегчённый вариант), выполняющая прямой проход (англ. inference) за временной интервал порядка нескольких миллисекунд при работе на промышленных контроллерах. Нейросетевая модель не только осуществляет классификацию объекта, но и вычисляет координаты ограничивающей рамки (англ. bounding box), а в совокупности с данными о глубине — определяет углы Эйлера для точного позиционирования схвата. При необходимости достижения субмиллиметровой точности (например, в системе CapSen Robotics PIC 2.0 — программно-аппаратной платформе 3D-зрения компании CapSen Robotics, США) точность позиционирования составляет ±0,10 мм, и применяется дополнительная обработка облака точек с совмещением цветовой сегментации и данных о кривизне поверхности [7].

1.3. Планирование траектории и управление (исполнительный уровень). На основе вычисленных нейросетью пространственных координат модуль управления (в референсной реализации [3] — программируемый логический контроллер Siemens S7-1200) решает обратную задачу кинематики, формируя массив углов поворота сервоприводов. В сценариях bin picking (от англ. — захват деталей из хаотично насыпанной тары) дополнительно активируются алгоритмы планирования бесколлизионной траектории, например RRT (от англ. Rapidly-exploring Random Tree — быстроисследующее случайное дерево), и реализуется принцип «видения в руке»: после выполнения захвата производится повторное сканирование сцены для верификации правильности позиционирования и внесения корректирующих поправок в реальном времени [6]. Синхронизация между вычислителем и исполнительными устройствами осуществляется по промышленным протоколам реального времени, в частности Profinet (от англ. Process Field Network), гарантирующим детерминированную задержку передачи данных [3].

Архитектурная организация интеллектуальных роботизированных систем.

С точки зрения структурной организации описанный выше функциональный цикл реализуется в рамках классической трехуровневой архитектуры, включающей сенсорную подсистему, вычислительное ядро и исполнительные механизмы [1]. Такая декомпозиция обеспечивает возможность независимой модернизации каждого из уровней и

масштабирования системы. Современные тенденции предполагают дополнение архитектуры уровнем цифрового двойника (англ. digital twin), что позволяет осуществлять предиктивное обслуживание и адаптивное управление в симулированной среде без остановки физического оборудования [8, 9].

Режимы функционирования и типовые производственные сценарии

В зависимости от степени априорной неопределённости рабочей среды выделяют два основных режима работы интеллектуальных манипуляторов [2].

3.1. Режим статической детекции. Применяется в условиях, когда объекты перемещаются по конвейеру с известной скоростью, однако их точное положение и ориентация варьируются в заданных пределах. Система однократно захватывает кадр, вычисляет пространственное смещение и передаёт скорректированные координаты на исполнительный уровень [3].

3.2. Режим динамического сопровождения (bin picking). Характерен для задач выборки деталей из хаотично насыпанной тары (bin picking). В данном сценарии необходима непрерывная коррекция траектории в условиях изменяющейся геометрии сцены. Согласно данным компании Inbolt, реализация технологии On-Arm Vision («зрение на руке») в задачах bin picking позволяет достичь 95 % успешных захватов при времени цикла менее 1 секунды в реальных производственных условиях [6].

Обзор верифицированных научных исследований и промышленных внедрений

4.1. Полностью автоматизированная система роботизированной укладки. В исследовании, опубликованном в журнале Sensors (MDPI, 2025), представлена система на основе глубокого обучения, интегрирующая алгоритм YOLOv5s, промышленный контроллер Siemens S7-1200 и манипулятор ABB IRB6640 [3]. Система обучена классификации 13 типов промышленных мешков. Валидационные испытания показали точность классификации 99,08 % на начальном этапе и 100 % после оптимизации условий освещения и угла съёмки камеры при эксплуатации на выборке из 9600 единиц продукции в течение пяти дней. Среднее время цикла составило 10–11 секунд, что соответствует производительности до шести единиц в минуту.

4.2. Технология bin picking компании Inbolt. В январе 2026 года компания Inbolt анонсировала решение для неструктурированного bin picking на основе бортового ИИ-зрения, функционирующее на аппаратной платформе NVIDIA [6]. Система использует собственные модели наведения, обеспечивающие оценку положения объекта в реальном времени и непрерывную коррекцию траектории. Ключевые заявленные характеристики включают время обработки менее 1 секунды на захват и надёжность до 95 % успешных попыток.

4.3. Высокоточное позиционирование. Платформа CapSen Robotics PIC 2.0 демонстрирует достижимые в настоящее время показатели точности 3D-зрения: распознавание объектов с погрешностью не более ±0,10 мм даже в условиях нагромождения деталей [7]. Обработка данных и планирование движений выполняются менее чем за 200 мс, что потенциально позволяет достигать скорости до 60 объектов в минуту.

Анализ текущего состояния рынка промышленной робототехники

Согласно отчёту World Robotics 2025, опубликованному IFR (Международной федерацией робототехники), в 2024 году глобальные установки промышленных роботов достигли 542 000 единиц, что является вторым по величине показателем за всю историю наблюдений [4]. Азия сохраняет доминирующее положение: на Китай пришлось 295 000 установок (54 % мирового объёма), Япония установила 44 500 роботов, Южная Корея — 30 600. В Европе зафиксировано 85 000 новых установок, в странах Америки — 50 077. Ведущим сектором автоматизации выступила электронная промышленность (128 899 установок), за ней следуют автомобилестроение и металлообработка.

Ключевыми трендами 2025— 2026 гг., по данным IFR, являются: переход от узкоспециализированных роботов к многоцелевым системам, оснащённым ИИ; расширение применения коллаборативных роботов (коботов); интеграция роботов в «умные» подключённые фабрики с возможностью управления в реальном времени [5].

Перспективные направления развития

Основной вектор эволюции — переход от аналитического ИИ к физическому ИИ (Physical AI — направление, объединяющее ИИ с робототехникой и симуляцией физических процессов), при котором роботы обучаются в виртуальных средах на цифровых двойниках и переносят приобретённые навыки в физический мир [8, 9]. Технология цифровых двойников обеспечивает безопасную среду тестирования алгоритмов, минимизирует риски повреждения оборудования и сокращает время вывода новых решений на рынок. Другим значимым направлением является использование генеративного ИИ для синтеза обучающих данных, что позволяет обучать нейросетевые модели без ручной разметки тысяч реальных изображений. Наконец, наблюдается тенденция к унификации AI-модулей, что должно снизить порог входа для предприятий малого и среднего бизнеса [5].

Проведённый анализ свидетельствует о том, что интеллектуальные роботизированные манипуляторы с AI-зрением перешли из категории экспериментальных разработок в разряд зрелых промышленных технологий. Верифицированные результаты научных исследований и промышленных внедрений подтверждают возможность достижения 100 % точности классификации объектов и производительности до шести единиц в минуту в реальных производственных условиях [3]. Технические характеристики решений компаний Inbolt [6] и CapSen Robotics [7] дополнительно

иллюстрируют высокий уровень технологической готовности. Интеграция методов искусственного интеллекта и компьютерного зрения в робототехнику является ключевым драйвером реализации концепции «Индустрия 4.0» (Industry 4.0) и формирования умных производственных систем будущего [1, 5].

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ОХРАНА И ДИНАМИКА ТУГАЙНЫХ ЛАНДШАФТОВ ЗАРАФШАНСКОЙ ДОЛИНЫ

Аннотация. *В данной научной статье проанализированы особенности формирования тугайных ландшафтов Зарафшанской долины, их территориальное распространение и современная динамика. В ходе исследования были рассмотрены основные природные факторы, влияющие на развитие тугайных экосистем, включая климатические условия, гидрологический режим и почвенные особенности. Наряду с этим выявлены негативные изменения, обусловленные антропогенным воздействием, в частности расширением орошаемых земель, нерациональным использованием водных ресурсов и усилением хозяйственной деятельности. С применением методов дистанционного зондирования и ГИС-технологий проведена оценка динамики изменений ландшафтов во времени. Полученные результаты могут служить научной основой для разработки мер по охране, восстановлению и рациональному использованию тугайных ландшафтов.*

Ключевые слова: *Тугайные экосистемы, динамика трансформации ландшафтов, экосистемные процессы, антропогенные воздействия, биологическое разнообразие, гидрологический режим реки, климатическая изменчивость, спутниковое дистанционное зондирование.*

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PROTECTION AND DYNAMICS OF TUGAI LANDSCAPES IN THE ZARAFSHAN VELLEY

Abstract. *This scientific article analyzes the formation characteristics, spatial distribution, and contemporary dynamics of tugai landscapes in the Zarafshan Valley. The study examines the key natural factors influencing the development of tugai ecosystems, including climatic conditions, hydrological regime, and soil properties. In addition, negative changes caused by anthropogenic impacts are identified, particularly those related to the expansion of irrigated lands, inefficient use of water resources, and the intensification of economic activities. Using remote sensing data and GIS technologies, the temporal dynamics of landscape changes are assessed. The obtained results provide a scientific basis for developing measures aimed at the conservation, restoration, and sustainable use of tugai landscapes.*

Key words: *Tugai ecosystems, landscape transformation dynamics, ecosystem processes, anthropogenic impacts, biological diversity, river hydrological regime, climate variability, satellite remote sensing.*

Актуальность темы

Зарафшанская долина является одним из древнейших и важнейших природно-географических регионов Центральной Азии, отличающимся сложной ландшафтной структурой и богатством природных ресурсов. Особое место в экологической системе данного региона занимают тугайные ландшафты, представляющие собой уникальные природные комплексы, сформированные вдоль речных долин. Тугайные экосистемы развиваются преимущественно на поймах рек, в прибрежных зонах и на территориях с близким залеганием грунтовых вод, формируя сложные биогеоценозы с характерным растительным и животным миром.

Тугайные ландшафты играют важную роль в сохранении биоразнообразия. Они служат средой обитания для множества эндемичных и реликтовых видов растений и животных. Кроме того, тугайные экосистемы выполняют важные экологические функции, такие как защита почв от эрозии, регулирование микроклимата и стабилизация водного режима. Особенно велика их роль в условиях аридного и полуаридного климата Зарафшанской долины [1].

Однако в последние десятилетия в регионе наблюдается нарушение природного равновесия, усиление антропогенной нагрузки и влияние глобальных климатических изменений, что приводит к существенным изменениям площади и состояния тугайных ландшафтов. Расширение орошаемого земледелия, регулирование стока рек, строительство водохранилищ и ирригационных систем существенно изменили естественный гидрологический режим реки Зарафшан. Это, в свою очередь, приводит к сокращению водообеспеченности тугайных экосистем и их деградации.

Кроме того, незаконная вырубка древесной растительности, усиление пастбищной нагрузки и неэффективное использование земельных ресурсов также способствуют сокращению площадей тугайных ландшафтов. В результате усиливаются процессы фрагментации ландшафтов и снижается устойчивость экологических систем. Эти процессы приводят к сокращению биоразнообразия, усилению процессов опустынивания и нарушению общего экологического равновесия.

В современных научных исследованиях изучение динамики ландшафтов приобретает особое значение. Особенно расширились возможности выявления пространственно-временных изменений ландшафтов с использованием методов дистанционного зондирования (remote sensing) и геоинформационных систем (ГИС). С помощью данных технологий можно точно оценить степень сокращения тугайных ландшафтов, их структурные изменения и уровень антропогенного воздействия [2].

Актуальность данного исследования заключается в необходимости комплексного изучения современного состояния и динамики тугайных ландшафтов Зарафшанской долины с целью разработки научно обоснованных мер по их охране и восстановлению. Основной целью исследования является выявление факторов формирования тугайных ландшафтов, этапов их развития и современных тенденций изменений, а также оценка их экологического состояния.

В соответствии с поставленной целью определены следующие задачи исследования:

– изучение закономерностей естественного формирования тугайных ландшафтов;

– определение их территориального распространения;

– оценка степени воздействия антропогенных факторов;

– выявление основных направлений динамики ландшафтов;

– разработка рекомендаций по охране и восстановлению тугайных экосистем.

В целом данное исследование имеет важное научно-практическое значение для обеспечения экологической устойчивости тугайных ландшафтов Зарафшанской долины, их охраны и рационального использования.

Источники и методы исследования

Изучение динамики тугайных ландшафтов Зарафшанской долины тесно связано с научными исследованиями, проводимыми в области ландшафтоведения, экологии и рационального природопользования. Анализ научных работ по данной проблеме показывает, что тугайные экосистемы представляют собой многофакторные и динамичные системы, развитие которых определяется воздействием как природных, так и антропогенных процессов.

В регионах Центральной Азии, включая Узбекистан, выполнен ряд научных исследований, посвящённых изучению тугайных ландшафтов. Местными учёными исследованы особенности формирования тугайных экосистем Зарафшанской долины, а также пойм рек Амударьи и Сырдарьи, их флора и фауна, а также экологическое состояние. В этих исследованиях обоснована высокая зависимость тугайных экосистем от гидрологического режима, а также показано, что снижение уровня грунтовых вод приводит к их деградации.

В последние годы в научных исследованиях особое внимание уделяется вопросам деградации и трансформации тугайных ландшафтов. В частности, показано, что расширение орошаемого земледелия, регулирование речного стока и строительство водохранилищ приводят к снижению водности рек, что, в свою очередь, вызывает сокращение тугайных экосистем. В ряде исследований в качестве основных факторов риска также отмечаются усиление пастбищной нагрузки и незаконная вырубка древесной растительности.

Международные исследования также подтверждают актуальность данной проблемы. В отчётах Программы ООН по окружающей среде (UNEP), Продовольственной и сельскохозяйственной организации ООН (FAO), а также Всемирного банка широко проанализированы процессы деградации речных экосистем Центральной Азии, сокращение водных ресурсов и негативное влияние климатических изменений. В этих источниках подчёркивается важная роль тугайных лесов в сохранении биоразнообразия, однако отмечается их значительное сокращение [3].

В современных научных исследованиях особое место занимает использование новых технологий при изучении динамики ландшафтов. С помощью методов дистанционного зондирования (remote sensing) и геоинформационных систем (ГИС) определяется изменение тугайных территорий во времени, их площадь и структура. Исследования, основанные на космических снимках, позволяют точно оценить степень фрагментации и деградации тугайных ландшафтов. Это способствует повышению точности научных результатов и эффективной организации регионального экологического мониторинга.

Кроме того, в ряде исследований рассматриваются вопросы восстановления и охраны тугайных ландшафтов. В частности, предлагаются такие меры, как рациональное использование водных ресурсов, частичное восстановление естественного гидрологического режима, расширение охраняемых территорий и создание искусственных лесонасаждений. Однако отмечается, что на практике данные меры реализуются недостаточно эффективно [4].

Анализ изученной литературы показывает, что, несмотря на достаточно высокий уровень изученности динамики тугайных ландшафтов Зарафшанской долины, ряд аспектов всё ещё требует углублённых исследований. В частности, недостаточно освещены вопросы долгосрочного

мониторинга ландшафтов, комплексного влияния климатических изменений и их взаимосвязи с антропогенными факторами. В связи с этим проведение комплексных исследований с использованием современных научных методов в данном направлении остаётся актуальной задачей.

В целом существующие научные источники свидетельствуют о высокой экологической значимости тугайных ландшафтов, однако их устойчивость находится под серьёзной угрозой. Это обусловливает необходимость разработки научно обоснованных подходов к их охране и восстановлению.

Таблица 1.
Территориальная площадь тугайных ландшафтов Зарафшанской долины и степень их деградации (1990–2025 гг.)

Год	Площадь тугаев (га)	Темпы сокращения (%)	Влияние гидрологических факторов (1–5)[1]	Влияние антропогенных факторов (1–5)[2]	Степень деградации[3]
1990	15,200	-	4	2	Низкая
2000	14,300	5,9	4	3	Средняя
2010	13,100	8,4	3	4	Высокая
2020	11,800	10,0	3	5	Очень высокая
2025*	11,200	5,1	2	5	Очень высокая

[1] Влияние гидрологических факторов (1–5) — оценка воздействия природных факторов, связанных с уровнем воды и речным стоком, на состояние ландшафтов (1 — минимальное, 5 — максимальное).

[2] Влияние антропогенных факторов (1–5) — оценка воздействия человеческой деятельности (орошение, вырубка древесной растительности, выпас скота).

[3] Степень деградации — уровень ухудшения экологического состояния тугайных ландшафтов, определённый на основе полевых наблюдений и данных ГИС.

2025 год — данные приведены на основе прогноза.

Данная таблица наглядно отражает территориальное сокращение и уровень деградации тугайных ландшафтов Зарафшанской долины за последние 30–35 лет. Полученные результаты показывают, что:

– площадь тугайных ландшафтов сократилась с 15 200 га в 1990 году до 11 200 га в 2025 году;

– темпы сокращения значительно возросли, особенно в период 2010–2020 гг.;

– влияние гидрологических факторов в последние годы снизилось, что указывает на ограниченность водных ресурсов;

– влияние антропогенных факторов усиливается, что свидетельствует о росте деградации вследствие человеческой деятельности;

– степень деградации за последние 10–15 лет достигла уровней «высокая» и «очень высокая».

Результаты исследования и их анализ

Полученные результаты по динамике тугайных ландшафтов Зарафшанской долины предоставляют важную информацию о сложном и изменчивом характере экологических систем региона. Исследование показало, что за последние 30–35 лет площадь тугайных ландшафтов существенно сократилась, что является результатом совокупного воздействия природных и антропогенных факторов.

Во-первых, гидрологические факторы — речной сток, уровень грунтовых вод и влажность почвы — оказывают непосредственное влияние на состояние ландшафтов. Как показано в таблице исследования, ухудшение гидрологических условий, особенно в период 2000–2025 гг., ускорило процессы деградации тугайных экосистем. Данный результат, в свою очередь, связан с сокращением водных ресурсов и регулированием речного стока. Таким образом, стабилизация гидрологических факторов является одним из ключевых стратегических направлений восстановления тугайных ландшафтов [5].

Во-вторых, антропогенные факторы — расширение орошаемых земель, усиление пастбищной нагрузки и незаконная вырубка древесной растительности — выступают основными причинами деградации тугайных ландшафтов. Результаты исследования показывают, что в результате человеческой деятельности естественная площадь тугаев подвергается фрагментации, что приводит к снижению биоразнообразия. Эти выводы подтверждаются данными других научных источников, в частности отчётами UNEP (2019) и FAO (2020), в которых отмечается деградация речных экосистем Центральной Азии под воздействием антропогенных факторов.

В-третьих, оценка динамики ландшафтов с использованием методов дистанционного зондирования и ГИС-анализа позволила точно определить территориальные изменения. Результаты показали, что площадь тугайных ландшафтов сократилась с 15 200 га в 1990 году до 11 200 га в 2025 году, то есть наблюдается сокращение на 26–27%. Данный показатель свидетельствует о значительном нарушении экологического равновесия.

Кроме того, уровень деградации за последние 10–15 лет достиг категорий «высокая» и «очень высокая». Такая ситуация требует принятия срочных мер для сохранения устойчивости экологических систем Зарафшанской долины. Исследование также показало, что для восстановления ландшафтов и сохранения их экологических функций необходимо восстановление гидрологического режима, рациональное использование водных ресурсов, расширение охраняемых территорий и создание искусственных лесонасаждений [7].

Сравнение полученных результатов с другими научными исследованиями показывает, что деградация тугайных ландшафтов Зарафшанской долины демонстрирует сходные тенденции с речными экосистемами глобального масштаба. В то же время при разработке региональных стратегий необходимо учитывать местные природные условия и уровень антропогенной нагрузки [6].

Обсуждение показало, что тугайные ландшафты Зарафшанской долины представляют собой сложную, многофакторную и динамичную систему, требующую интегрированного подхода к их охране и восстановлению. Наряду с этим внедрение системы экологического мониторинга и использование современных технологий — дистанционного зондирования и геоинформационных систем (ГИС) — имеют важное значение для эффективного наблюдения за динамикой ландшафтов.

Выводы

Тугайные ландшафты Зарафшанской долины представляют собой сложную и динамичную природную систему, играющую важную роль в обеспечении экологической устойчивости региона, сохранении биоразнообразия и регулировании водных ресурсов. Результаты исследования показывают, что за последние 30–35 лет площадь тугайных ландшафтов существенно сократилась (с 15 200 га в 1990 году до 11 200 га в 2025 году), что привело к их деградации и фрагментации.

Основными факторами сокращения тугайных ландшафтов являются гидрологические изменения (снижение речного стока, понижение уровня грунтовых вод) и антропогенные воздействия (расширение орошаемых земель, вырубка древесной растительности, развитие животноводства). Исследование показало, что в последние годы влияние антропогенных факторов значительно усилилось, что привело к повышению уровня деградации до категорий «высокая» и «очень высокая».

Сложившаяся ситуация требует разработки комплексных мер по охране, восстановлению и устойчивому использованию тугайных ландшафтов Зарафшанской долины. К таким мерам относятся: рациональное управление водными ресурсами и восстановление гидрологического режима, расширение охраняемых территорий и внедрение системы экологического мониторинга, создание искусственных лесонасаждений и рекультивация деградированных земель, а также повышение экологической осведомлённости местного населения через развитие экологического и ландшафтного образования.

Вместе с тем использование технологий дистанционного зондирования и геоинформационных систем (ГИС) является важным инструментом для точного мониторинга динамики ландшафтов и формирования научной базы для принятия стратегических решений.

В целом результаты исследования имеют важное научно-практическое значение для обеспечения экологической устойчивости тугайных

ландшафтов Зарафшанской долины и их сохранения для будущих поколений.

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РЕШЕНИЕ ПРОБЛЕМ ЗАТОРОВ ГОРОДА ТАШКЕНТА ВНЕДРЕНИЕМ ЦИФРОВЫХ ТЕХНОЛОГИЙ

Аннотация: *Данная статья содержит информацию по обеспечению качества и повышения контроля транспортного потока, изучение и анализ пробок, оптимизация управления транспортными потоками путём внедрения цифровых технологий.*

Ключевые слова: *Безопасность дорожного движения, транспортные пробки, интеллектуальные транспортные системы, законадательная основа контроля транспортного потока, комплексный подход и цифровизация.*

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SOLVING TASHKENT TRAFFIC JAMS BY IMPLEMENTING DIGITAL TECHNOLOGIES

Abstract: *This article provides information on ensuring the quality and improving the control of traffic flow, studying and analyzing traffic jams, and optimizing traffic flow management through the implementation of digital technologies.*

Keywords: *Road safety, traffic jams, intelligent transport systems, legislative framework for traffic flow control, comprehensive approach, and digitalization.*

Ежедневно Ташкент застревает в километровых пробках. В часы пик уровень загруженности дорог вырастает до семи-восьми баллов. Проблема образования пробок создает для общества и государства огромные издержки, включая экономические. Власти пытаются избавиться от заторов расширением главных улиц, мотивируя свое решение увеличением количества транспорта в столице. Хук разбирается, почему возникают пробки в Ташкенте и не только, насколько эффективны нынешние решения госорганов и можно ли адаптировать под реалии Узбекистана опыт других стран.

Как начали появляться пробки?

Индустриализация и промышленная революция конца XIX — начала XX века привели к урбанизации и массовому переезду людей из сельских районов в крупные города. В течение XX века численность урбанистического населения быстро росла. Города развивались,

увеличивалось расстояние от окраин к центру. Жители стали предпочитать ездить на своем личном автомобиле, чтобы сократить время в поездке. Такая модель поведения широко пропагандировалась в СМИ, а также продвигалась автомобильными концернами и лобби. В самом начале процесса массовой автомобилизации водители не сталкивались с таким явлением, как пробки, поэтому их издержки были минимальными. В этих условиях у горожан был стимул для покупки автомобилей, так как это представлялось рациональным с точки зрения их собственной выгоды. Таким образом, во всех городах начался процесс массовой автомобилизации.

По состоянию на 1 июля 2025 года в Узбекистане зарегистрировано 4 612,7 тыс. транспортных средств, принадлежащих физическим лицам.

Согласно данным Национального статистического комитета, основную их часть составляют легковые автомобили (93 % от общего числа).

По сравнению с аналогичным периодом 2024 года количество автомобилей увеличилось на 441,5 тыс. единиц.

Количество транспортных средств по видам:

- легковые автомобили – 4 289,0 тыс. единиц;
- грузовые автомобили – 302,6 тыс. единиц;
- микроавтобусы – 7,7 тыс. единиц;
- специальные транспортные средства – 7,3 тыс. единиц;
- автобусы – 6,1 тыс. единиц.

Основными причинами пробок в столице являются перегруженность дорог, превышение числа автомобилей и отсутствие единого управления дорожной инфраструктурой. "Дороги Ташкента рассчитаны на одновременное движение около 400 тысяч машин, тогда как их число превышает 1 миллион. В настоящее время за работу столичных дорог отвечают шесть различных ведомств, что не позволяет сформировать единую стратегию развития"

Естественно, дороги, спроектированные и построенные в советское время, не справляются с таким потоком автомобилей еще и потому, что изначально были рассчитаны на приоритет общественного транспорта. Однако постепенно с улиц города убрали выделенку для троллейбусов, а потом отказались и от трамваев. Растущее количество автомобилей побуждало власти проводить дорожные реформы, расширяя транспортные артерии, строя мосты и развязки, что не всегда приводило к решению проблемы.

Если смотреть на карту Ташкента, то становится понятно, что город имеет радиально-кольцевую структуру. Спальные районы строились на окраине, а рабочие организации и другие объекты размещались в центре. Утром люди из микрорайонов едут на работу в центр, а вечером по тому же маршруту обратно домой. Во время часов пик на важных магистралях возникают заторы.

Как решать проблему пробок?

Пробки возникают по той причине, что дороги перегружены, то есть на каждый автомобиль приходится все меньше площади улично-дорожной сети. Можно сделать вывод о необходимости расширять городские транспортные артерии, включая строительство новых широкополосных дорог, которые помогут разгрузить дорожно-транспортную сеть. Однако уже давно доказано, что расширение дорог не помогает снизить количество пробок. Расширение дорог не только не решает проблему их загруженности, но наоборот, приводит к усугублению проблемы. Чем больше строится дорог, тем больше становится автомобилистов. При увеличении пропускной способности дорог понадобится лишь пять лет, чтобы уровень их загрузки достиг отметки в 90 процентов. В статье про реконструкцию улицы Навои автор также говорил о нецелесообразности расширения дорог и предлагал альтернативный проект.

Изучив опыт крупных мегаполисов – Сеула, Шэнчжэня, Дубая и Москвы, власти представили комплекс мер по организации дорожного движения. Для этого создадут единый центр управления, который позволит разработать мастер-план с учетом всех видов транспорта и пассажиропотоков.

На основе мастер-плана жители смогут получать информацию о наиболее удобных маршрутах с использованием общественного транспорта, а пассажиры будут заранее уведомляться о ремонтах и альтернативных путях. Цифровизация процессов, позволит сократить пробки на 30–40 %.

В пресс-службе Министерства юстиции Республики Узбекистан сообщили, что Указом Президента Республики Узбекистан принято постановление № ПП-368 от 4 декабря 2025 года "О дальнейших мерах по совершенствованию управления транспортной системой и предупреждению заторов в городе Ташкенте". Документ направлен на системное развитие городской транспортной инфраструктуры, повышение эффективности управления дорожным движением и снижение уровня заторов на улично-дорожной сети столицы.

Принятое постановление устанавливает жесткие целевые показатели (KPI) до 2030 года. К этому сроку доля использования общественного транспорта должна возрасти до 60%. Для достижения этой цели планируется увеличить среднюю эксплуатационную скорость автобусов с нынешних 18 км/ч до 24 км/ч, что должно сделать поездки более предсказуемыми по времени. Параллельно будет продолжаться развитие рельсового транспорта: протяженность линий Ташкентского метрополитена намечено довести до 103 километров.

Существенные изменения коснутся и парковочного пространства. План предусматривает организацию 150 тысяч новых парковочных мест. Особый упор будет сделан на строительство многоуровневых перехватывающих парковок. Они будут располагаться на ключевых въездных магистралях, интегрированных с крупными транспортно-

пересадочными узлами — конечными станциями метро и автобусными терминалами. Это классическая схема Park & Ride, призванная отсечь часть трафика на подступах к центру.

Техническое перевооружение станет фундаментом реформы. Совместно с Министерством цифровых технологий внедряются системы мониторинга потоков в режиме реального времени («цифровой двойник» города). Также анонсирована разработка специализированного мобильного приложения для жителей, которое будет не только прокладывать оптимальные маршруты, но и заранее оповещать о дорожных работах, предлагая варианты объезда. Это должно обеспечить прозрачность управления и возможность оперативного реагирования на дорожные инциденты.

Экологический аспект реформы также выведен на передний план. Ожидается, что оптимизация трафика и снижение времени простоя автомобилей в заторах приведут к сокращению вредных выбросов в атмосферу минимум на 15%. Общее же снижение уровня загруженности дорог, согласно прогнозам хокимията, составит порядка 30-40% после полноценного запуска работы Центра и внедрения мастер-плана.

К основным задачам Центра отнесена организация дорожного движения в городе Ташкенте на основе анализа данных, поступающих в режиме реального времени. Предполагается использование интеллектуальных систем управления, в том числе для оптимизации работы светофорных объектов, перераспределения потоков по маршрутам, своевременного реагирования на заторы и аварийные ситуации. Центр также будет ответственен за разработку транспортного мастер-плана Ташкента - долгосрочного стратегического документа, определяющего направления развития улично-дорожной сети, общественного транспорта, парковочного пространства и иных элементов городской мобильности.

Другим способом борьбы с пробками является развитие и улучшение городского общественного транспорта. Общественный транспорт должен быть удобным, недорогим и хорошо продуманным, то есть он должен ездить регулярно и предсказуемо. При выборе общественного транспорта большое влияние на человека оказывает фактор расстояния между домом и ближайшей остановкой. Чем больше человеку придется пройти пешком, тем меньше вероятность того, что он выберет общественный транспорт. Фактор времени также играет важную роль в процессе принятия решений. Если при поездке в метро увеличивается вероятность прийти вовремя, то у человека появляется рациональный стимул воспользоваться услугами метрополитена.

Изучено влияние расположения вузов на заторы при движении транспорта в Ташкенте. Сообщается, что поездки студентов на учебу увеличивают заторы на дорогах на 33 процента. Авторы исследования не исключают необходимости переноса вузов за пределы города.

Опубликован анализ экспертов Института прогнозирования и макроэкономических исследований (ИПМИ) о том, как расположение

высших учебных заведений влияет на состояние городов и проблему дорожного движения.

Эксперты проанализировали уровень загруженности дорог Ташкента на основании средней скорости движения по дорогам, протяженности загруженных дорог и результатов социального опроса.

Исследование выявило следующее:

- общая протяженность дорог с интенсивным движением в г.Ташкенте составляет более 120 км. Это больше, чем расстояние от Ташкента до Гулистана (119 км);
- 43% высших учебных заведений республики расположены в Ташкенте и 34% от общего числа студентов (354 тыс. человек) обучаются в столице;
- 47 процентов респондентов назвали увеличение активности учащихся одной из трех основных причин заторов на дорогах;
- Движение учащихся в учебные часы приведет к увеличению протяженности чрезвычайно загруженных дорог с 8,5 км до 11,3 км;
- За год в атмосферу выбрасывается дополнительно 507 тонн CO2 из-за увеличения трафика в течение учебного года. Это требует посадки дополнительных 19 031 единиц деревьев или создания 53 гектаров зеленых насаждений.

Как население города Ташкента относится к заторам на дорогах?

Ташкент, Узбекистан (UzDaily.uz) - Экспертами Института прогнозирования и макроэкономических исследований (ИПМИ) изучено отношение жителей города Ташкента к пробкам на дорогах.

Заторы являются серьезной проблемой и в городе Ташкенте. По данным Агентства статистики, количество автомобилей, принадлежащих физическим лицам, в столице составило 562,1 тыс. единиц в 2022 году или 178 автомобилей на 1000 человек постоянного населения.

С целью изучения отношения жителей города Ташкента к заторам на дорогах и предложений по их снижению в процессе исследования проведен социальный опрос. В нем приняли участие 891 респондент, 60,8% которых составили водители автомобилей, в том числе 10,3% - женщины.

Результаты опроса выявили следующее:

1. 41,8% опрошенных, заявивших, что не водят автомобиль, пользуются автобусом, 27,5% - метро, 24,1% - такси, 1,7% - микроавтобусом, 4,9% - ходят пешком. Выявлено, что общественным транспортом пользуются преимущественно женщины (33,1%) и молодежь (36,5%), личным транспортом - мужчины (33,1%).

2. 74% опрошенных жителей столицы отметили, что считают заторы на дорогах одной из актуальных проблем, 21% - проблемой среднего уровня, 5% - менее актуальной, нежели другие проблемы.

3. Пассажиры автобусов и микроавтобусов больше остальных страдают из-за пробок. 82,9% пользователей автобусов, 83,3% - пассажиров

микроавтобусов обозначили заторы на дорогах, как одну из актуальных проблем столицы.

4. 62,2% респондента в качестве причины образования заторов назвали недисциплинированность водителей, нарушение правил, неправильные парковки, 57,6% - плохое качество дорог, 46,8% - поездки на учебу, 41,2% - поездки на работу.

5. Респонденты обозначили, что в первую очередь, необходимо урегулировать движение на перекрестках Малой кольцевой дороги (136 отзывов), проспекта Бунедкор (106 отзывов).

6. 41,8% респондента ответили, что планируют больше времени на дорогу, 39,1% - едут по дорогам, где нет пробок, 16,9% - ожидают снижения потока автомашин, 2,2% - не выходят в путь.

Среди мнений чаще всего отмечаются предложения по улучшению инфраструктуры общественного транспорта (автобусов), правильному размещению парковок, строительству многоэтажных автостоянок, подземных пешеходных переходов и мостов, расширению линий метро, обеспечению строгого соблюдения правил дорожного движения, переходу на цифровое управление.

Ежедневно в городе перемещается около 1 млн транспортных средств, из которых 300 тыс. — личные автомобили, создающие пробки.

Для развития общественного транспорта введено более 1 тыс. автобусов, включая 304 электробуса. Сейчас в Ташкенте работает 164 маршрута: 99 основных, 14 кольцевых, 11 магистральных и 40 вспомогательных. Интервалы движения сокращены до 8–10 минут, средняя скорость автобусов достигла 18–21 км/ч, что позволяет ежедневно перевозить около 1,4 млн пассажиров.

На загруженных магистралях внедрены умные светофоры, датчики и камеры для мониторинга нарушений. На Ахангаранском шоссе и еще 11 ключевых участках управление трафиком осуществляется в режиме реального времени.

Для соединения пригородов с городом планируется расширение маршрутов и поставка дополнительных автобусов, в рамках программы приобретаются электробусы, к этому году парк увеличится еще на 1 тыс. машин. Также будут работать ночные маршруты и туристический транспорт, связывающий аэропорт, вокзалы, метро и гостиницы с 22:00 до 06:00.

Подводя итог, можно сказать, что автоматизированные системы управления автотранспортом представляют собой комплексные решения, сочетающие в себе технические, организационные и программные меры. Автоматизированные системы управления дорожным движением позволяют собирать данные и обрабатывать основную информацию о движении, трафике на дорогах. Все эти данные станут основой для оптимизации транспортных потоков.

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ТРАНСФОРМАЦИЯ МАРКЕТИНГОВЫХ СТРАТЕГИЙ ПРЕДПРИЯТИЙ В УСЛОВИЯХ ЗЕЛЁНОЙ ЭКОНОМИКИ

Аннотация. *В статье рассматриваются особенности формирования и реализации маркетинговой стратегии предприятий, внедряющих «зеленые» технологии. Раскрывается сущность зеленого маркетинга, его ключевые инструменты, стратегические подходы и роль в обеспечении устойчивого развития. Особое внимание уделено проблемам и перспективам внедрения экологически ориентированных маркетинговых стратегий в странах с развивающейся экономикой, включая Узбекистан. Сделан вывод о том, что зеленый маркетинг становится важнейшим фактором повышения конкурентоспособности и долгосрочной устойчивости бизнеса.*

Ключевые слова: *зеленый маркетинг, устойчивое развитие, ESG, экологические технологии, конкурентоспособность, маркетинговая стратегия.*

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TRANSFORMATION OF CORPORATE MARKETING STRATEGIES IN THE GREEN ECONOMY

Abstract. *This article examines the specific features of the formation and implementation of marketing strategies for enterprises adopting green technologies. It reveals the essence of green marketing, its key tools, strategic approaches, and its role in ensuring sustainable development. Particular attention is given to the challenges and prospects of implementing environmentally oriented marketing strategies in developing economies, including Uzbekistan. The study concludes that green marketing is becoming a crucial factor in enhancing competitiveness and ensuring the long-term sustainability of businesses.*

Keywords: *green marketing, sustainable development, ESG, environmental technologies, competitiveness, marketing strategy.*

Современная мировая экономика характеризуется усилением экологических вызовов, включая изменение климата, истощение природных ресурсов и загрязнение окружающей среды. В этих условиях предприятия вынуждены трансформировать свои бизнес-модели, интегрируя принципы устойчивого развития. Одним из ключевых инструментов такой

трансформации выступает маркетинговая стратегия, ориентированная на внедрение и продвижение «зеленых» технологий. Зеленый маркетинг представляет собой не просто инструмент продвижения, а комплексную систему управления, направленную на создание экологически безопасной продукции и формирование ответственного поведения потребителей. В условиях глобализации и роста экологической осознанности общества данный подход становится стратегическим фактором успеха бизнеса.

Проблематика зеленого маркетинга сформировалась на стыке маркетинга, экологии и устойчивого развития. Ее теоретические основы восходят к идеям устойчивого развития, продвигаемым ООН, где подчеркивается необходимость баланса между экономическим ростом и экологической безопасностью. Одним из первых исследователей, систематизировавших понятие зеленого маркетинга, является Майкл Джей Полонский, который определял его как деятельность, направленную на удовлетворение потребностей потребителей с минимальным вредом для окружающей среды. [5] Его работа стала фундаментальной для дальнейших исследований. Значительный вклад внес Кен Питти, который рассматривал зеленый маркетинг как стратегический инструмент формирования устойчивого потребительского поведения. [3]

Promotion (Продвижение) - основные инструменты экологическая реклама; прозрачная коммуникация; участие в социальных и экологических инициативах. При продвижении товара уделяется особое внимание на реальные экологические показатели (данные, метрики) и ESG-отчеты.

Элемент	Традиционный маркетинг	Зеленый маркетинг
Цель	Максимизация прибыли	Устойчивое развитие + прибыль
Продукт	Функциональность	Экологичность + жизненный цикл
Цена	Конкурентная	С учетом “экологической премии”
Продвижение	Реклама	ESG, прозрачность, эко-коммуникация
Распределение	Эффективность	Снижение углеродного следа
Ценность	Потребительская	Социально-экологическая

В зависимости от уровня экологической интеграции выделяются 3 вида стратегий, такие как:

Адаптивная стратегия — соблюдение экологических стандартов и требований законодательства.

Проактивная стратегия — использование экологичности как конкурентного преимущества.

Инновационная стратегия — создание новых рынков за счет внедрения радикально новых технологий.

С точки зрения маркетинга экологическая сертификация выполняет несколько ключевых функций. Прежде всего, она выступает инструментом

позиционирования, позволяя компаниям формировать имидж экологически ответственного бренда. Кроме того, наличие сертификатов служит доказательной базой в коммуникациях с потребителями и инвесторами, снижая риски обвинений в ложной экологичности. В условиях развития ESG-подходов сертификация также становится важным фактором инвестиционной привлекательности предприятий.

Вместе с тем внедрение экологической сертификации сопряжено с рядом ограничений. К числу основных относятся высокая стоимость процедур, сложность получения и поддержания сертификатов, а также недостаточная осведомленность потребителей, особенно в странах с развивающейся экономикой. Это снижает эффективность использования сертификации как маркетингового инструмента.

Таким образом, экологическая сертификация является не только инструментом подтверждения соответствия стандартам, но и важным элементом маркетинговой стратегии, обеспечивающим повышение доверия потребителей, укрепление конкурентных позиций и устойчивое развитие предприятий.

Для Узбекистана развитие зеленого маркетинга имеет стратегическое значение. В последние годы государственная политика направлена на поддержку экологических инициатив и устойчивого развития. Основные особенности: растущий интерес к «зеленой» энергетике; развитие экологического строительства; необходимость повышения экологической культуры населения; ограниченные финансовые ресурсы предприятий. В то же время страна обладает значительным потенциалом для развития зеленой экономики, особенно в сферах энергетики, сельского хозяйства и строительства.

Для Узбекистана экологическая сертификация представляет собой перспективное направление развития. В условиях ориентации экономики на экспорт и интеграцию в международные рынки предприятия вынуждены соответствовать глобальным экологическим стандартам.

Несмотря на значительное количество исследований, остаются нерешенные вопросы:

- недостаток эмпирических исследований на уровне предприятий Узбекистана
- слабая разработанность маркетинговых моделей для локальных рынков
- ограниченность исследований поведения потребителей в контексте green marketing
- необходимость интеграции цифровых технологий и ESG-стратегий

Выводы

В заключении можно сделать следующие выводы что, маркетинговая стратегия предприятий, внедряющих зеленые технологии, является важным элементом современного бизнеса. Она позволяет не только минимизировать негативное воздействие на окружающую среду, но и формировать

устойчивые конкурентные преимущества. В условиях глобальной экологизации экономики предприятия, игнорирующие принципы устойчивого развития, рискуют утратить свои позиции на рынке. В то же время эффективная реализация зеленого маркетинга способствует росту инвестиционной привлекательности, укреплению бренда и обеспечению долгосрочной устойчивости бизнеса. Несмотря на преимущества, внедрение зеленых маркетинговых стратегий сопровождается рядом проблем: высокая стоимость внедрения технологий; риск ложной экологичности и позиционирования; недостаточная экологическая осведомленность потребителей; сложность измерения экологической эффективности.

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ЦИФРОВЫЕ ТЕХНОЛОГИИ И ИХ РОЛЬ В ФИЗИКЕ

Аннотация: *В данной статье рассматривается применение цифровых технологий в высшем образовании как возможность обучения студентов в соответствии с их индивидуальными потребностями. Выделены факторы, способствующие расширению научного мышления студентов за счет сочетания теоретических знаний и практических навыков в процессе обучения. Эти подходы важны для достижения высокой эффективности.*

Ключевые слова: *интерактивные обучающие платформы, онлайн-курсы и дистанционное обучение, производство, практическая подготовка, исторические вопросы, приобретение навыков и профессиональной квалификации, междисциплинарная дидактическая интеграция.*

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DIGITAL TECHNOLOGIES AND THEIR ROLE IN PHYSICS

Abstract: *This article presents the application of digital technologies in higher education as an opportunity to educate students according to their individual needs. The factors that contribute to expanding students' scientific thinking capacity by combining theoretical knowledge and practical skills in the teaching process are highlighted. These approaches are important for achieving high efficiency.*

Keywords: *interactive learning platforms, online courses and distance learning, production, practical training, historical issues, acquisition of skills and professional qualifications, interdisciplinary didactic integration.*

Введение

В современном обществе цифровые технологии вносят революционные изменения во все сферы, включая образование. Сегодня образовательный процесс не ограничивается традиционными методами, а обогащается инновационными технологиями, такими как цифровые

платформы, интерактивные инструменты и искусственный интеллект. Внедрение цифровых технологий в образование делает процесс обучения студентов более эффективным и интересным, одновременно предоставляя преподавателям возможность проводить уроки современным, интерактивным и персонализированным способом.

В современной системе образования цифровые технологии создают новые возможности не только для студентов, но и для преподавателей и всех сотрудников образовательных учреждений. Онлайн-платформы обучения, виртуальные лаборатории, дистанционные курсы, интерактивные образовательные программы и использование искусственного интеллекта повышают качество образования, делая его всесторонним и эффективным.

Использование цифровых технологий в образовании предоставляет возможности для обучения учащихся в соответствии с их индивидуальными потребностями. Одновременно с этим, они служат эффективным инструментом для анализа и мониторинга образовательного процесса. Цифровые технологии создают возможности для более точного определения уровня усвоения знаний учащимися, оценки их успехов и предоставления учителям персонализированных знаний.

Однако внедрение цифровых технологий в образовательный процесс сопряжено и с определенными трудностями. К ним относятся недостаточное развитие технологической инфраструктуры, проблемы, с которыми сталкиваются преподаватели при освоении новых технологий, а также сложности в обеспечении эффективности онлайн-образования. Поэтому успешное использование цифровых технологий в образовании требует сотрудничества между государствами и образовательными учреждениями, а также совершенствования технологической инфраструктуры.

Основная часть

В данной статье будет проведен анализ современных цифровых технологий, используемых в образовании, их влияния на образовательный процесс и пользы для учащихся, а также рассмотрены проблемы, возникающие при их эффективном применении. В результате будут определены меры, которые следует предпринять для интеграции цифровых технологий в систему образования, и обозначены пути их дальнейшего развития.

Интерактивные обучающие платформы, один из основных компонентов цифровых технологий в современном образовании, предоставляют студентам возможность получать образование в удобной для них форме. Эти платформы делают процесс обучения не только эффективным, но и интересным. Одна из важнейших особенностей интерактивных обучающих платформ заключается в том, что они не только предоставляют студентам возможность получать информацию, но и обеспечивают их различными инструментами, облегчающими интерактивное общение, закрепление и усвоение знаний.

Суть интерактивных обучающих платформ

Интерактивные обучающие платформы — это интернет-системы, позволяющие студентам изучать конкретный курс или урок в удобное для них время и удобным способом. Эти платформы направлены на организацию учебного процесса студентов в интерактивной форме и выполняют следующие основные функции:

1. Видеоуроки: Учащиеся получат возможность просматривать уроки в видеоформате. Это расширяет их возможности визуального обучения.
2. Система тестирования и оценки: Платформы предоставляют студентам интерактивные тесты и инструменты оценки для проверки уровня их знаний. Это позволяет осуществлять непрерывный мониторинг уровня знаний студентов.
3. Аналитика и отчеты: Возможность анализировать и оценивать процесс обучения в режиме реального времени, позволяющая отслеживать прогресс учащихся и вносить необходимые изменения.
4. Форумы и группы: Создает возможности для онлайн-общения между учащимися и преподавателями, что делает процесс обучения более интерактивным и эффективным.
5. Обмен ресурсами и материалами: Преподаватели могут размещать на платформе свои учебные материалы, методические пособия и другие дополнительные ресурсы.

Цифровые ресурсы и приложения для учителей

Учителя широко используют цифровые технологии для поддержки учебного процесса. Это, в свою очередь, помогает учителям совершенствовать свои навыки. Например, использование образовательных приложений и цифровых инструментов для учителей (например, Kahoot, Quizlet, Padlet) может сделать уроки интерактивными.

Онлайн-курсы и дистанционное обучение

Технологии онлайн-курсов и дистанционного обучения расширяют возможности образования в глобальном масштабе. Такие платформы, как Coursera, edX и Udemy, позволяют студентам и преподавателям учиться в удобное для них время и в удобном месте. Это особенно важно для тех, кто проживает в отдаленных районах и имеет ограниченный доступ к образованию.

Роль искусственного интеллекта и программных средств в решении физических задач

Физика — одна из естественных наук, изучающих основные законы существующей Вселенной. Физические задачи могут применяться в различных областях, например, в технике, медицине, экологии, космонавтике и т. д. Их решение не только научно, но и практично. Однако решение традиционных физических задач вручную или с помощью простых вычислительных методов занимает много времени и может привести к неверным результатам. Необходимость поиска новых, эффективных методов решения таких задач возрастает с каждым днем.

В последние годы роль искусственного интеллекта (ИИ) и программных средств (компьютеров, вычислительных систем, программ моделирования и симуляции) в этом процессе приобрела большое значение. Возможности искусственного интеллекта помогают быстро и точно решать физические задачи, упрощают анализ различных вариантов и позволяют получать наиболее оптимальные результаты. Программные средства, в свою очередь, позволяют выполнять сложные вычисления и моделирование, автоматически решать задачи и визуально представлять результаты.

Использование искусственного интеллекта и современных программных средств в физике имеет огромное значение не только для решения математических и вычислительных задач, но и для проведения научных исследований, создания новых теорий, открытия новых материалов и технологий. С помощью этих технологий становится возможным точное моделирование физических систем, процессов и явлений, а также моделирование экспериментов и наблюдений.

Тема, а именно роль искусственного интеллекта и программных средств в решении физических задач, представляет большой интерес для мировой науки и техники. С развитием программных средств и технологий искусственного интеллекта физика может выйти на новый уровень, что, в свою очередь, будет способствовать расширению научных знаний человечества, созданию новых технологий и достижению новых успехов в различных областях.

Анализ и результаты

Использование программных средств для решения физических задач

Решение физических задач часто осуществляется с помощью математических моделей и формул. Однако эти задачи всегда можно эффективно и быстро решить вручную или с помощью традиционных вычислений. Поэтому с развитием науки и техники использование программных средств для решения физических задач становится все более распространенным. Программные средства оказывают большую помощь в моделировании физических систем, решении сложных математических задач и анализе экспериментальных результатов.

Роль программных инструментов

Программные инструменты выполняют несколько ключевых функций в решении физических задач:

• Моделирование: моделирование физических систем на компьютере и имитация их поведения. Это позволяет нам понимать физические процессы и проверять теоретические результаты.

• Автоматизация математических вычислений: Быстро и точно выполняйте сложные математические вычисления с помощью программного обеспечения. Это особенно полезно для решения задач, не имеющих аналитического решения, таких как интегральные и дифференциальные уравнения.

• Графика и визуализация: Предоставляет возможность визуального представления и анализа физических задач. Графики, диаграммы и 3D-модели могут использоваться для лучшего понимания результатов.

• Анализ данных и статистика: Предоставляет возможности для использования статистических методов при анализе экспериментальных данных, расчете ошибок и корректировке результатов.

• Обучение и преподавание: Программные средства играют важную роль в изучении физических проблем или в образовательном процессе. Выполнение различных практических упражнений с использованием компьютера и интерактивное решение задач облегчают понимание материала студентами.

Программные средства, используемые для решения физических задач

Программные средства, используемые для решения физических задач, делятся на следующие основные группы:

a) Математические и вычислительные программы

Эти программы используются для моделирования математических моделей, решения дифференциальных уравнений и автоматизации вычислений. К ним относятся:

• Matlab: Matlab — один из самых популярных программных инструментов для решения физических задач. Matlab позволяет решать дифференциальные уравнения, строить графики, анализировать данные и проводить моделирование. Matlab обладает широким спектром библиотек и функций и используется для решения множества научных и инженерных задач.

• Mathematica: Эта программа широко используется для анализа математических задач и физических систем, решения интегральных и дифференциальных уравнений, а также моделирования. Mathematica — универсальная программа, включающая алгебру, геометрию и статистику.

• Wolfram Alpha: Эта программа работает как онлайн-платформа и предоставляет интерактивные возможности для быстрого решения физических задач. Wolfram Alpha очень полезна для решения математических задач, включая различные вычисления в физике.

b) Нейронные сети и приложения искусственного интеллекта (ИИ)

Нейронные сети и приложения на основе искусственного интеллекта помогают анализировать и моделировать физические системы, а также находить решения сложных физических задач. С помощью искусственного интеллекта можно изучать математические модели физических процессов и выполнять вычисления.

• TensorFlow и PyTorch: Эти платформы используются в области искусственного интеллекта и машинного обучения. Они используются для моделирования физических систем и процессов, создания моделей искусственного интеллекта, которые используются для решения задач. Например, они могут моделировать динамику физических систем путем анализа изображений и обучения нейронных сетей.

с) Приложения для моделирования

Приложения для моделирования используются для изучения физических систем и моделирования их поведения. С помощью таких приложений можно создавать экспериментальные условия в виртуальной среде и анализировать результаты работы системы.

Преимущества программных средств в решении физических задач

- Скорость и эффективность: Программные средства позволяют быстро и эффективно решать физические задачи. Эти системы выполняют большие и сложные вычисления за короткое время.

Решение сложных вычислительных задач: с помощью этих инструментов решаются на компьютере задачи, которые не могут быть решены аналитически, такие как дифференциальные уравнения и интегральные задачи.

Снижение погрешностей: Программные инструменты уменьшают вероятность ошибок в процессе вычислений и повышают точность результатов.

Визуализация: Программные инструменты визуально представляют физические процессы и результаты, что помогает лучше понять результаты.

Выводы и предложения.

Программные средства являются одними из наиболее эффективных и удобных помощников в решении современных физических задач. Они не только ускоряют вычисления, но и позволяют решать сложные задачи, моделировать системы и визуально отображать результаты. Программные средства — это мощный инструмент для более глубокого изучения и анализа физических систем, и их использование имеет важное значение в научно-технических исследованиях.

Искусственный интеллект и программные средства играют все более важную роль в решении физических задач. Они ускоряют физические исследования, позволяют получать научные результаты более точно и эффективно. Эти технологии также оказывают большую помощь в моделировании сложных систем, имитации экспериментов и совершении новых научных открытий. Будущее развитие физики тесно связано с искусственным интеллектом и современными программными средствами. Это станет важным фактором в достижении человечеством новых научных успехов.

Создание специализированных электронных платформ для физики имеет огромное значение для эффективной организации научных исследований и расчетов, а также для совершения новых научных открытий. Такие платформы обеспечивают удобство для научного сообщества при моделировании поведения физических систем, анализе результатов и управлении данными. Их использование открывает возможности для новых подходов, технологий и научных исследований в физике.

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НАПРАВЛЕНИЯ ИСПОЛЬЗОВАНИЯ ИСКУССТВЕННОГО ИНТЕЛЛЕКТА ДЛЯ ПОВЫШЕНИЯ ЭКОНОМИЧЕСКОЙ ЭФФЕКТИВНОСТИ ПРОИЗВОДСТВЕННЫХ ПРОЦЕССОВ

Аннотация: *В статье рассматриваются теоретико-методологические основы и практические направления внедрения технологий искусственного интеллекта (ИИ) в производственные процессы предприятий промышленного сектора Республики Узбекистан. На примере ООО «Grand Road Materials» - производителя строительных материалов предложен авторский композитный индикатор цифровой интеграции (SI-index). Построены эконометрические прогнозные модели на период 2025–2029 гг. с коэффициентом детерминации* $R^2 \geq 0{,}92$ *по трём сценариям (пессимистический, базовый, оптимистический).*

Ключевые слова: *искусственный интеллект, производственные процессы, экономическая эффективность, цифровизация промышленности, SI-index, ART-модель, машинное обучение.*

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APPLICATIONS OF ARTIFICIAL INTELLIGENCE TO IMPROVE THE ECONOMIC EFFICIENCY OF PRODUCTION PROCESSES

Abstract: *This article examines the theoretical and methodological foundations and practical areas for implementing artificial intelligence (AI) technologies in the production processes of industrial enterprises in the Republic of Uzbekistan. Using the example of Grand Road Materials LLC, a manufacturer of building materials, we propose a proprietary composite digital integration indicator (SI-index). Econometric forecast models for the period 2025–2029 with a determination coefficient of* $R^2 \geq 0.92$ *are constructed across three scenarios (pessimistic, baseline, and optimistic).*

Keywords: *artificial intelligence, production processes, economic efficiency, industrial digitalization, SI-index, machine learning.*

Введение

Современный этап развития мировой экономики характеризуется стремительным переходом промышленного производства к парадигме «Индустрия 4.0», в основе которой лежит интеграция киберфизических

систем, промышленного Интернета вещей (IoT) и технологий искусственного интеллекта (ИИ). По данным McKinsey Global Institute, повсеместное внедрение ИИ в обрабатывающую промышленность способно обеспечить мировой экономике прирост в 13 трлн долл. США до 2030 года, что эквивалентно дополнительному росту ВВП на 1,2% в год.

Несмотря на значительный объём зарубежных исследований по вопросам внедрения ИИ в производство (E.Brynjolfsson, A.Agrawal, G.Westerman, K.Schwab и др.), недостаточно проработаны методические подходы к количественной оценке зрелости цифровой интеграции производственных процессов и их экономической эффективности. Это обусловливает необходимость разработки авторского инструментария, учитывающего отраслевую специфику и институциональные особенности национальной экономики.

Целью настоящего исследования является обоснование теоретико-методологических положений и разработка практических инструментов использования технологий искусственного интеллекта для повышения экономической эффективности производственных процессов предприятий промышленности строительных материалов Республики Узбекистан.

Материалы и методы исследования

Методологической базой исследования послужили системный и процессный подходы, методы эконометрического моделирования, метод анализа иерархий (AHP), градиентный бустинг (XGBoost), рекуррентные нейронные сети (LSTM) и Prophet для прогнозирования временных рядов.

Эмпирической базой исследования выступили производственно-хозяйственные данные ООО «Grand Road Materials» за период 2019-2024 гг., аналитические отчёты международных консалтинговых компаний (McKinsey, Deloitte, PwC), а также нормативно-правовые акты Республики Узбекистан в сфере цифровой экономики.

Обзор литературы и зарубежный опыт

Анализ зарубежного опыта показывает, что ведущие промышленно развитые страны сформировали различные модели внедрения ИИ в производственные процессы. Немецкая концепция «Industrie 4.0» делает акцент на киберфизических системах и горизонтальной интеграции цепочек создания стоимости. Американская модель «Smart Manufacturing Leadership Coalition» ориентирована на облачные платформы и предиктивную аналитику. Китайская стратегия «Made in China 2025» сочетает государственное стимулирование с массовым внедрением промышленных роботов. Опыт Республики Корея и Японии демонстрирует эффективность использования коллаборативной робототехники и компьютерного зрения в серийном производстве.

В таблице 1 систематизированы ключевые направления использования ИИ в производстве, выявленные по результатам контент-анализа 87 зарубежных научных публикаций, проиндексированных в базах Scopus и Web of Science за 2019-2024 гг.

Таблица 1.
Основные направления применения ИИ в производственных процессах[67]

Направление	Технологии ИИ	Экономический эффект
Предиктивное техобслуживание	ML-модели (Random Forest, LSTM), анализ вибраций, IIoT-сенсоры	Сокращение простоев на 25-50%, экономия затрат на ремонт 10-40%
Контроль качества	Компьютерное зрение (CNN), свёрточные нейросети	Снижение брака на 30-90%, сокращение возвратов
Оптимизация ресурсов	Генетические алгоритмы, линейное программирование, RL	Экономия сырья 5-15%, энергозатрат 8-20%
Прогнозирование спроса	ARIMA, Prophet, XGBoost, градиентный бустинг	Снижение складских остатков на 20-35%
Цифровой двойник	Комбинация CPS, IIoT, симуляции, ML-моделей	Ускорение вывода продукции на рынок 20-50%
Автономная логистика	Роботизация (AGV/AMR), маршрутная оптимизация	Рост оборачиваемости 15-25%, снижение затрат 10-18%

Результаты исследования

Для количественной оценки уровня интеграции технологий ИИ в производственные процессы промышленного предприятия разработан композитный индикатор Smart Integration Index (SI-index), охватывающий 13 частных показателей, сгруппированных в 5 тематических блоков: (1) цифровая инфраструктура, (2) данные и аналитика, (3) автоматизация и роботизация, (4) человеческий капитал и компетенции, (5) управление и стратегия ИИ.

Расчёт индекса осуществляется по следующей формуле:

$$SI = \Sigma (w_i \times x_i_norm), \quad i = 1, 2, ..., 13$$

где w_i - весовой коэффициент i-го показателя, определённый методом анализа иерархий (AHP); x_i_norm - нормализованное по методу Min-Max значение i-го показателя (в диапазоне 0-1). Итоговое значение SI-index принимает значения в диапазоне от 0 до 100 %.

Интерпретация полученных значений осуществляется по пятиуровневой шкале зрелости цифровой интеграции (таблица 2).

Апробация методики на материалах ООО «Grand Road Materials» позволила получить значение SI-index = 34,7%, что соответствует базовому уровню зрелости и указывает на значительный потенциал дальнейшего развития цифровой интеграции.

[67] Составлено автором по отчётам McKinsey & Company (2023-2024)

Таблица 2

Пятиуровневая шкала интерпретации значений SI-index[68]

Диапазон	Уровень зрелости	Характеристика
0-20%	Начальный	Фрагментарная автоматизация, отсутствие единой системы сбора данных
21-40%	Базовый	Внедрение SCADA/MES, цифровизация ключевых операций
41-70%	Развитый	Систематическое использование аналитики данных, первые пилоты ИИ
71-90%	Продвинутый	Промышленное использование ML, предиктивная аналитика, цифровые двойники
91-100%	Интеллектуальный	Полная интеграция ИИ в бизнес-процессы, автономные системы принятия решений

На основе временных рядов производственно-экономических показателей ООО «Grand Road Materials» за 2019-2024 гг. построены эконометрические прогнозные модели на период 2025-2029 гг. для восьми ключевых индикаторов: объём производства, выручка от реализации, производительность труда, материалоёмкость, энергоёмкость, себестоимость единицы продукции, рентабельность продаж, уровень простоев оборудования.

Для каждого показателя рассчитаны три сценария: пессимистический (сохранение текущего уровня цифровизации), базовый (частичное внедрение ИИ-решений) и оптимистический (комплексная реализация предложенных инструментов). Сводные результаты прогнозирования представлены в таблице 3.

Таблица 3.

Прогнозные значения ключевых показателей ООО «Grand Road Materials» на 2029 год по сценариям[69]

Показатель	2024 (факт)	Песс. 2029	Баз. 2029	Опт. 2029
Объём производства, тыс. т	248,6	275,3	312,8	358,4
Производительность труда, тыс. сум/чел.	187 420	204 500	228 700	255 600
Материалоёмкость, сум/сум	0,642	0,628	0,589	0,553
Энергоёмкость, кВт·ч/т	92,4	89,7	81,2	73,8
Рентабельность продаж, %	14,8	15,6	18,9	22,7
Простои оборудования, ч/год	412	395	318	268
SI-index, %	**34,7**	**42,5**	**58,3**	**74,6**

Качество построенных эконометрических моделей характеризуется высокими значениями коэффициента детерминации (R^2 = 0,92-0,97), а также низкими значениями среднеквадратичной ошибки (RMSE) и средней абсолютной ошибки (MAE), что подтверждает их пригодность для

[68] Разработано автором

[69] Расчёты автора на основе данных ООО «Grand Road Materials» с использованием EViews 12 и Python 3.11.

практического применения в прогнозировании и управленческом планировании.

Для моделирования динамики SI-index использована логистическая функция роста, отобранная по критерию минимизации AIC/BIC среди альтернативных спецификаций (линейной, экспоненциальной, полиномиальной). Логистическая модель адекватно отражает эффект «цифрового плато» - замедление темпов роста интеграции по мере приближения к верхнему теоретическому пределу.

Заключение

Проведённое исследование позволило получить следующие основные результаты теоретического и прикладного характера:

Во-первых, обоснована авторская концепция многоуровневой интеграции технологий искусственного интеллекта в производственные процессы промышленных предприятий, учитывающая отраслевые особенности производства строительных материалов и институциональные условия Республики Узбекистан.

Во-вторых, разработан композитный индикатор цифровой интеграции SI-index, позволяющий количественно оценивать уровень зрелости применения ИИ в производстве по 13 частным показателям и пяти тематическим блокам. Апробация методики на материалах ООО «Grand Road Materials» выявила значительный потенциал цифрового развития предприятия.

В-третьих, построены эконометрические прогнозные модели ($R^2 \geq 0{,}92$) по трём сценариям развития, свидетельствующие о том, что реализация оптимистического сценария обеспечит рост производительности труда на 27%, снижение материалоёмкости на 14%, сокращение простоев оборудования на 35% и повышение рентабельности продаж до 22,7%.

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АНАЛИЗ АНКЕТИРОВАНИЯ ПО ОЦЕНКЕ КАЧЕСТВА ВОДНОГО ФАКТОРА

Аннотация. *В статье проанализированы результаты опроса по оценке влияния водного фактора на здоровье населения. По состоянию на январь 2025 года 80,9% населения Узбекистана обеспечено централизованной питьевой водой. Обеспечение населения качественной, безопасной и достаточной по количеству питьевой водой является одной из актуальных задач. В связи с этим мы проанализировали наличие или отсутствие перебоев в системе водоснабжения и получили следующие результаты: 14 участников (23,3%) ответили «да, часто», 35 (58,3%) - «редко», а 11 (18,3%) - «нет».*

Ключевые слова: *население, питьевая вода, водоснабжение, загрязнение, участник, гигиенические требования, опрос, заболеваемость.*

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ANALYSIS OF A SURVEY ON THE EVALUATION OF WATER QUALITY

Abstract. *This article analyzes the results of a survey assessing the impact of water quality on public health. As of January 2025, 80.9% of the population of Uzbekistan has access to centralized drinking water. Ensuring the population has access to high-quality, safe, and sufficient drinking water is one of the most pressing challenges. In this regard, we analyzed the presence or absence of interruptions in the water supply system and obtained the following results: 14 participants (23.3%) answered "yes, often," 35 (58.3%) answered "rarely," and 11 (18.3%) answered "no."*

Keywords: *population, drinking water, water supply, pollution, participant, hygiene requirements, survey, morbidity.*

Актуальность

В природе вода никогда не бывает в идеально чистом состоянии. Природная вода представляет собой естественный раствор, в составе которого всегда присутствуют какие-либо растворённые вещества, соединения, ионы и газы. Качество природной воды всегда зависит от местных географических условий её расположения и состава водоносных горных пород. Данный вопрос приобретает особую актуальность и ещё большую значимость в условиях новых экономических, социальных, политических и экологических реалий в регионе Центральной Азии, где водные ресурсы ограничены, экономика и население быстро растут (следовательно, растёт потребность в воде), а последствия изменения климата ощущаются всё сильнее (то есть условия обеспечения водой становятся более сложными). Для обеспечения населённых пунктов и объектов водой необходимо проектировать сооружения, обеспечивающие требуемое давление и расход воды в системах водоснабжения, в том числе: распределительные водопроводные сети, напорные водонапорные башни, напорные бассейны (резервуары) [2]. Для правильного размещения сооружений и определения их размеров необходимо знать объём водопотребления на различных объектах. По данным, в течение жизни человек в среднем потребляет 75 тонн воды. В частности, взрослые люди в сутки потребляют 2,5-3 литра воды. Из этого 1,2 литра приходится на питьевую воду, 1 литр потребляется через различные пищевые продукты, фрукты и овощи, а 0,3 литра образуется в организме в процессе обмена веществ. Уровень обеспеченности населения Узбекистана питьевой водой: по состоянию на январь 2025 года 80,9% населения Узбекистана обеспечено централизованной питьевой водой [4]. В Узбекистане в 2026 году уровень обеспеченности централизованной питьевой водой будет доведён до 90%, а уровень охвата услугами канализации - до 35%.

Материалы и методы

Среди различных групп населения был проведён опрос о питьевой воде, её значении и эпидемиологической безопасности, а также об уровне медицинской культуры населения; результаты были статистически обработаны и проанализированы.

Полученные результаты

Мы провели опрос среди населения о значении водного фактора. При этом сведения о состоянии обеспеченности населения питьевой водой в Узбекистане изучались при непосредственном участии населения. Данный опрос состоял из нескольких частей: демографические данные, источники питьевой воды, привычки потребления воды, качество воды и здоровье, гигиенические знания и поведение.

По результатам данного опроса были получены следующие данные: в части демографических данных по результатам анализа возраста участников число участников в возрасте 18-20 лет составило 18 человек (30%), 21-23 лет - 32 человека (53,3%), 24-26 лет - 7 человек (11,6%), 27 лет и старше - 3 человека (5%). Вода очень важна для организма. Тело человека примерно на 60-70% состоит из воды, и вода играет важную роль в осуществлении многих жизненно важных функций. Некоторые причины, по которым вода важна для организма: регулирует температуру тела: вода играет важную роль в регуляции температуры тела. Испарение воды через потоотделение помогает регулировать температуру тела. Поддерживает метаболизм: вода служит средой для всех химических реакций, необходимых для обмена веществ в организме. Питьевая вода ускоряет метаболизм и помогает организму вырабатывать энергию. Поддерживает деятельность клеток: необходима для выполнения клетками своих функций. Питательные вещества и кислород транспортируются через воду. Помогает выводить токсины: вода способствует удалению отходов из организма [2,7,8]. Отходы выводятся из организма с мочой и водой. При анализе по полу участников опроса было установлено следующее: общее число участников составило 60 человек, из них 18 мужчин (30,0%) и 42 женщины (70,0%). В связи с этим мы проанализировали, в каких населённых пунктах проживают участники, и получили следующие результаты: установлено, что 39 участников (65%) проживают в сельских населённых пунктах, а 21 (35%) - в городе. Качество питьевой воды также зависит от источника, поэтому мы выяснили, какими источниками пользуются потребители, и получили следующие результаты: 32 участника используют централизованную водопроводную воду (53,3%), 9 - колодезную воду (15,0%), 9 - бутилированную воду (15,0%), 7 - артезианскую воду (11,6%), а 3 участника (5,0%) указали, что пользуются другими источниками (рис. 1).

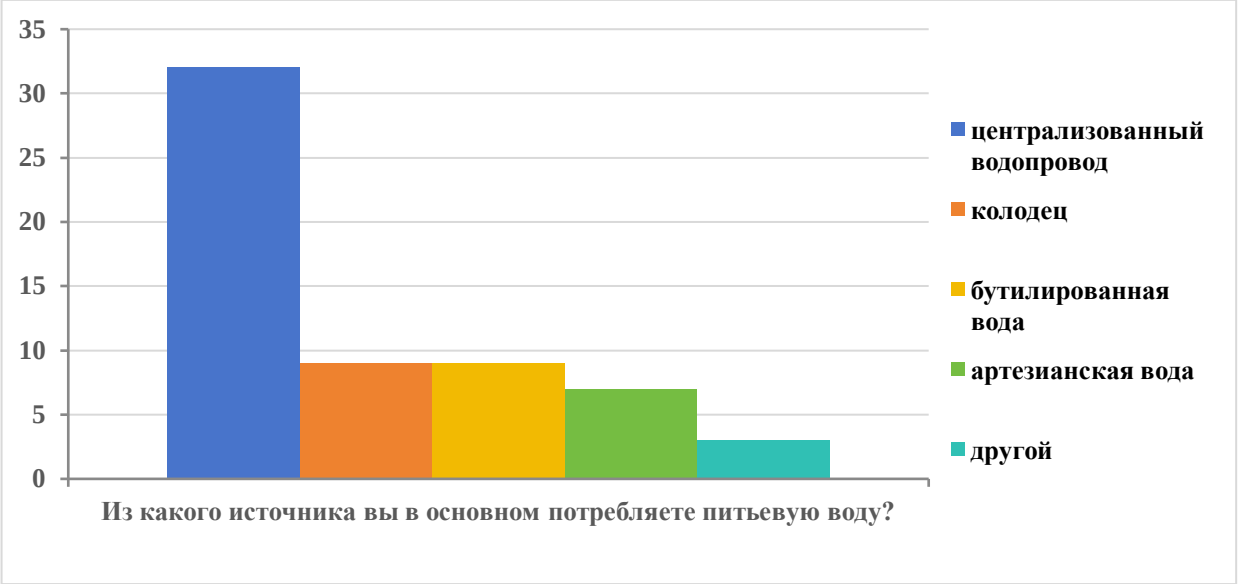

Рисунок 1. Состояние использования источников воды участниками опроса

Обеспечение населения качественной, безопасной и достаточной по количеству питьевой водой является одной из актуальных задач. В связи с этим мы проанализировали наличие или отсутствие перебоев в системе водоснабжения и получили следующие результаты: 14 участников (23,3%) ответили «да, часто», 35 (58,3%) - «редко», а 11 (18,3%) - «нет». Качество воды, используемой для питьевых, хозяйственных и технических целей, зависит от состава различных растворимых и нерастворимых минеральных и органических веществ в воде и определяется по совокупности физических, химических, бактериологических и биологических свойств воды. Требования к качеству питьевой воды установлены на основании требований государственного стандарта Узбекистана «Питьевая вода. Гигиенические требования и контроль качества» MCT133-2024 [2,3,5]. В связи с этим на вопрос участников «Каково ваше мнение о качестве воды?» были получены следующие ответы: 23 человека (38,3%) указали «хорошее», 25 человек (41,6%) - «удовлетворительное», 12 человек (20,0%) - «плохое» (рис. 2).

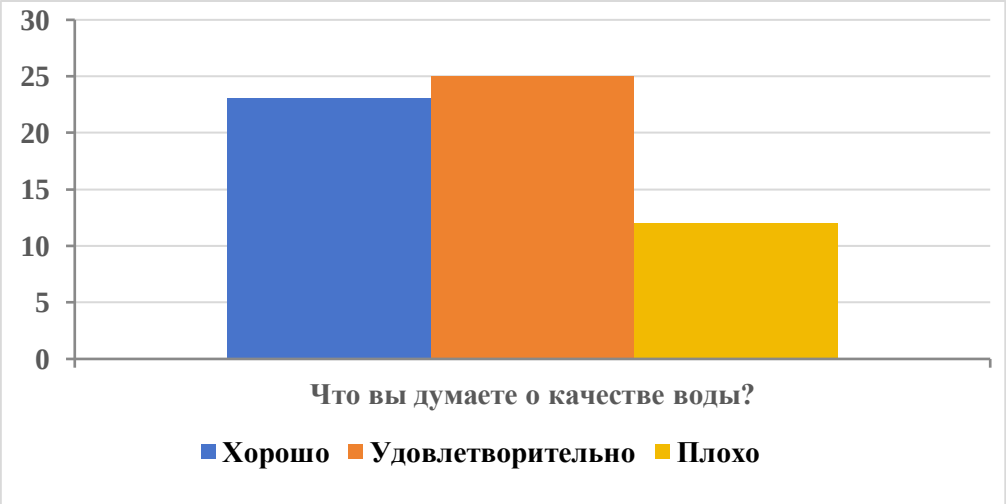

Рисунок 2. Мнение участников о качестве воды

Недостаточное потребление воды приводит к обезвоживанию организма. Поэтому, когда мы спросили участников, какое количество воды они употребляют в течение суток, они ответили следующим образом: 23 человека (38,3%) - 2 литра, 37 человек (61,1%) - 2-3 литра (рис. 3).

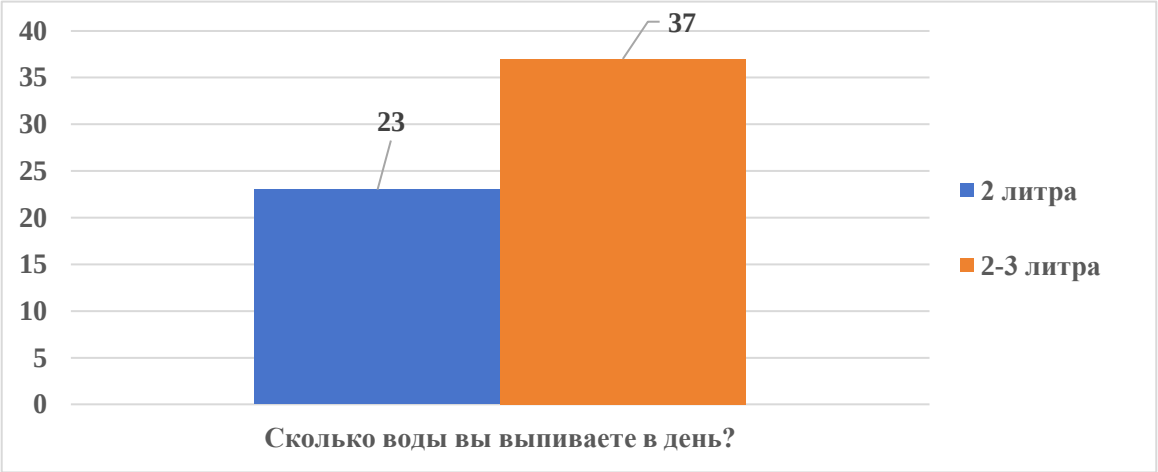

Рисунок 3. Количество ежедневного потребления воды участниками

Кипячёная вода (особенно в тёплом виде), выпитая утром натощак, ускоряет обмен веществ, улучшает пищеварение, выводит токсины и помогает избавиться от лишнего веса. На этот вопрос участники опроса ответили следующим образом: 34 человека (56,6%) указали, что пьют кипячёную воду, 26 человек (43,3%) - что употребляют её некипячёной (рис.4).

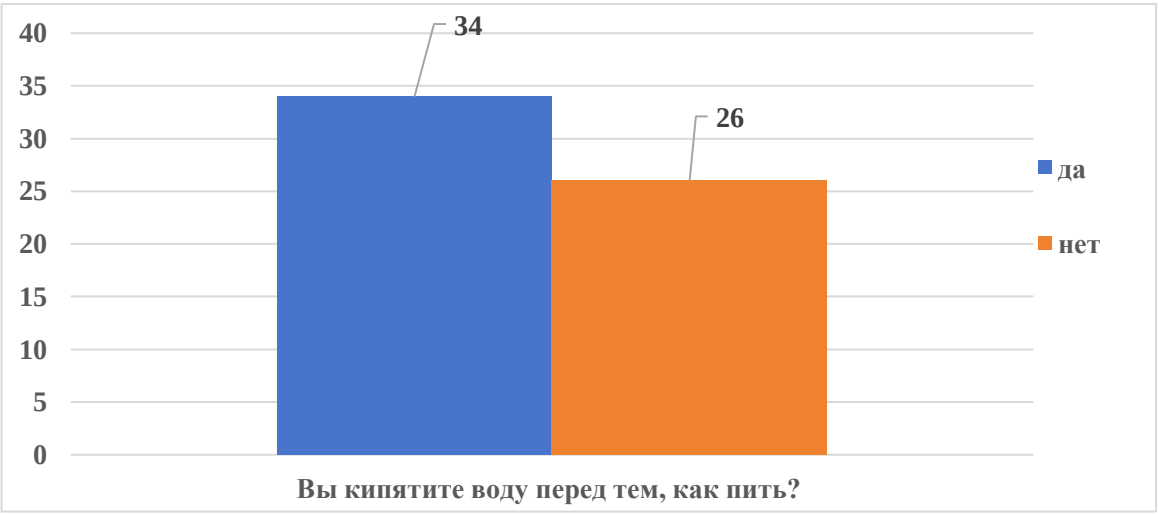

Рисунок 4. Результаты по употреблению кипячёной воды.

Эксперты Всемирной организации здравоохранения установили, что 80% всех заболеваний в мире передаются через загрязнённую воду. Загрязнение воды болезнетворными микроорганизмами может стать причиной распространения ряда инфекционных заболеваний, таких как брюшной тиф, дизентерия, холера, вирусный гепатит А [7,8]. В связи с этим

мы указали заболевания, связанные с качеством воды, и оценили мнение участников: 43 человека (71,6%) ответили «да», 9 человек (15,0%) - «нет», а 8 человек (13,3%) - «не знаю».

Заключение

В настоящее время каждому человеку на Земле требуется от 3 до 790 литров воды в сутки, количество ежедневно расходуемой воды на душу населения различается. В частности, в развитых странах этот показатель чаще всего составляет 550-600 литров, в развивающихся государствах - около 60-150 литров, в сельской местности - 15-25 (40 литров). Из полученных результатов можно сделать вывод, что качество и количество воды имеют значение в распространении инфекционных заболеваний среди населения. В сохранении здоровья населения важное значение имеет медицинская культура.

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ЖЕНСКАЯ ПРЕССА КЫРГЫЗСТАНА: КОНТЕНТ-АНАЛИЗ ГЕНДЕРНЫХ НАРРАТИВОВ В ПЕРИОД 2010–2020 ГОДОВ

Аннотация: *В статье рассматривается женская пресса Кыргызстана как пространство формирования и трансляции гендерных представлений в период 2010–2020 годов. Основное внимание уделяется тому, какие образы женщины закреплялись в публикациях женских медиа и каким образом в них сочетались традиционные и модернизационные модели женской идентичности. Анализ показывает, что женская пресса в указанный период не ограничивалась развлекательной или бытовой тематикой: наряду с материалами о семье, материнстве, красоте и домашнем пространстве всё более заметными становились сюжеты об образовании, профессиональной самореализации, экономической самостоятельности, социальной активности и правах женщин. Особое значение имело усиление правозащитного нарратива, связанного с обсуждением домашнего насилия, дискриминации, ранних браков и личной автономии. Делается вывод, что женская пресса Кыргызстана отражала постепенное и противоречивое переосмысление роли женщины в обществе, сохраняя связь с традиционными ценностями и одновременно расширяя представления о женской субъектности.*

Ключевые слова: *женская пресса; Кыргызстан; гендерные нарративы; контент-анализ; женская идентичность; медиа; права женщин; гендерные роли; цифровизация; социальные трансформации.*

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WOMEN'S PRESS IN KYRGYZSTAN: A CONTENT ANALYSIS OF GENDER NARRATIVES IN 2010–2020

Abstract: *This article examines women's press in Kyrgyzstan as a space where gender perceptions were shaped and communicated between 2010 and 2020. The study focuses on the images of women represented in women-oriented media and on the ways traditional and modernizing models of female identity coexisted in journalistic discourse. The analysis shows that women's press during*

this period was not limited to entertainment or domestic topics. Alongside publications on family, motherhood, beauty, and home life, increasing attention was given to education, professional self-realization, economic independence, civic participation, and women's rights. Particular importance is attached to the growing human-rights narrative associated with domestic violence, discrimination, early marriage, and personal autonomy. The article concludes that women's press in Kyrgyzstan reflected a gradual and often contradictory rethinking of women's roles in society, maintaining links with traditional values while expanding the understanding of women's agency.

Keywords: *women's press; Kyrgyzstan; gender narratives; content analysis; female identity; media; women's rights; gender roles; digitalization; social transformation.*

Введение

Женская пресса занимает особое место в медиапространстве. Она не просто отражает повседневные интересы и запросы аудитории, но и участвует в формировании представлений о социальных ролях, нормах поведения и допустимых моделях женской самореализации. Через темы семьи, материнства, внешности, образования, карьеры и общественной активности такие издания создают определённый образ женщины. Причём образ этот редко бывает однозначным: он может одновременно воспроизводить традиционные установки и фиксировать перемены, происходящие в обществе.

Для Кыргызстана период 2010–2020 годов представляет особый исследовательский интерес. Это десятилетие было связано с заметными политическими и социальными трансформациями, развитием гражданского общества, усилением дискуссий о правах женщин, домашнем насилии, участии женщин в публичной жизни, а также с постепенным переходом медиа в цифровую среду. На этом фоне женская пресса стала важной площадкой, где пересекались традиционные представления о женственности и новые запросы, связанные с образованием, профессиональной самостоятельностью и личной автономией.

Объектом исследования выступает женская пресса Кыргызстана в 2010–2020 годах. Предмет исследования — гендерные нарративы, представленные в публикациях женских медиа указанного периода. Цель статьи состоит в том, чтобы выявить, какие образы женщины и модели женской идентичности транслировались в женской прессе Кыргызстана, а также определить, как в этих материалах сочетались традиционные и модернизационные представления о роли женщины в обществе.

В статье рассматриваются особенности развития женской прессы в контексте медиасистемы Кыргызстана, основные тематические направления публикаций, а также ключевые гендерные нарративы, связанные с семьёй, материнством, красотой, карьерой, социальной активностью и правами женщин. Такой подход позволяет увидеть в женских медиа не только

источник информации или развлечения, но и пространство, где формируются и переосмысливаются социальные ожидания в отношении женщины.

Женская пресса Кыргызстана в контексте медиасистемы 2010–2020 годов

Женская пресса Кыргызстана в 2010–2020 годах развивалась в условиях заметной трансформации медиасреды. Этот период был связан не только с изменением общественно-политической повестки, но и с постепенным переходом аудитории от печатных форматов к цифровым каналам коммуникации. Если в начале десятилетия журналы, газеты и тематические рубрики ещё сохраняли привычную роль источника советов, рекомендаций и культурных ориентиров, то к концу периода всё большее значение приобрели онлайн-СМИ, социальные сети и мультимедийные платформы [1].

Важно, что женская пресса не ограничивается передачей информации. Она также формирует представления о том, какой должна быть «современная женщина». В кыргызстанском контексте этот образ складывался на пересечении традиционных ожиданий и новых социальных возможностей. С одной стороны, значительное место занимали материалы о семье, материнстве, браке, воспитании детей, красоте и домашнем пространстве. С другой — всё заметнее становились сюжеты об образовании, профессиональной реализации, предпринимательстве, общественной активности и защите прав женщин.

Такое сочетание традиционного и нового было связано с более широкими изменениями в обществе. После 2010 года в Кыргызстане активизировались дискуссии о гражданском участии, социальных правах, положении женщин и проблемах насилия в семье. Женская пресса, реагируя на эти процессы, начала включать темы, которые раньше могли восприниматься как слишком острые или «неженские»: экономическая самостоятельность, личные границы, дискриминация, выбор профессии, баланс между семьёй и работой.

Что немаловажно, существенную роль сыграла цифровизация. Онлайн-среда изменила не только форму подачи материалов, но и характер общения с аудиторией. Тексты становились короче, визуальнее, эмоциональнее. Чаще использовались интервью, личные истории, экспертные комментарии и практические рекомендации. Интернет позволил быстрее реагировать на общественные события и включать в обсуждение разные голоса: журналисток, активисток, специалистов, предпринимательниц и самих читательниц [2].

При этом женские медиа не отказались от традиционных моделей. Скорее наоборот: в 2010–2020 годах они часто совмещали разные, а порой и противоречивые представления о женской роли. Женщина могла изображаться одновременно как заботливая мать, привлекательная жена, успешный профессионал и самостоятельный участник общественной жизни.

Именно эта многослойность показывает, что женская пресса Кыргызстана не просто отражала социальные изменения, но и участвовала в их осмыслении, фиксируя напряжение между привычными нормами и новыми формами женской идентичности.

Тематические доминанты женской прессы: семья, красота, карьера и социальная активность

Если рассматривать женскую прессу Кыргызстана как часть меняющейся медиасистемы, особенно важно обратиться к её содержанию. Именно оно показывает, какие темы становились основой разговора о женщине и её роли в обществе. В публикациях 2010–2020 годов можно выделить несколько устойчивых направлений: семья и материнство, красота и здоровье, профессиональная самореализация, образование, социальная активность и защита прав женщин [3].

Одной из наиболее устойчивых тем оставалась семья. Женщина в таких материалах часто представлялась через роли матери, жены, дочери, хозяйки дома, ответственной за эмоциональное благополучие близких. Публикации о браке, воспитании детей и семейной гармонии воспроизводили традиционное понимание женской социальной функции. Но эти материалы нельзя сводить только к консервативной риторике. Они отражали и реальные повседневные запросы аудитории, и значимость семьи как важной социальной ценности.

Заметное место занимали материалы о красоте, здоровье и внешнем облике. В публикациях о моде, уходе за собой и здоровье образ женщины часто строился вокруг идеи самодисциплины и соответствия эстетическим нормам. Вместе с тем тема заботы о себе постепенно получала более широкий смысл. Она связывалась уже не только с внешностью, но и с физическим состоянием, психологическим комфортом, личными границами и качеством жизни.

На этом фоне всё заметнее становился мотив профессиональной и образовательной самореализации. Женская пресса чаще обращалась к историям женщин, добившихся успеха в бизнесе, образовании, культуре или общественной деятельности. Такие публикации расширяли привычные рамки женской идентичности: женщина представлялась не только как член семьи, но и как самостоятельный субъект, способный строить карьеру, принимать решения и влиять на социальную среду.

Отдельное значение имели материалы о правах женщин, насилии, дискриминации и участии в общественной жизни. Их появление свидетельствовало о расширении публичного разговора о проблемах, которые ранее часто оставались в частной сфере. Женский опыт начинал описываться не только через обязанности, но и через возможности, ограничения и потребность в общественном признании.

В итоге тематические доминанты женской прессы Кыргызстана в 2010–2020 годах показывают постепенное усложнение образа женщины. Наряду с устойчивыми сюжетами о семье, материнстве и красоте

усиливались темы образования, карьеры, личного выбора и правовой защищённости.

Гендерные нарративы и образ женщины в публикациях 2010–2020 годов

Анализ тематических доминант позволяет перейти к вопросу о том, какие представления о женщине закреплялись через содержание женской прессы. В публикациях 2010–2020 годов прослеживается не один единый образ, а несколько параллельных нарративов. Примечательно, что они нередко сосуществовали в одном медиапространстве и даже внутри одной логики разговора о женской роли.

Наиболее устойчивым оставался традиционный нарратив. В его поле женщина описывалась прежде всего через семью, материнство, заботу и способность поддерживать гармонию в доме. Этот образ был связан с культурными представлениями о женской ответственности за семейное благополучие. Даже когда в публикациях поднимались темы образования, работы или личного выбора, новые роли женщины часто оценивались через их совместимость с семейными обязанностями.

Второй значимый нарратив можно определить как модернизационный. Он формировал образ женщины как активной, образованной и профессионально самостоятельной личности. В таких материалах важными становились личные достижения, экономическая независимость, образование и способность принимать решения. Этот нарратив отражал социальные изменения, связанные с расширением возможностей женщин в бизнесе, образовании и общественной деятельности.

Наряду с этим сохранялся нарратив внешней привлекательности и самоконтроля. Женщина представлялась как человек, который должен следить за собой и соответствовать определённым эстетическим ожиданиям. На первый взгляд, это довольно привычная для женских медиа линия. Однако к концу рассматриваемого периода забота о себе всё чаще связывалась не только с красотой, но и со здоровьем, психологическим состоянием и уважением к собственным потребностям.

Отдельное место занимал правозащитный нарратив, связанный с обсуждением домашнего насилия, ранних браков, дискриминации и экономической зависимости. Здесь женщина рассматривалась не только как носительница семейных обязанностей, но и как субъект прав. Женский опыт начинал описываться через категории безопасности, достоинства, выбора и социальной справедливости [4,с.95].

В результате женская пресса Кыргызстана в 2010–2020 годах создавала многослойный образ женщины. Традиционные представления о материнстве и семье сочетались с идеями самостоятельности, образования, профессионального роста и правовой защищённости. Это отражало не резкую смену ценностей, а постепенное и противоречивое переосмысление роли женщины в обществе.

Заключение

Проведённый анализ позволяет сделать вывод, что женская пресса Кыргызстана в 2010–2020 годах выступала не только как источник информации для женской аудитории, но и как пространство формирования гендерных представлений. Через выбор тем, героинь публикаций, интонацию и ценностные акценты такие медиа участвовали в создании образа женщины, соответствующего как традиционным культурным ожиданиям, так и новым социальным условиям.

В рассматриваемый период в женской прессе сохранялись устойчивые сюжеты о семье, материнстве, браке, красоте и заботе о домашнем пространстве. Эти темы отражали значимость традиционных социальных ролей и продолжали закреплять представление о женщине как о хранительнице семьи и эмоциональной опоре близких. Вместе с тем содержание женских медиа постепенно усложнялось: всё заметнее становились материалы об образовании, профессиональной самореализации, экономической самостоятельности, личном выборе и участии женщин в общественной жизни.

Особое значение имело появление и усиление правозащитного нарратива. Обсуждение домашнего насилия, ранних браков, дискриминации и социальной уязвимости женщин переводило многие проблемы из частной сферы в публичную. Благодаря этому женский опыт начинал осмысляться не только через обязанности перед семьёй и обществом, но и через категории достоинства, безопасности, правовой защищённости и личной автономии.

Подводя итог, можно сказать: женская пресса Кыргызстана в 2010–2020 годах отражала сложный процесс трансформации гендерных норм. Она не демонстрировала полного отказа от традиционной модели женственности, но постепенно расширяла её границы. Женщина в этих публикациях представала одновременно как мать, жена, профессионал, активная участница общественной жизни и субъект собственных прав. Именно это сочетание традиционного и модернизационного начал позволяет рассматривать женскую прессу как важный индикатор социальных изменений в кыргызстанском обществе.

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ИНТЕГРАТИВНЫЙ ПОДХОД В ПРЕПОДАВАНИИ БИОЛОГИИ В МЕДИЦИНСКОМ КОЛЛЕДЖЕ КАК ФАКТОР ФОРМИРОВАНИЯ ПРОФЕССИОНАЛЬНЫХ КОМПЕТЕНЦИЙ

Аннотация. *В статье рассматривается проблема повышения качества биологического образования в медицинском колледже посредством реализации интегративного подхода. Раскрывается сущность интегративного подхода и его значение для формирования целостного представления о биологических закономерностях в контексте будущей профессиональной деятельности медицинского работника. Анализируются возможности межпредметной интеграции биологии с клиническими дисциплинами (анатомией, физиологией, патологией, фармакологией). Представлены результаты экспериментальной работы по внедрению интегративного подхода в преподавание биологии, включая разработку междисциплинарных модулей и практико-ориентированных заданий.*

Ключевые слова: *биология, интегративный подход, медицинский колледж, профессиональные компетенции, межпредметные связи, практико-ориентированное обучение.*

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INTEGRATIVE APPROACH IN TEACHING BIOLOGY IN A MEDICAL COLLEGE AS A FACTOR OF FORMATION OF PROFESSIONAL COMPETENCES

Abstract. *The article examines the problem of improving the quality of biological education in a medical college through the implementation of an integrative approach. The essence of the integrative approach and its significance*

for the formation of a holistic understanding of biological patterns in the context of the future professional activity of a medical worker are revealed. The possibilities of interdisciplinary integration of biology with clinical disciplines (anatomy, physiology, pathology, pharmacology) are analyzed. The results of experimental work on the implementation of an integrative approach in teaching biology, including the development of interdisciplinary modules and practice-oriented tasks, are presented.

Keywords: *biology, integrative approach, medical college, professional competences, interdisciplinary connections, practice-oriented training.*

Биология является одной из фундаментальных дисциплин в системе среднего профессионального медицинского образования. Она формирует у студентов представления о жизни как особом явлении, о закономерностях строения, функционирования и развития живых систем, о взаимосвязи организма и среды. Знания по биологии служат теоретической основой для изучения анатомии, физиологии, патологии, фармакологии, микробиологии и других клинических дисциплин. Однако традиционное преподавание биологии в медицинском колледже часто носит изолированный характер, не в полной мере отражая связи биологических закономерностей с будущей профессиональной деятельностью медицинского работника. Студенты не всегда видят практическую значимость биологических знаний для понимания этиологии, патогенеза, диагностики и лечения заболеваний. В связи с этим актуальной становится реализация интегративного подхода в преподавании биологии, который позволяет преодолеть разрыв между фундаментальными биологическими знаниями и профессиональными компетенциями медицинского работника.

Интегративный подход в образовании представляет собой методологическую стратегию, направленную на установление содержательных и методических связей между различными учебными дисциплинами, формирование целостной системы знаний и развитие способности применять эти знания в комплексном решении профессиональных задач. В контексте преподавания биологии в медицинском колледже интегративный подход предполагает: установление внутрипредметных связей между разделами биологии (цитология, генетика, экология, эволюция); установление межпредметных связей с клиническими дисциплинами; ориентацию содержания биологического образования на формирование профессиональных компетенций; использование практико-ориентированных заданий, моделирующих профессиональные ситуации; развитие у студентов системного мышления, способности видеть биологические механизмы патологических процессов.

Возможности межпредметной интеграции биологии с клиническими дисциплинами весьма разнообразны. При изучении цитологии и гистологии акцент делается на строение и функции клеток, тканей, что является основой для понимания патофизиологических процессов на клеточном и тканевом

уровнях. При изучении генетики рассматриваются закономерности наследования, хромосомные и генные болезни, что необходимо для понимания этиологии наследственных заболеваний, медико-генетического консультирования. При изучении микробиологии и иммунологии интегрируются знания о микроорганизмах, инфекционных процессах, иммунитете, что составляет основу диагностики и лечения инфекционных заболеваний. При изучении экологии рассматриваются факторы среды, влияющие на здоровье человека, адаптационные механизмы, что важно для профилактической медицины. При изучении эволюции и антропологии формируется представление о месте человека в биосфере, о биологических основах здоровья и болезни.

Для реализации интегративного подхода в преподавании биологии в Армавирском медицинском колледже была разработана и апробирована методика, включающая следующие компоненты: разработка междисциплинарных модулей, объединяющих содержание биологии и клинических дисциплин; создание банка практико-ориентированных заданий, демонстрирующих связь биологических знаний с профессиональной деятельностью; использование активных и интерактивных методов обучения (проблемные лекции, дискуссии, разбор клинических случаев, проектная деятельность); организация междисциплинарных семинаров и конференций с участием преподавателей биологии и клинических дисциплин; включение в контрольно-измерительные материалы заданий интегративного характера.

Эффективность разработанной методики проверялась в ходе педагогического эксперимента, в котором приняли участие 90 студентов первого-второго курсов ГБПОУ «Армавирский медицинский колледж». Были сформированы экспериментальная группа (45 человек), в которой преподавание биологии осуществлялось с использованием интегративного подхода, и контрольная группа (45 человек), занимавшаяся по традиционной программе. Длительность эксперимента составила один учебный год. Диагностика проводилась до начала эксперимента и после его окончания с использованием: тестовых заданий для оценки знаний по биологии; комплексных междисциплинарных заданий для оценки способности применять биологические знания в профессиональном контексте; опросов для выявления мотивации и интереса к изучению биологии; экспертной оценки преподавателей клинических дисциплин уровня подготовки студентов.

Результаты исследования показали следующее. В экспериментальной группе уровень знаний по биологии повысился в большей степени, чем в контрольной (средний балл 4,2 против 3,7). При выполнении комплексных междисциплинарных заданий студенты экспериментальной группы продемонстрировали значительно более высокую способность применять биологические знания для объяснения патологических процессов и клинических ситуаций (85% правильных ответов против 58% в контрольной

группе). Мотивация к изучению биологии в экспериментальной группе выросла на 35%, интерес к дисциплине и понимание ее профессиональной значимости были отмечены 92% студентов экспериментальной группы (в контрольной – 64%). Преподаватели клинических дисциплин отметили более высокий уровень базовой биологической подготовки у студентов экспериментальной группы, что проявлялось в лучшем понимании этиологии, патогенеза, механизмов действия лекарственных средств.

Таким образом, интегративный подход в преподавании биологии в медицинском колледже является эффективным фактором формирования профессиональных компетенций будущих медицинских работников. Он позволяет преодолеть разрыв между фундаментальными биологическими знаниями и профессиональной деятельностью, формирует у студентов целостное представление о биологических закономерностях в контексте медицины, развивает системное мышление и способность применять знания на практике. Реализация интегративного подхода требует координации усилий преподавателей биологии и клинических дисциплин, разработки междисциплинарных учебных материалов и использования активных методов обучения. Дальнейшие исследования могут быть направлены на создание электронных образовательных ресурсов интегративного характера, разработку междисциплинарных программ практической подготовки, а также на изучение долгосрочных эффектов интегративного обучения в профессиональной деятельности выпускников.

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ЭКОНОМИЧЕСКИЕ ИМПЕРАТИВЫ И МЕХАНИЗМЫ КОММЕРЦИАЛИЗАЦИИ РАДИОЛОКАЦИОННЫХ ТЕХНОЛОГИЙ ДВОЙНОГО НАЗНАЧЕНИЯ В УСЛОВИЯХ ИМПОРТОЗАМЕЩЕНИЯ

Аннотация. *В статье исследуются экономические механизмы трансформации научно-технических заделов оборонно-промышленного комплекса (ОПК) для нужд гражданского сектора экономики. Особое внимание уделяется радиолокационным системам (РЛС) как технологической платформе двойного назначения, обладающей высоким потенциалом коммерциализации в таких сферах, как интеллектуальные транспортные системы, беспилотная авиация, экологический мониторинг и промышленная безопасность. Предложена методика оценки экономической эффективности внедрения радиолокационных технологий в гражданский сектор, основанная на системе частных показателей и интегральном показателе эффективности, учитывающем коэффициент синергии накопленного интеллектуального капитала. Обоснована необходимость адаптационного проектирования и институциональных механизмов поддержки коммерциализации технологий двойного назначения.*

Ключевые слова: *радиолокация, технологии двойного назначения, импортозамещение, диверсификация ОПК, экономическая эффективность, инновации, технологический суверенитет.*

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ECONOMIC IMPERATIVES AND MECHANISMS FOR COMMERCIALIZATION OF DUAL-USE RADAR TECHNOLOGIES IN THE CONTEXT OF IMPORT SUBSTITUTION

Abstract. *This article examines the economic mechanisms for transforming the scientific and technical capabilities of the defense-industrial complex (DIC) to meet the needs of the civilian sector. Particular attention is paid to radar systems (RADs) as a dual-use technological platform with high commercialization potential in areas such as intelligent transport systems, unmanned aircraft, environmental monitoring, and industrial safety. A methodology for assessing the economic efficiency of implementing radar technologies in the civilian sector is proposed, based on a system of partial indicators and an integrated performance*

indicator that takes into account the synergy coefficient of accumulated intellectual capital. The need for adaptive design and institutional mechanisms to support the commercialization of dual-use technologies is substantiated.

Keywords: *radar, dual-use technologies, import substitution, defense industry diversification, economic efficiency, innovation, technological sovereignty.*

В современных условиях глобальной технологической конкуренции обеспечение технологического суверенитета становится одним из ключевых факторов устойчивого экономического развития. Для государств с развитым оборонно-промышленным комплексом важным направлением является диверсификация оборонных производств и интеграция военных технологий в гражданскую экономику.

Одним из наиболее перспективных направлений такого технологического трансфера выступают радиолокационные системы. Исторически радиолокация развивалась преимущественно в рамках военных программ, однако накопленный научно-технический потенциал позволяет эффективно использовать данные технологии и в гражданских секторах экономики, например, в интеллектуальных транспортных системах, системах мониторинга окружающей среды, промышленной автоматизации и беспилотной авиации [1].

Радиолокационные сенсорные системы способны решать широкий спектр задач: мониторинг транспортных потоков, управление беспилотными летательными аппаратами, контроль промышленной инфраструктуры, наблюдение за экологическими рисками, а также обеспечение безопасности критически важной инфраструктуры.

Несмотря на значительный потенциал применения, коммерциализация радиолокационных технологий сталкивается с рядом барьеров, среди которых высокая стоимость адаптации военных решений, институциональные ограничения, а также недостаточная разработанность экономических моделей оценки эффективности таких проектов. Это определяет актуальность разработки методологического подхода к оценке экономической эффективности внедрения радиолокационных технологий двойного назначения [2].

Рассмотрим методику оценки экономической эффективности. Для научно обоснованной оценки инвестиционной привлекательности проектов внедрения радиолокационных систем в гражданский сектор предлагается использовать двухуровневую систему показателей, включающую частные и интегральные показатели эффективности.

Рассматриваемая система частных показателей отражает различные аспекты экономической эффективности внедрения радиолокационных технологий и должна интерпретироваться не изолированно, а как взаимосвязанная совокупность факторов, формирующих конечный результат.

К числу частных показателей относятся: показатель снижения эксплуатационных издержек; коэффициент предотвращенного ущерба; показатель повышения операционной безопасности; показатель технологической синергии [3].

Рассмотрим, показатель снижения эксплуатационных издержек

$$E_{cost} = (C_{base} - C_{radar}) / C_{base} \quad (1)$$

где:

C_{base} – затраты до внедрения радара;

C_{radar} – затраты после внедрения радара.

Содержательно (E_{cost}) отражает операционную эффективность внедрения радиолокационной системы. Однако его значение не ограничивается прямой экономией затрат.

Во-первых, снижение эксплуатационных издержек часто сопровождается структурными изменениями в бизнес-процессах, включая сокращение доли ручного труда и переход к автоматизированным системам управления. Это, в свою очередь, ведет к уменьшению вероятности ошибок оператора и повышению устойчивости системы в долгосрочной перспективе.

Во-вторых, важно учитывать, что экономия затрат может носить нелинейный характер. На начальном этапе внедрения возможен рост расходов, связанный с адаптацией технологии, обучением персонала и интеграцией с существующей инфраструктурой. Следовательно, показатель (E_{cost}) должен анализироваться в динамике по периодам реализации проекта.

В-третьих, чрезмерная ориентация исключительно на снижение затрат может привести к недооценке качественных эффектов, таких как повышение точности мониторинга или расширение функциональности системы. Поэтому данный показатель целесообразно рассматривать как базовый, но не доминирующий.

Коэффициент предотвращенного ущерба определяется следующим образом:

$$E_{prev} = P \cdot L \quad (2)$$

где:

P – вероятность возникновения негативного события (например, аварии, столкновения или отказа системы);

L – стоимостная оценка потенциального ущерба.

Данный показатель является ключевым в условиях высокой неопределенности и отражает экономику управления рисками. То есть, данный показатель позволяет количественно оценить экономический эффект от предотвращения аварийных ситуаций благодаря применению радиолокационных систем мониторинга.

С теоретической точки зрения, E_{prev} представляет собой математическое ожидание потерь, которых удалось избежать благодаря внедрению технологии. Это означает, что даже при редких событиях (низкое P) показатель может быть значительным, если потенциальный ущерб (L) высок.

В системах промышленного и транспортного мониторинга данный показатель может играть доминирующую роль в структуре экономического эффекта, поскольку предотвращенный ущерб зачастую существенно превышает прямую экономию эксплуатационных затрат [3].

Особое значение этот показатель приобретает в следующих случаях:

эксплуатация критически важной инфраструктуры;

высокая стоимость единичного инцидента;

высокая социальная или экологическая цена ошибки.

Следует подчеркнуть, что в отличие от показателя затрат, E_{prev} носит вероятностный и прогностический характер, что требует использования методов риск-анализа и сценарного моделирования.

Кроме того, предотвращённый ущерб обладает свойством асимметричного влияния: один предотвращённый инцидент может компенсировать значительный объем инвестиций. Это делает данный показатель одним из наиболее значимых при обосновании проектов в сфере безопасности и мониторинга.

Следующий показатель – показатель повышения операционной безопасности:

$$E_{safe} = (N_{base} - N_{radar}) / N_{base} \quad (3)$$

где:

N_{base} – число инцидентов до внедрения радара;

N_{radar} – число инцидентов после внедрения радара.

Этот показатель отражает системную устойчивость объекта и имеет двойственную природу – как экономическую, так и организационную.

С одной стороны, снижение числа инцидентов приводит к прямой экономии ресурсов. С другой стороны, оно формирует долгосрочные институциональные эффекты, такие как:

повышение доверия со стороны пользователей и регуляторов;

снижение страховых издержек;

улучшение репутации предприятия.

Важно отметить, что показатель E_{safe} тесно связан с E_{prev} однако не тождественен ему. Если E_{prev} отражает стоимостной эффект риска, то E_{safe} характеризует частотную динамику событий.

В методическом плане это означает, что:

E_{safe} лучше отражает тренд устойчивости системы;

E_{prev} – масштаб потенциальных последствий.

Совместное использование этих показателей позволяет получить более полное представление о рисковом профиле проекта.

Еще один частный показатель – показатель технологической синергии α. Коэффициент синергии интеллектуального капитала представляет собой один из ключевых элементов предлагаемой методики, поскольку он отражает накопленный технологический потенциал предприятия.

Его экономическая природа заключается в эффекте:

повторного использования результатов НИОКР;

снижения затрат на разработку;

ускорения вывода продукта на рынок.

С методической точки зрения, коэффициент α выполняет роль мультипликатора эффективности, усиливая влияние всех остальных факторов.

Важно подчеркнуть, что значение α зависит не только от технологической базы, но и от:

организационной структуры предприятия;

доступности интеллектуальной собственности;

уровня кооперации внутри отрасли.

Таким образом, данный показатель отражает не только технологические, но и институциональные условия реализации проекта.

Теперь рассмотрим связь частных показателей, представленных выше, с интегральным показателем.

Интегральный показатель эффективности предлагается рассчитывать по модифицированной формуле чистого дисконтированного дохода:

$$E_{total} = \Sigma\ (CF_t \cdot (1 + \alpha) / (1 + r)^t) - I_0 \qquad (4)$$

где:

CF_t – денежный поток проекта в период t;

r – ставка дисконтирования;

I_0 – первоначальные инвестиционные затраты;

α – коэффициент синергии интеллектуального капитала.

Коэффициент синергии отражает экономический эффект, возникающий благодаря использованию ранее созданных технологических решений и результатов научно-исследовательских и опытно-конструкторских работ. Для предприятий радиоэлектронной промышленности данный коэффициент может принимать значения в диапазоне 0,1–0,3, что позволяет существенно снизить стоимость разработки новых гражданских продуктов на базе существующих военных технологий [4].

Интегральный показатель эффективности (4) фактически аккумулирует влияние частных показателей через денежные потоки CF_t.

При этом:

E_{cost} увеличивает CF_t за счет экономии затрат;

E_{prev} отражает эффект управления рисками;

E_{safe} характеризует устойчивость и надежность системы;

α усиливает эффект за счет накопленного потенциала.

Принципиально важно, что данные показатели не являются независимыми. Например:

снижение инцидентов (E_{safe}) приводит к росту предотвращённого ущерба (E_{prev});

использование существующих технологий (α снижает затраты E_{cost});

повышение точности системы одновременно влияет на все показатели.

Следовательно, методика должна учитывать синергетический эффект взаимодействия факторов, а не только их индивидуальные значения.

Для примера рассмотрим внедрение радиолокационной системы на транспортном объекте.

Исходные данные условно представим так:

затраты до внедрения: C_{base} = 12 млн. руб.

после внедрения: C_{radar} = 9 млн. руб.

вероятность аварии: P = 0,08

ущерб: L = 40 млн. руб.

число инцидентов: было 25, стало 10

коэффициент синергии: α = 0,2

Произведем расчет:

1. Снижение затрат: $E_{cost} = (12 – 9)/12 = 0,25$
2. Предотвращенный ущерб: $E_{prev} = 0,08 \cdot 40 = 3,2$ млн. руб.
3. Повышение безопасности: $E_{safe} = (25 – 10)/25 = 0,6$

Таким образом, снижение затрат на 25% указывает на значительный операционный эффект, однако он не является определяющим фактором эффективности. Предотвращённый ущерб в размере 3,2 млн. руб. демонстрирует, что даже при относительно низкой вероятности аварий экономический эффект может быть существенным. Это подтверждает целесообразность инвестиций в технологии мониторинга. Снижение числа инцидентов на 60% свидетельствует о качественном изменении уровня безопасности, что особенно важно для объектов с повышенными требованиями к надежности. Коэффициент синергии 0,2 указывает на наличие развитой технологической базы, позволяющей сократить издержки разработки и ускорить внедрение.

Совокупность полученных результатов показывает, что основная ценность проекта заключается не столько в снижении текущих затрат, сколько в снижении рисков и повышении устойчивости функционирования системы.

Таким образом, углубленный анализ частных показателей показывает, что эффективность внедрения радиолокационных систем формируется за счет комплексного взаимодействия операционных, риск-ориентированных и технологических факторов. При этом ключевую роль играет предотвращённый ущерб и повышение уровня безопасности, тогда как снижение эксплуатационных затрат выступает в качестве сопутствующего эффекта. Учет коэффициента синергии интеллектуального капитала позволяет дополнительно интегрировать в модель фактор технологического наследия, что особенно важно для оценки проектов двойного назначения.

После оценки экономической эффективности применения радиолокационных технологий двойного назначения, проведем сравнительный анализ сенсорных технологий. Для обоснования перспективности радиолокационных технологий в гражданском секторе

проведено сравнение РЛС с альтернативными сенсорными решениями, такими как лидарные и оптические системы наблюдения [5].

Из сравнения, приведенного в таблице 1 видно, что радиолокационные сенсоры обладают существенными преимуществами при эксплуатации в неблагоприятных погодных условиях, а также при необходимости обеспечения высокой надежности мониторинговых систем.

Таблица 1.

Сравнение РЛС с альтернативными сенсорными решениями

Критерий оценки	РЛС (Радары)	Лидарные системы	Оптические датчики
Работа в условиях тумана/пыли	Высокая стабильность	Критическое падение точности	Полная неработоспособность
Дальность детектирования	До 500 метров	Ограничена 150 метрами	Зависит от освещенности
Эксплуатационная надежность	Высокая (отсутствие оптики)	Средняя (чувствительность)	Низкая (загрязняемость)

В отличие от лидарных систем и видеонаблюдения, радиолокационные комплексы сохраняют стабильность детектирования объектов на дальностях до нескольких сотен метров и обладают высокой эксплуатационной надежностью благодаря отсутствию оптических элементов. Это делает радиолокационные технологии особенно перспективными для применения в транспортной инфраструктуре, промышленной автоматизации и системах безопасности.

Проведенное исследование показывает, что ключевым барьером коммерциализации технологий двойного назначения является структурный разрыв между военными стандартами разработки и требованиями гражданского рынка.

Военные системы традиционно проектируются с учетом экстремальных условий эксплуатации и повышенных требований к надежности, что приводит к значительному удорожанию конечного продукта. Попытка прямого переноса военных стандартов в гражданские решения может увеличивать стоимость продукции на 150-200 % [6].

Для преодоления данной проблемы необходима адаптация аппаратной части радиолокационных систем при сохранении уникальных алгоритмических решений обработки сигналов.

Существенную роль играют и макроэкономические факторы. Высокая стоимость заемного капитала увеличивает сроки окупаемости проектов в радиоэлектронной промышленности. В этой связи важным инструментом стимулирования коммерциализации технологий может стать государственное софинансирование на стадии адаптационного проектирования.

Отдельным ограничением являются институциональные барьеры, связанные с режимом секретности и ограничениями доступа к результатам интеллектуальной деятельности. Развитие гибких механизмов

лицензирования внутри отраслевых холдингов может значительно ускорить процесс трансфера технологий.

Коммерциализация радиолокационных технологий двойного назначения представляет собой важный инструмент диверсификации оборонно-промышленного комплекса и формирования новых высокотехнологичных рынков.

В результате проведенного исследования предложена методика оценки экономической эффективности внедрения радиолокационных технологий, основанная на частном и интегральном показателях эффективности с учетом коэффициента синергии интеллектуального капитала.

Для повышения эффективности коммерциализации технологий двойного назначения рекомендуется:

внедрение экономических моделей оценки проектов на ранних стадиях разработки;

развитие механизмов государственно-частного партнерства в сфере радиоэлектроники;

создание экспериментальных регуляторных режимов для тестирования новых технологических решений;

стимулирование передачи результатов НИОКР из оборонного сектора в гражданскую экономику.

Реализация данных мер позволит повысить точность стратегического планирования и обеспечить устойчивый рост высокотехнологичного экспорта.

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ПАСХА И НАВРУЗ: СРАВНИТЕЛЬНЫЙ АНАЛИЗ ПРАЗДНИКОВ ВЕСЕННЕГО ОБНОВЛЕНИЯ

Аннотация. *В данной статье проводится междисциплинарное сравнительное исследование двух фундаментальных праздников - христианской Пасхи и восточного Навруза. Автором подробно анализируются исторические пласты, обрядовые комплексы и семантическая нагрузка праздничной атрибутики. Особое внимание уделяется архетипическому сходству ритуалов, связанных с культом плодородия и обновления. В результате исследования делается вывод о том, что, несмотря на разные религиозные векторы, оба праздника базируются на единой идее торжества жизни над смертью и циклического возрождения бытия.*

Ключевые слова: *Пасха, Навруз, весеннее равноденствие, литургический цикл, сумаляк, символика яйца, культурная идентичность, сотериология, зороастризм, обновление.*

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EASTER AND NAVRUZ: COMPARATIVE ANALYSIS OF SPRING RENEWAL HOLIDAYS

Abstract. *This article provides an interdisciplinary comparative study of two fundamental holidays - Christian Easter and Eastern Nowruz. The author analyzes in detail historical layers, ritual complexes, and semantic significance of holiday attributes. Particular attention is paid to the archetypal similarity of rituals associated with the cult of fertility and renewal. As a result of the study, it is concluded that despite different religious vectors, both holidays are based on a single idea of the triumph of life over death and the cyclic rebirth of existence.*

Keywords: *Easter, Nowruz, spring equinox, liturgical cycle, sumalak, egg symbolism, cultural identity, soteriology, Zoroastrianism, renewal.*

Введение

Празднично-обрядовая культура является важнейшим индикатором духовного состояния этноса. В ряду древнейших торжеств человечества особое место занимают Пасха и Навруз. Несмотря на разную

конфессиональную принадлежность, эти праздники синхронизированы с природным циклом весеннего пробуждения. Исследование их типологической близости позволяет выявить универсальные культурные коды, которые объединяют народы Востока и Запада в их стремлении к гармонии и духовному преображению [3, с. 47].

Объект исследования: Историко-культурные и религиозные системы праздников Пасхи и Навруза.

Предмет исследования: Семантическая близость и функциональные различия в ритуальных практиках весеннего цикла.

Материалы и методы исследования

В основе исследования лежит междисциплинарный подход, объединяющий методы сравнительно-исторического, культурологического и семиотического анализа. В качестве эмпирической базы использованы религиозные тексты, исторические источники, этнографические описания и современные научные публикации, отражающие особенности праздников Пасхи и Навруза. Метод сравнительного анализа позволил выявить сходства и различия в ритуальных практиках, символике и семантическом наполнении данных праздников.

Семиотический метод применялся для интерпретации ключевых символов (яйцо, проросшее зерно, сумаляк) как носителей культурных значений. Историко-генетический подход использовался для прослеживания происхождения и эволюции обрядов в контексте религиозных и природных циклов.

Дополнительно применялся метод контент-анализа научной литературы и нормативных документов, что позволило систематизировать существующие научные позиции и выявить универсальные культурные коды, отражающие идею обновления и возрождения в разных традициях.

Результаты исследования

Пасха (Воскресение Христово) - центральное событие христианского мира. Термин «Пасха» восходит к древнееврейскому «Песах», что означает «прохождение мимо». В христианском контексте этот смысл трансформировался в переход от рабства греха к свободе вечной жизни [1, с. 1102].

Основным символом праздника является **яйцо**. В народном сознании оно воплощает идею скрытой жизни, которая в назначенный срок прорывает мертвую оболочку. Окрашивание яиц в красный цвет символизирует кровь Христа и радость воскресения. Кулич, как высокая выпечка, отражает антропоморфную идею «тела» общины, собранной вокруг сакральной идеи спасения. Литургическая сторона праздника (бдение, крестный ход) направлена на психологическую разрядку после долгого периода воздержания, что подчеркивает идею духовного обновления.

Навруз, чье название буквально переводится как «Новый день», отмечает астрономическое начало весны. Это праздник, лишенный узкорелигиозного догматизма, но пронизанный глубокой натурфилософией.

Согласно трудам Абу Райхана Беруни, Навруз - это момент, когда природа выходит из состояния покоя и обретает новую жизненную силу [2, с. 214].

Центральным элементом праздника выступает **сумаляк** - блюдо из проросших зерен пшеницы. Процесс его приготовления представляет собой коллективный ритуал, объединяющий женщин общины. Проросшее зерно - это живая метафора вечности, передающая идею того, что жизнь никогда не прекращается, а лишь меняет форму. Навруз в Центральной Азии сегодня - это не только дань предкам, но и символ государственного единства, что подтверждается официальными актами Республики Узбекистан [5].

При детальном изучении можно выделить несколько ключевых параллелей, которые делают эти праздники родственными на уровне народной психологии:

1. Перед Пасхой верующие соблюдают «Чистый четверг», который предполагает не только физическую уборку дома, но и очищение помыслов. В традиции Навруза существует аналогичный обычай - перед праздником необходимо очистить арыки, высадить деревья и помириться со всеми, с кем были конфликты. Эти действия направлены на обнуление прошлых ошибок и начало нового цикла в состоянии чистоты.
2. В обоих праздниках важную роль играют проростки и семена. В Наврузе это *сабза* (проросшая пшеница), в некоторых восточнохристианских традициях к Пасхе также принято проращивать зерна для украшения стола. Это наглядная демонстрация победы весны над зимой, света над тьмой.
3. Оба праздника невозможны в одиночестве. Они требуют коллективного участия: совместных трапез, одаривания соседей, посещения родственников. Это укрепляет социальный капитал общества и формирует чувство сопричастности к общей культурной традиции.

Дискурс различий: Религия против Природы

Несмотря на сходство форм, содержание праздников имеет существенные отличия:

- **Пасха** — это в первую очередь событие **религиозное**, связанное с конкретной исторической Личностью и актом божественного спасения.
- **Навруз** носит более **светский и этнический** характер, будучи привязанным к природному календарю и универсальным законам космоса.

Если Пасха ориентирует человека на жизнь после смерти, то Навруз призывает к полноте жизни здесь и сейчас, в гармонии с земными циклами. Исследователи подчеркивают, что именно эта диалектика позволяет обоим праздникам дополнять друг друга в поликультурном пространстве [4, с. 114].

Заключение

Пасха и Навруз представляют собой две грани великой человеческой надежды на возрождение. Проведенный анализ доказывает, что идея обновления жизни является универсальной для человечества, независимо от географии или вероисповедания. Понимание этих глубоких связей способствует укреплению межкультурного диалога и снижению конфликтного потенциала в современном многонациональном мире. Оба

праздника, сохраняя свою уникальную специфику, продолжают оставаться мощными источниками духовной силы для миллионов людей.

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СОВЕРШЕНСТВОВАНИЕ ТЕХНОЛОГИИ ПРОИЗВОДСТВА НОВЫХ ВИДОВ КОНСЕРВИРОВАННОЙ ПРОДУКЦИИ ИЗ ПЛОДОВ СМОРОДИНЫ

АННОТАЦИЯ. *В данной статье научно анализируются вопросы совершенствования технологии производства новых видов консервированной продукции из плодов боярышника (Crataegus spp.). В ходе исследования были изучены химический состав плодов боярышника, биологически активные вещества, а также их пищевая и функциональная значимость. Кроме того, была проведена оценка влияния процессов подготовки сырья, измельчения, бланширования, фасовки и стерилизации на качество готовой продукции. Результаты исследования показали, что новые виды консервированной продукции, изготовленные из плодов боярышника, обладают высокой пищевой ценностью, при этом в их составе сохраняются антиоксидантные вещества, витамины и минеральные элементы. Усовершенствованная технология способствует улучшению вкусовых качеств продукции, её биологической ценности и увеличению срока хранения. Также обоснована возможность производства функциональных пищевых продуктов на основе данной технологии.*

Ключевые слова:. *плоды боярышника, консервированная продукция, технология переработки, стерилизация, биологически активные вещества, антиоксиданты, пищевая ценность, функциональные продукты питания.*

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IMPROVEMENT OF TECHNOLOGY FOR THE PRODUCTION OF NEW TYPES OF CANNED CURRANT FRUIT PRODUCTS

ANNOTATION. *This article scientifically analyzes the issues of improving the technology for the production of new types of canned products from hawthorn fruits (Crataegus spp.). During the study, the chemical composition of hawthorn fruits, their biologically active compounds, as well as their nutritional and functional significance were investigated. In addition, the influence of raw material preparation, grinding, blanching, packaging, and sterilization processes*

on product quality was evaluated. The results of the study showed that new types of canned products made from hawthorn fruits have high nutritional value, while antioxidant compounds, vitamins, and mineral elements are preserved in their composition. The improved technology contributes to enhancing the taste, biological value, and shelf life of the product. The possibility of producing functional food products based on this technology was also substantiated.

Keywords: *hawthorn fruits, canned products, processing technology, sterilization, biologically active compounds, antioxidants, nutritional value, functional foods.*

Введение

Сегодня в нашей стране развивается выращивание и переработка лекарственных растений в хозяйствах различных форм собственности с целью обеспечения фармацевтической промышленности растительным сырьем. Некоторые виды боярышника также произрастают в диком виде в Узбекистане и выращиваются в научных учреждениях. Вах различных форм собственности с целью обеспечения фармацевтической промышленности растительным сырьем. Однако в настоящее время количество видов лекарственных растений, выращиваемых в промышленных масштабах, относительно невелико, и одной из актуальных задач является совершенствование технологий их выращивания и переработки. Некоторые виды боярышника также произрастают в диком виде в Узбекистане и выращиваются в научных учреждениях. В частности, в Ташкентском ботаническом саду создана богатая коллекция, насчитывающая более 90 видов боярышника, многие из которых завезены из Северной Америки. В настоящее время одним из перспективных направлений является переработка плодов боярышника и производство из них различных пищевых продуктов, в том числе консервов. Богатство плодов боярышника биологически активными веществами позволяет использовать их в качестве важного сырья при производстве функциональных продуктов питания. Поэтому разработка и совершенствование технологии производства новых видов консервов из плодов боярышника имеет важное научное и практическое значение.

Анализ литературы по теме

В последние годы глубокое изучение лекарственных растений и вопросы их использования в пищевой и фармацевтической промышленности стали одним из основных направлений многих научных исследований этом отношении боярышник (Crataegus spp.) растение занимает особое место в научных исследованиях благодаря своему химическому составу, богатству биологически активными веществами и положительному влиянию на здоровье человека. Нии боярышник (Crataegus spp.) растение занимает особое место в научных исследованиях благодаря своему химическому составу, богатству биологически активными веществами и положительному влиянию на здоровье человека. Анализ литературы показывает, что, хотя

химический состав и лечебные свойства плодов боярышника достаточно изучены, исследований по совершенствованию технологии производства новых видов функциональных консервов из него пока недостаточно. Поэтому разработка и совершенствование технологии производства нового вида консервов из плодов боярышника, богатых биологически активными веществами, имеет важное научное и практическое значение.

Цель исследования

Основной целью данного исследования является изучение боярышника (Crataegus spp.) исследования изучается химический состав плодов боярышника, биологически активные вещества и степень их сохранности в процессе переработки. Целью исследования является создание эффективной технологии производства консервированного боярышника, богатого биологически активными веществами, обладающего высокой пищевой ценностью и длительным сроком хранения. Процессе переработки. Также предполагается определить влияние процессов подготовки сырья, измельчения, бланширования, упаковки и стерилизации на качество продукции, а также установить оптимальные технологические режимы. Целью исследования является создание эффективной технологии производства консервированного боярышника, богатого биологически активными веществами, обладающего высокой пищевой ценностью и длительным сроком хранения.

Результаты эксперимента

Боярышник (Crataegus spp.) плоды богаты биологически активными веществами, из которых можно делать варенье, компоты, пюре и другие консервы. Поэтому к качеству сырья предъявляются высокие требования при его переработке и производстве консервов. Качество плодов боярышника оценивается в соответствии с государственными стандартами (ГОСТ) и техническими условиями. Поэтому к качеству сырья предъявляются высокие требования при его переработке и производстве консервов. Качество плодов боярышника оценивается в соответствии с государственными стандартами (ГОСТ) и техническими условиями.

Требования к сырью

Плоды боярышника должны соответствовать следующим требованиям: быть свежими и спелыми, не иметь признаков вредителей и гниения, быть одинакового размера и не иметь механических повреждений. Не должно быть гнилых, заплесневелых или зараженных вредителями фруктов. Не должно быть посторонних примесей (листьев, веток, почвы).

Таблица 1

Органолептические показатели

Показатель	Требование
Цвет	Красный или желтый, характерный для сорта
Вкус	Кисло-сладкий, характерный
Запах	Естественный запах, характерный для доланы
Консистенция	Плотная и цельная

Для приготовления консервов из плодов боярышника использовался сорт желтого боярышника, выращиваемый в Наманганской области. Технологический процесс состоит из нескольких технологических этапов. Этот процесс направлен на сохранение качества сырья, максимальное сохранение биологически активных веществ и обеспечение длительного срока хранения продукта.

Таблица 2

Рецепт приготовления боярышника на 1 кг готового продукта

Сырье	Количество
Плоды боярышника	600 г
Сахар	350 г
Вода	300 мл
Лимонная кислота	1-2 г
Ванилин (по желанию)	0,5 г

Таблица 3

Таблица лабораторных анализов

№	Показатель	Метод определения	Норма
1	Сухое вещество	Рефрактометр	20–30 %
2	Содержание сахара	Метод Фелинга	10–18 %
3	Органические кислоты	Титриметрический метод	1–3 %
4	Витамин С	Йодометрический метод	30–100 mg/100 g
5	Индикатор pH	pH-метр	3.2–3.8
6	Микробиологические показатели	Метод Петри Соответствует норме	Соответствует норме
7	Тяжелые металлы	Спектрометрический метод	В пределах нормы СанПиН

Рисунок 1. Плоды боярышника и переработанная банка боярышника

Таблица 4

Влияние экстракта боярышника на сердечно-сосудистые показатели (на основе 30-дневной лабораторной модели)

Показатель	Контрольная группа	Экспериментальная группа	Изменение (%)
Систолическое давление(мм рт. ст.)	145	130	↓ 10%
Систолическое давление (мм рт. ст.)	90	82	↓ 9%
Частота сердечных сокращений (уд/мин)	88	76	↓ 13%
Холестерин (ммоль/л)	6.2	5.1	↓ 17%

Вывод

Проведенные исследования показали, что боярышник (Crataegus spp.) технология производства консервов из плодов изучена и усовершенствована на научной основе. Основании результатов эксперимента определены оптимальные технологические режимы производства консервов из боярышника. В том числе, флавоноиды, витамины, органическими кислотами и минералами, которые имеют важное значение для организма человека. На основании результатов эксперимента определены оптимальные технологические режимы производства консервов из боярышника. В частности, установлено, что бланширование фруктов при температуре 90-95°C в течение 3-5 минут и стерилизация при температуре 100°C в течение 15-20 минут являются наиболее оптимальным режимом для сохранения качества продукции и обеспечения микробиологической безопасности.

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ЗНАЧЕНИЕ ТЕПЛОВОГО ИЗЛУЧЕНИЯ В МЕДИЦИНЕ

Аннотация: *Тепловое излучение, или радиация, лучи — это процесс высвобождения энергии в виде электромагнитных волн, зависящий от температуры всех тел. Такие явления широко используются в медицине в диагностике, лечении и физиотерапии. В статье анализируются физические основы теплового излучения, его воздействие на человеческий организм и практическое применение в современной медицине.*

Ключевые слова: *тепловое излучение, инфракрасные лучи, термография, физиотерапия, радиация, диагностика.*

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THE IMPORTANCE OF THERMAL RADIATION IN MEDICINE

Abstract: *Thermal radiation, or radiation, is the process of releasing energy in the form of electromagnetic waves, dependent on the temperature of all bodies. Such phenomena are widely used in medicine for diagnosis, treatment, and physiotherapy. This article analyzes the physical principles of thermal radiation, its effects on the human body, and its practical application in modern medicine.*

Keywords: *thermal radiation, infrared rays, thermography, physiotherapy, radiation, diagnostics.*

Введение

Тепловое излучение (радиоволны, микроволны, инфракрасные лучи, видимые лучи, ультрафиолетовые лучи, рентгеновские лучи и гамма-лучи) — это электромагнитное излучение, испускаемое в зависимости от температуры тела, то есть, если температура любого тела выше 0 градусов, оно излучает тепло, и это излучение проявляется преимущественно в инфракрасном диапазоне. Любой живой организм, включая человеческий, постоянно излучает тепловое излучение.

В области медицины явление теплового излучения имеет большое значение для определения физиологических процессов в организме, диагностики и лечения заболеваний на ранней стадии. В частности, развитие современных технологий — тепловизоров, инфракрасных камер и лазерных устройств — еще больше расширило эту область.

Основная часть

1. О физических основах теплового излучения:

Тепловое излучение присуще всем телам, и по мере повышения их температуры его интенсивность возрастает, а длина волны уменьшается. Этот процесс описывается следующими основными законами:

законом Стефана-Больцмана, законом смещения Вина, законом Кирхгофа.

Основная часть теплового излучения находится в инфракрасном диапазоне, который проникает глубоко в человеческое тело. Это позволяет эффективно использовать его в медицине.

2. Диагностическое применение в медицине

Одним из важнейших методов, основанных на тепловом излучении, является термография. Термография — это метод определения распределения температуры на поверхности организма, который осуществляется с помощью инфракрасных камер.

Преимущества термографии:

• неинвазивный метод (не наносит вреда организму)
• безболезненный метод
• дает быстрые результаты
• позволяет проводить раннюю диагностику

Области применения:

• онкология (выявление опухолей)
• ангиология (нарушения кровообращения)
• неврология
• травматология

Например, при заболеваниях, то есть в областях с воспалительными процессами, температура повышается, и это определяется с помощью термографии.

3. Тепловое излучение в физиотерапии

Тепловое излучение широко используется в медицине, то есть в физиотерапии. В частности, очень эффективен метод лечения с использованием инфракрасных лучей.

Основные механизмы действия:

• улучшает кровообращение
• расслабляет мышцы
• уменьшает боль
• ускоряет метаболизм

Случаи применения:

• артрит и артроз
• мышечные спазмы
• невралгия
• восстановление после травмы

Инфракрасные лучи проникают глубоко в ткани через кожу, создавая тепловой эффект и ускоряя процессы регенерации.

4. Современные технологии и инновации

Сегодня разрабатываются следующие технологии, основанные на тепловом излучении:

• Системы термовизуальной диагностики
• Инфракрасная лазерная терапия
• Устройства дистанционного мониторинга
• Тепловой анализ на основе искусственного интеллекта

С помощью этих технологий расширяются возможности раннего выявления заболеваний и разработки индивидуальных стратегий лечения.

Заключение

Тепловое излучение имеет большое значение в медицине и широко используется как безопасный и эффективный метод. Однако существуют некоторые ограничения:

• влияние внешней температуры
• сложность интерпретации результатов
• необходимость в высокоточном оборудовании

Тем не менее, современные технологии уменьшают эти недостатки.

Тепловое излучение является важным диагностическим и терапевтическим инструментом в медицине. Его неинвазивность, безопасность и эффективность делают его неотъемлемой частью современной медицины. В будущем ожидается дальнейшее расширение его применения за счет интеграции с искусственным интеллектом и цифровыми технологиями.

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ФЕНОМЕН ДИСКУРСА: ЛИНГВИСТИЧЕСКИЙ АНАЛИЗ НА ОСНОВЕ ВЗГЛЯДОВ СОССЮРА И ХАРРИСА

Аннотация: *В данной статье рассматриваются научные основы теории дискурса, этапы её формирования и её место в современной лингвистике. Анализируются различия между понятиями «дискурс» и «текст», а также на основе теории Ф. де Соссюра о langue и parole и взглядов З. Харриса на дискурс-анализ раскрываются лингвистические, социальные и коммуникативные особенности дискурса. Кроме того, прагматическая и социолингвистическая сущность дискурса обосновывается на примерах.*

Ключевые слова: *дискурс, текст, лингвистика, Соссюр, langue, parole, З. Харрис, дискурс-анализ, прагмалингвистика, социолингвистика, коммуникативный процесс, структурализм.*

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THE PHENOMENON OF DISCOURSE: A LINGUISTIC ANALYSIS BASED ON THE VIEWS OF SAUSSURE AND HARRIS

Annotation: *This article presents the scientific foundations of discourse theory, its stages of development, and its role in modern linguistics. The differences between the concepts of discourse and text are analyzed, and based on F. de Saussure's theory of langue and parole as well as Z. Harris's approach to discourse analysis, the linguistic, social, and communicative features of discourse are discussed. The pragmatic and sociolinguistic nature of discourse is also explained through examples.*

Keywords: *discourse, text, linguistics, Saussure, langue, parole, Z. Harris, discourse analysis, pragmalinguistics, sociolinguistics, communicative process, structuralism.*

Теория дискурса является одним из важнейших объектов исследования современной лингвистики, социолингвистики и прагмалингвистики. Она изучает речь не только как систему языковых единиц, но и как социальное, культурное и коммуникативное явление. Иными словами, дискурс — это не «сухая структура» языка, а сложная система, связанная с реальными процессами общения, отношениями участников и целями высказывания. Формирование понятия дискурса является длительным научно-историческим

процессом, тесно связанным со структурализмом, функциональной лингвистикой и современными направлениями дискурс-анализа.

В лингвистике понятия «текст» и «дискурс», хотя и близки, имеют различия в содержании и функции. Текст обычно рассматривается как завершённая языковая единица в устной или письменной форме, обладающая грамматической и логической связностью. Например, абзац учебника, газетная статья или фрагмент художественного произведения являются текстами.

Дискурс же является более широким понятием, включающим не только языковые единицы, но и условия их употребления, цели говорящего, отношения между собеседниками, социальную ситуацию и культурный контекст. Иными словами, текст — это продукт, а дискурс — процесс.

Например, предложение «Закройте дверь» в разных ситуациях формирует разные типы дискурса:

– в классе — педагогический дискурс;

– в операционной — профессионально-медицинский дискурс;

– дома — семейно-воспитательный дискурс.

Таким образом, одна и та же языковая единица приобретает различные значения в зависимости от социального контекста, что отражает прагматическую и социальную природу дискурса.

Ещё один пример — выражение «Поздравляю вас»:

– в официальной обстановке — официальный дискурс;

– среди друзей — неформальный эмоциональный дискурс;

– в интернете — цифровой коммуникативный дискурс.

Следовательно, в анализе дискурса внимание уделяется не только структуре предложения, но и тому, кто, кому, в какой ситуации и с какой целью его произносит.

Таким образом, основное различие между текстом и дискурсом заключается в том, что текст является статической языковой единицей, тогда как дискурс представляет собой динамический социально-коммуникативный процесс.

В формировании теории дискурса важную роль сыграли идеи швейцарского лингвиста Фердинанда де Соссюра [1]. Он считается основателем структурализма в лингвистике. Соссюр разделил язык на два аспекта — *langue* (языковая система) и *parole* (речь).

Langue представляет собой общественную и устойчивую систему языка, включающую грамматические правила и словарный состав. *Parole* — это индивидуальная реализация языка в речи.

Например, правило приветствия относится к *langue*, а конкретные выражения «Здравствуйте, учитель!» или «Привет, друг!» относятся к *parole*.

Согласно Соссюру, дискурс тесно связан с *parole*, поскольку он отражает реальное использование языка. Например, предложение «Приглашаем вас на собрание» в зависимости от контекста может принадлежать официальному деловому дискурсу.

Значительный вклад в развитие дискурс-анализа внес американский лингвист Зеллиг Харрис [2]. В 1950-х годах он ввёл термин «discourse analysis» и обосновал необходимость изучения языка выше уровня предложения.

По его мнению, смысл формируется не в отдельном предложении, а в их последовательности и контексте. Например, предложения «Закройте дверь. Холодно. Дети могут простудиться» образуют единый дискурс предупреждения и заботы.

Харрис рассматривал дискурс как взаимосвязь грамматической структуры и социального контекста. Его исследования заложили основу для развития прагмалингвистики и социолингвистики.

Теория дискурса является одной из ключевых направлений современной лингвистики. Она рассматривает язык не только как систему, но и как социально-коммуникативный процесс. Различие между текстом и дискурсом позволяет глубже понять динамическую природу языка.

Идеи Ф. де Соссюра и З. Харриса сыграли важную роль в формировании научной базы дискурс-анализа. В целом, теория дискурса раскрывает взаимосвязь языка, общества и мышления и занимает важное место в современной лингвистической науке.

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ПОДХОДЫ К ОЦЕНКЕ ЭФФЕКТИВНОСТИ КОМАНДООБРАЗОВАНИЯ

Аннотация: *Необходимость в измерении того, насколько создание рабочих групп отражается на повседневной работе и на финансовых результатах, в последнее время резко выросла. Именно этот запрос со стороны бизнеса и определяет актуальность нашего исследования. В рамках статьи не только перечислены ключевые оценочные показатели для мероприятий по командообразованию, но и предложены конкретные инструменты, пригодные для сбора сведений в ходе такой оценки.*

Ключевые слова: *персонал, управление персоналом, предприятие, командообразование, эффективность, оценка эффективности.*

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APPROACHES TO ASSESSING THE EFFECTIVENESS OF TEAM BUILDING

Abstract: *The relevance of this research topic stems from the growing need for organizations to quantitatively and qualitatively assess the impact of working group creation on operational and financial performance. This article examines metrics for evaluating teambuilding activities and proposes tools for collecting data during the evaluation process.*

Keywords*: personnel, personnel management, enterprise, team building, efficiency, performance evaluation.*

Интерес к пристальному изучению того, как строятся и работают команды, сегодня подогревается сразу несколькими факторами. Среди них — реформа социально-экономического устройства страны. Далее — то, что человеческие ресурсы теперь играют куда более значимую роль в текущей деятельности предприятий. Ещё один фактор — постоянное усложнение

взаимосвязей в предметном окружении. И наконец, противоречия внутри трудовых коллективов, которые регулярно перерастают в конфликты между сотрудниками.

Казалось бы, ценность командообразования для современных компаний очевидна. Однако на практике многие российские предприятия сталкиваются с серьёзными проблемами при внедрении этого инструмента. Данные консалтинговой фирмы «Экопси» показывают: 68 из каждых 100 запущенных корпоративных программ по сплочению коллективов не дают того результата, на который рассчитывали, и почти не влияют на то, как сотрудники работают. В чём же дело? Чаще всего корень неудач кроется не столько в самих тренингах или тимбилдингах, сколько в том, что внутри организации отсутствует поддерживающая среда. Без неё любые полученные знания и навыки просто негде применять.

В основе системного подхода к измерению эффективности командообразования лежат три исходных положения. Первое касается ответа на вопрос, ради чего вообще нужна оценка: с её помощью, в частности, можно подтвердить оправданность вложений в тимбилдинг и вычислить возврат на эти вложения — тот самый ROI. Второе — постоянная настройка: необходимо регулярно выявлять, какие мероприятия работают, какие нет, и на основе этого вносить правки в будущие программы. Третье — фиксация динамики: важно зафиксировать, в каком состоянии команда находилась до начала преобразований и каких результатов достигла по итогам.

Чтобы определить, насколько результативно прошло сплочение коллектива, применяют комплексную оценку, опирающуюся на два блока измерителей (рисунок 1).

Рисунок 1 – Метрики для оценки мероприятий

Рекомендуемые инструменты для сбора данных в процессе оценки мероприятий по командообразованию приведены в таблице 1.

Таблица 1.
Инструменты для сбора данных в процессе оценки мероприятий по командообразованию

Инструменты	Краткое описание
Анкеты и опросы (Google Forms, SurveyMonkey)	Быстро, анонимно, массово
Интервью и фокус-группы	Позволяют понять глубинные причины проблем
Наблюдение за командами	Как проходят встречи? Насколько активны чаты? Как часто коллеги добровольно помогают друг другу?
Анализ цифрового следа	Активность в корпоративных чатах Использование общих рабочих пространств
Метрики производительности	Анализ данных из CRM, систем управления проектами (Jira, Asana), таск-трекеров

Таким образом, сами по себе рекомендации не универсальны. Они превращаются в действенный инструмент повышения результативности организации только в том случае, если учесть два фактора: отраслевую и процессную специфику предприятия, а также степень сформированности командных навыков у его сотрудников. И это верно для любых многопрофильных компаний.

Успех в командообразовании не сводится к одноразовым тренингам. Гораздо более стойкий эффект приносит системная работа, которая ведётся без перерывов и охватывает сто процентов персонала. Регулярные мероприятия по командообразованию с обязательным участием всех категорий персонала дают более долгосрочный и надёжный прирост эффективности, чем инициативы разового характера.. Чтобы такие усилия действительно дали результат, нужны три условия: живое участие в процессах и начальников, и подчинённых; привязка содержания занятий к тому, чем компания занята здесь и сейчас; и наконец, органичное вписывание всех мероприятий в рамки существующей корпоративной культуры.

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ПРОБЛЕМЫ И ПЕРСПЕКТИВЫ МЕЛИОРАТИВНОГО ЗЕМЛЕДЕЛИЯ В СРЕДНЕЙ АЗИИ ЗА ПОСЛЕДНЕЕ ДЕСЯТИЛЕТИЕ

Аннотация: *Мелиоративное земледелие играет важную роль в обеспечении продовольственной безопасности стран Средней Азии. В условиях засушливого климата и ограниченности водных ресурсов развитие эффективных систем орошения и дренажа является одним из ключевых факторов устойчивого сельскохозяйственного производства. В статье рассматриваются основные проблемы мелиоративного земледелия в регионе за последнее десятилетие, включая деградацию почв, дефицит водных ресурсов, износ ирригационной инфраструктуры и последствия изменения климата. Особое внимание уделяется перспективным направлениям развития мелиорации, таким как внедрение водосберегающих технологий, модернизация ирригационных систем и совершенствование управления водными ресурсами.*

Ключевые слова: *мелиорация, орошаемое земледелие, водные ресурсы, засоление почв, ирригация, устойчивое сельское хозяйство, Центральная Азия.*

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PROBLEMS AND PROSPECTS OF LAND RECLAMATION AGRICULTURE IN CENTRAL ASIA OVER THE LAST DECADE

Abstract: *Reclamation agriculture plays an important role in ensuring food security in Central Asian countries. Due to the arid climate and limited water resources, the development of efficient irrigation and drainage systems is one of the key factors for sustainable agricultural production. The article analyzes the main problems of reclamation agriculture in the region over the past decade and outlines the prospects for its development.*

Keywords: *land reclamation, irrigated agriculture, water resources, soil salinity, irrigation, sustainable agriculture.*

Введение

Страны Средней Азии характеризуются аридными и полуаридными природно-климатическими условиями, что обусловливает высокую зависимость сельского хозяйства от искусственного орошения. Основные сельскохозяйственные культуры региона – хлопчатник, зерновые, овощные и кормовые культуры – выращиваются преимущественно на орошаемых землях. По оценкам специалистов, около 70–80 % сельскохозяйственной продукции региона производится именно на орошаемых территориях [1; 2].

Мелиоративное земледелие является важнейшим элементом аграрной экономики стран региона. Однако значительная часть мелиоративных систем была создана ещё в советский период и в настоящее время характеризуется высоким уровнем физического износа. Недостаточный уровень финансирования, несовершенство управления водными ресурсами и экологические проблемы существенно снижают эффективность функционирования ирригационных систем [3].

Одной из наиболее серьёзных проблем мелиоративного земледелия является дефицит водных ресурсов. Основными источниками водоснабжения региона являются трансграничные реки Амударья и Сырдарья, воды которых используются несколькими государствами [4]. Рост потребления воды в сельском хозяйстве, промышленности и энергетике усиливает конкуренцию за водные ресурсы.

Дополнительное влияние на водообеспеченность региона оказывает изменение климата. Наблюдается сокращение площади ледников в горах Тянь-Шаня и Памира, которые являются основными источниками питания рек Центральной Азии. По данным международных исследований, за последние десятилетия площадь некоторых ледников региона сократилась на 20–30 % [5].

Серьёзной экологической проблемой орошаемого земледелия остаётся засоление почв. Нерациональное использование оросительной воды, недостаточная эффективность дренажных систем и высокий уровень грунтовых вод способствуют накоплению солей в почве. Это приводит к

ухудшению свойств почвы, снижению её плодородия и уменьшению урожайности сельскохозяйственных культур [6].

Большинство ирригационных каналов, насосных станций и дренажных сооружений было построено несколько десятилетий назад. Их техническое состояние во многих случаях остаётся неудовлетворительным. Потери воды при транспортировке могут достигать 30–40 %, что значительно снижает эффективность использования водных ресурсов [7].

Перспективы развития мелиоративного земледелия связаны с внедрением современных водосберегающих технологий. Наиболее эффективными методами считаются капельное и дождевальное орошение, которые позволяют существенно снизить расход воды и повысить эффективность её использования [8].

Таблица 1.

Статистический анализ динамики мелиоративного состояния земель в Центральной Азии

(Динамика ключевых показателей, 2015 – 2025 гг.)

Показатель	2015 г.	2020 г.	2025 г. (оценка)	Изменение, %
Площадь орошаемых земель, млн га	8,5	8,7	8,9	+4,7
Доля засоленных земель, %	48	50	52	+8,3
Потери воды в каналах, %	40	35	30	–25,0
Использование водосберегающих технологий, %	10	18	28	+180
Объём водопотребления, км³/год	120	125	130	+8,3

Анализ представленных данных показывает несколько важных тенденций:

- Рост орошаемых земель (на ~4–5 %) свидетельствует о расширении сельскохозяйственного производства.
- Увеличение доли засоленных почв – тревожная тенденция, указывающая на недостаточную эффективность мелиоративных мероприятий.
- Снижение потерь воды с 40 % до 30 % связано с частичной модернизацией инфраструктуры.
- Быстрый рост водосберегающих технологий (почти в 3 раза) – ключевой позитивный тренд.
- Рост водопотребления усиливает нагрузку на ограниченные ресурсы региона.

Статистический анализ показывает, что несмотря на определённый прогресс (снижение потерь воды и внедрение технологий), в регионе сохраняются системные проблемы – прежде всего засоление почв и рост нагрузки на водные ресурсы. Это подтверждает необходимость комплексной модернизации мелиоративных систем.

Важным направлением развития является модернизация ирригационной инфраструктуры, включая реконструкцию каналов и внедрение автоматизированных систем управления водораспределением.

Это позволяет значительно сократить потери воды и повысить эффективность функционирования мелиоративных систем.

Заключение

Таким образом, мелиоративное земледелие является основой сельскохозяйственного производства стран Средней Азии. Однако регион сталкивается с рядом серьёзных проблем, включая дефицит водных ресурсов, деградацию почв и износ мелиоративной инфраструктуры. Решение данных проблем требует комплексного подхода, включающего модернизацию ирригационных систем, внедрение водосберегающих технологий и совершенствование управления водными ресурсами.

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АГРОТЕХНИЧЕСКИЕ И ЭКОНОМИЧЕСКИЕ АСПЕКТЫ ПОВТОРНОГО ПОСЕВА В УСЛОВИЯХ ЦЕНТРАЛЬНОЙ АЗИИ

Аннотация: *В статье рассматриваются теоретические и практические аспекты применения повторного посева в сельском хозяйстве стран Центральной Азии. Особое внимание уделено агротехническим условиям возделывания повторных культур, их влиянию на плодородие почвы и эффективное использование водных ресурсов. Также анализируются научные источники и обосновываются перспективы внедрения современных технологий в условиях ограниченности природных ресурсов региона.*

Ключевые слова: *Повторный посев, агротехнологии, плодородие почвы, орошение, сельское хозяйство, Центральная Азия, ресурсосбережение.*

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AGROTECHNICAL AND ECONOMIC ASPECTS OF DOUBLE CROPPING IN THE CONDITIONS OF CENTRAL ASIA

Abstract: *This article examines the theoretical and practical aspects of implementing double cropping in the agriculture of Central Asian countries. Special attention is given to the agrotechnical conditions for cultivating successive crops, their impact on soil fertility, and the efficient use of water resources. The article also analyzes scientific sources and justifies the prospects for introducing modern technologies under the constraints of the region's limited natural resources.*

Keywords: *Double cropping, agrotechnology, soil fertility, irrigation, agriculture, Central Asia, resource conservation.*

Введение

Современное развитие сельского хозяйства в странах Центральной Азии требует существенного повышения эффективности использования ограниченных земельных и водных ресурсов [1]. Это обусловлено как природно-климатическими особенностями региона, так и усиливающимся антропогенным воздействием на агроэкосистемы. Рост численности населения, урбанизация и увеличение потребности в продовольствии делают особенно актуальным внедрение интенсивных и ресурсосберегающих методов земледелия [2]. В этих условиях особое значение приобретает рациональное использование каждого гектара сельскохозяйственных угодий.

Одним из перспективных направлений интенсификации является повторный посев, позволяющий получать дополнительный урожай в течение одного вегетационного сезона [1]. Данная практика широко применяется в регионах с благоприятными климатическими условиями и достаточной продолжительностью безморозного периода. Повторный посев способствует более полному использованию природного потенциала, повышает общую продуктивность сельскохозяйственного производства и способствует укреплению продовольственной безопасности [3, 4]. Кроме того, он играет важную роль в адаптации сельского хозяйства к изменениям климата.

Анализ литературы

Современные научные исследования подчеркивают важность повторного посева как ключевого элемента устойчивого земледелия [1]. По мнению ряда авторов, внедрение данной технологии позволяет значительно повысить коэффициент использования пашни, что особенно важно в условиях ограниченности земельных ресурсов [2]. Кроме того, повторный посев способствует диверсификации сельскохозяйственного производства, снижая зависимость фермеров от одной культуры и тем самым уменьшая экономические риски.

В научной литературе также уделяется большое внимание вопросам рационального использования водных ресурсов, особенно в условиях аридного климата Центральной Азии [3]. Эффективное управление

орошением является критическим фактором успешного применения повторных посевов. Международные организации, в том числе FAO, активно продвигают внедрение ресурсосберегающих технологий, таких как минимальная обработка почвы, капельное орошение и использование адаптированных сортов культур [4].

Особое значение придается включению бобовых культур в севооборот. Исследования показывают, что такие культуры, как соя, маш, нут и фасоль, способствуют улучшению структуры почвы, увеличению содержания органического вещества и обогащению почвы азотом [5, 6]. Это, в свою очередь, снижает потребность в минеральных удобрениях и способствует экологизации сельского хозяйства.

Основная часть

Повторный посев представляет собой агротехнический прием, при котором после уборки основной культуры на том же участке в течение одного сезона высевается вторая культура [1]. В странах Центральной Азии наиболее распространенной практикой является посев вторичных культур после уборки озимой пшеницы, которая освобождает поля в начале лета [2]. Это создает благоприятные условия для выращивания скороспелых культур.

Эффективность повторного посева во многом зависит от строгого соблюдения агротехнических сроков, уровня обеспеченности влагой, плодородия почвы и правильного выбора культур [3]. Важным фактором является также использование современных сортов с коротким вегетационным периодом и высокой устойчивостью к засухе и высоким температурам.

К числу наиболее распространенных культур повторного посева относятся кукуруза, маш и другие бобовые культуры (соя, фасоль, нут), подсолнечник, картофель, а также овощные культуры — томаты, огурцы, перец и баклажаны [2, 5]. Эти культуры отличаются относительно коротким периодом вегетации и высокой экономической ценностью. Помимо этого, широко применяются кормовые и бахчевые культуры, такие как сорго, люцерна, арбуз и дыня, которые также способны давать хорошие урожаи при повторном выращивании [5, 6].

Агрономическая значимость повторного посева заключается в повышении общей продуктивности сельскохозяйственных угодий, улучшении структуры посевных площадей и повышении плодородия почвы. Особенно важно влияние бобовых культур, которые благодаря симбиотической фиксации азота способствуют естественному обогащению почвы [1, 5]. Это создает благоприятные условия для последующих культур и снижает нагрузку на окружающую среду.

С экономической точки зрения повторный посев позволяет значительно увеличить доходы сельхозпроизводителей за счет получения дополнительного урожая в течение одного года [2, 4]. Это особенно важно для фермерских хозяйств с ограниченными земельными ресурсами. Однако внедрение данной технологии связано и с рядом трудностей. К основным

проблемам относятся дефицит водных ресурсов, риск вторичного засоления почв, необходимость строгого соблюдения агротехнических требований и высокая зависимость от погодных условий [3, 6].

В последние годы особое внимание уделяется внедрению инновационных технологий, направленных на повышение эффективности повторного посева. К таким технологиям относятся системы капельного орошения, использование засухоустойчивых и скороспелых сортов, а также цифровые технологии мониторинга состояния почвы и растений [4, 6]. Применение данных решений позволяет оптимизировать использование ресурсов, снизить производственные риски и повысить устойчивость аграрного производства.

Заключение

Таким образом, повторный посев является эффективным инструментом интенсификации сельского хозяйства в странах Центральной Азии. Он способствует более рациональному использованию земельных и водных ресурсов, повышению урожайности и укреплению продовольственной безопасности региона. В условиях современных вызовов, связанных с изменением климата и ростом населения, значение данной технологии будет только возрастать.

Для дальнейшего развития повторного посева необходимо совершенствование агротехнологий, расширение научных исследований и активное внедрение инновационных решений в практику сельского хозяйства. Важную роль также играет государственная поддержка и повышение уровня знаний фермеров в области устойчивого земледелия.

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РОЛЬ ТВОРЧЕСТВА ШЕРМУХАММЕДА МУНИСА В ЛИТЕРАТУРНОЙ СРЕДЕ ХИВЫ

Аннотация: *В данной обзорной статье рассматривается роль творчества Шермухаммада Муниса в формировании и развитии литературной среды Хивы конца XVIII -начала XIX века. Анализируются основные жанры его поэтического наследия, тематическое разнообразие произведений и их идейно-художественные особенности . Особое внимание уделяется влиянию классической восточной литературы, в частности творчества Алишера Навои и других поэтов, на формирование эстетических взглядов Муниса. Исследование демонстрирует, что поэт выступал не только как творец, но и как наставник, оказавший значительное влияние на литературный процесс региона. Делается вывод о высокой культурной и исторической значимости его наследия.*

Ключевые слова. *Деван, «Первый Деван», «Мунис уль-Ушшак», газель, мухаммас, мусаддас, рубаи, туюк, кута, касыда, чистан.*

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THE ROLE OF SHERMUHAMMAD MUNIS'S WORK IN THE LITERARY ENVIRONMENT OF KHIVA

Abstract: *This review article examines the role of Shermuhammad Munis's work in the formation and development of the literary environment of Khiva in the late 18th and early 19th centuries. The main genres of his poetic legacy, the thematic diversity of his works, and their ideological and artistic features are analyzed. Particular attention is paid to the influence of classical Eastern literature, particularly the works of Alisher Navoi and other poets, on the development of Munis's aesthetic views. The study demonstrates that the poet acted not only as a creator but also as a mentor, significantly influencing the literary process in the region. It concludes that his legacy is of great cultural and historical significance.*

Keywords: *Devan, "First Dewan", "Munis ul-Ushshak", ghazal, mukhammas, musaddas, rubai, tuyuk, kuta, qasida, chistan.*

Введение

Шермухаммад Мунис (1778–1829) -один из великих представителей узбекской классической литературы, поэт, историк и переводчик. Его творчество сформировалось в культурной среде Хивского ханства и отражает социально-политическую жизнь, нравственные взгляды и эстетические вкусы своего времени.

Шермухаммад Мунис -выдающийся поэт, учёный и историк, живший и работавший в литературной среде Хивы в конце XVIII и первой четверти XIX веков. В своих произведениях он был свидетелем, обсуждал и описывал многие события и явления своего времени. Творчество Муниса отражает многие аспекты жизни: взгляды поэта на ханов, визирей и беков, шейхов и аскетов, поэтов и учёных, ремесленников и других трудящихся [1,3].

Материалы и методы исследования

В основе исследования лежит литературоведческий и историко-культурный подход к анализу творчества Шермухаммада Муниса. В качестве материалов использованы его поэтические сборники («Ильк диван», «Мунис уль-ушшак»), а также научные издания, посвящённые узбекской классической литературе и литературной среде Хивы.

Метод текстологического анализа применялся для изучения жанровых особенностей, образной системы и тематического содержания произведений поэта. Сравнительно-литературный метод позволил выявить влияние творчества восточных классиков, в частности Alisher Navoi, на формирование эстетических взглядов Муниса.

Историко-биографический метод использовался для рассмотрения связи творчества поэта с социально-культурным контекстом Хивинского ханства. Дополнительно применялся метод интерпретации художественного текста, направленный на раскрытие идейно-философского содержания произведений.

Комплексное применение данных методов позволило объективно оценить вклад Муниса в развитие литературной традиции региона.

Результаты исследования

Мунис при жизни написал два дивана. Первый называется «Ильк диван». Второй был составлен в 1813-1814 годах и назывался «Мунис уль-ушшак». Диван «Мунис уль-ушшак» начинается с предисловия. Он включает 8446 стихов поэта. Более 10 рукописей и литографий этого дивана хранятся в рукописном фонде Института востоковедения им. Абу Райхана Беруни Академии наук Узбекистана [2].

В собрании сочинений Муниса представлены произведения, написанные более чем в десяти классических жанрах, таких как газели, мухаммы, мусадды, рубаи, туюки, киа, касиды и чистан. Поэтическое наследие Муниса насчитывает около десяти тысяч стихов. Он творил практически во всех жанрах классической литературы. Мунис -поэт, писатель, историк, ученый и каллиграф. Его наследие в этих областях имеет огромную ценность. Мунис -творец, имеющий статус наставника для

развития талантов после себя и для совершенствования истории нашей литературы и культуры [3].

Творчество великих мастеров стало для Муниса уроком в достижении поэтического совершенства. Он подчеркнул это в своей газели, условно озаглавленной «Исповедь мастеров». В ней он перечислил десятки выдающихся деятелей искусства, таких как Низами, Джами, Хусрав, Ансари, Хафиз Ширози, Аттар, Фирдоуси, Хокани, Анвари, Ираки, Бедил, Навои, Кироми, и показал масштабы их влияния. Мунис особенно высоко ценит Навои. Он сочинил около десяти газелей. В них отчетливо видна близость мировоззрения учителя и ученика, умение передать соразмерные друг другу чувства, а также способность ученика быть не хуже учителя. Мунис всегда чувствует духовную поддержку Навои в сложной сфере творчества [3].

Если вы так поступите, вы будете несчастны, здесь нет места словам.

Кто в этом смысле является покровителем Навои?

Мунис стремился к положению Навои в мире поэзии. Он учился у его школы мастерства. В результате он пытался достичь той же глубины в поэзии, что и Навои. Он поднялся до статуса наставника в хивской литературной среде. Мунис даже видит вызов в сходстве их имен с именем своего наставника. Он обращает внимание на то, что его имя состоит из корней Шер и Мухаммад, а имя Навои -из Али и Шер.

Иными словами, Навой -путешественник по миру,
он -странник по пути смысла Мунисги,
нет никого, кроме него, говорят:
Это Шермухаммед, он - Алишер [2].

Хотя Мунис этого не признавал, влияние произведений Бабура также очевидно в его поэзии. Например, в газели поэта «Хануз» и газели Бабура, которая начинается со строки «Мое сердце подобно бутону цветка, оно подобно бутону цветка», мы видим, что они воспевают схожие и соразмерные чувства. В первом стихе лирический герой Муниса находится в том же душевном состоянии, что и лирический герой Бабура:

Бутоны распустились, но мое сердце все еще не открылось,
Мои воспоминания о соловье все еще не любят цветы [1].

В обеих газелях, несмотря на весну и цветение, лирический герой -влюблённый -несчастен. Причина этого -переселение. Однако, начиная со следующих стихов, оба поэта начинают проявлять свой собственный стиль и уникальные черты. В газели Бабура вступает образ влюблённого, и он комментирует своё печальное состояние. В газели Муниса лирические переживания усиливаются, и проявляется сильный драматизм. Он становится активной личностью -примером для народа Ушшака:

Я – урок для слабых среди слабых, брат мой.
Мое состояние до сих пор неясно.
Если Мунис захочет отправиться в очередное приключение,
не предупреждай его, он еще не вышел из себя.

Главная тема газелей Муниса -любовь. У поэта есть собственное толкование любви: «Хотя в большинстве газелей и рубаи любовь в форме метафор выражалась как проявление красоты, она не была лишена истинного смысла и реального знака этого смысла». Таким образом, как отмечал сам поэт, хотя его стихи на первый взгляд могут показаться метафорическими выражениями, они не лишены глубокого смысла внутри. У лирического героя поэта есть только одна истина. Это любовь. Все остальные действия кажутся ему эгоистичными, высокомерными и ложными. Он считает, что хитрость и лицемерие в деятельности отшельника -не что иное, как невежество.

Это не доказательство бесполезности знаний,

а доказательство их неэффективности.

Не приходи в мир аскетом в таком невежестве.

Главными героями произведений Муниса являются возлюбленный и любовница. Любовница представлена как угнетатель, а возлюбленный - как угнетённый.

О, этот угнетатель всё ещё убивает меня, угнетённого.

То есть, он всё ещё испытывает сто тысяч чувств к моей боли [1].

Заключение

Фактически, Мунис был королем мудрецов в литературных кругах своего времени. Шермухаммад Мунис Хорезми -один из мыслителей, занимавших статус наставника в литературной среде Хорезма. Информация о Мунисе, занимавшем уважаемое положение как творец, дошла до нас в тазкирах, исторических и художественных трудах. Мунис с уважением упоминается в тазкирах Ахмада Табиби «Маджмуат уш-шуаро», в «Биографиях поэтов и писателей Хивы» Лаффаси, а также в исторических трудах Огахи и Баяни.

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ПРОЕКТИРОВАНИЕ И РАЗРАБОТКА ЭЛЕКТРОННОЙ ПЛАТФОРМЫ ДЛЯ ПРЕПОДАВАНИЯ СТУДЕНТАМ ДИСЦИПЛИНЫ "НАНОТЕХНОЛОГИИ" В ПЕДАГОГИЧЕСКИХ ВУЗАХ

Аннотация. *В данной статье исследованы этапы проектирования электронной платформы предназначенной для преподавания дисциплины "Нанотехнологии" студентам в педагогических высших образовательных учреждениях. Полученные результаты показали, что предложенный методический подход эффективен в развитии методической компетентности студентов и формировании научного мышления в преподавании дисциплины "Нанотехнологии".*

Ключевые слова: *методическая компетентность, модель ADDIE, компьютерное моделирование, интерактивная платформа, образовательные технологии.*

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DESIGN AND DEVELOPMENT OF AN ELECTRONIC PLATFORM FOR TEACHING NANOTECHNOLOGY TO STUDENTS IN PEDAGOGICAL UNIVERSITIES

Abstract. *This article examines the design stages of an electronic platform for teaching nanotechnology in pedagogical higher education institutions. The results demonstrate that the proposed methodological approach is effective in developing students' methodological competence and fostering scientific thinking in teaching nanotechnology.*

Keywords: *methodological competence, ADDIE model, computer modeling, interactive platform, educational technologies.*

В Узбекистане проводится масштабная работа по дальнейшему повышению эффективности проводимых реформ, созданию условий для всестороннего и ускоренного развития государства и общества, модернизации и развитию всех сфер жизни, в том числе системы образования, укреплению материально-технической базы образовательных учреждений, совершенствованию системы подготовки педагогических кадров, созданию современной учебной лаборатории [1]. Современный этап

развития образования характеризуется поиском новых теорий и практик. Наш опыт преподавания дисциплины “Нанотехнологии” в педагогических высших учебных заведениях показывает, что будущие учителя физики, несмотря на то, что обладают достаточными теоретическими знаниями по этом дисциплины, сталкиваются с определенными трудностями в педагогической знаний, то есть в изложении сложного научного содержания в доступной для студентов форме, в его объяснении с помощью (визуальных и интерактивных) средств. Это обстоятельство способствует развитию методической компетентности будущих учителей [2].

Процесс создания программного обеспечения, предназначенного для преподавания Нанотехнологии, студентам должен осуществляться не на основе случайного или технического подхода, а опираясь на конкретные педагогические, методические и технологические требования. С этой точки зрения в рамках данной статьи в качестве методологической основы была выбрана модель ADDIE (*Analysis, Design, Development, Implementation, Evaluation*), являющаяся системной моделью образовательного дизайна при разработке программного обеспечения.

Этап Design (проектирование)

Первым и наиболее важным этапом модели ADDIE является этап анализа (Analysis), на котором комплексно изучаются дидактические, методические и технические аспекты преподавания дисциплины “Нанотехнологии”. Основной целью этапа анализа является выявление образовательных потребностей будущих учителей физики, анализ существующих проблем и научное обоснование требований к будущему программному обеспечению [3].

Этап Development (разработки)

Второй этап модели ADDIE - этап Design (проектирование) служит формированию педагогической и технологической концепции программного обеспечения, предназначенной для преподавания дисциплины “Нанотехнологии”. На этом этапе четко определяются цель, задачи, дидактическая структура и механизмы применения создаваемой платформы в учебном процессе.

Этап Implementation (внедрение)

Четвёртый этап модели ADDIE является этап, на основе которого разработанное программное обеспечение внедряется в реальный учебный процесс педагогических высших учебных заведений.

К числу широко используемых на международном уровне цифровых образовательных платформ в преподавании дисциплины “Нанотехнология” можно отнести платформы, разработанные Carl Wieman (США) (PhET Simulations) и созданные под руководством Gerhard Klimeck (США) (nanoHUB).

Платформа “PhET Simulations" направлена на интерактивное моделирование физических процессов, с помощью которого визуально и

динамически представлены различные физические явления, в том числе (квантовые и наноскопические процессы).

Платформа “NanoHUB" предлагает решить сложные научные проблемы, связанные с нанотехнологиями и квантовой механикой, включая компьютерное моделирование (туннельный эффект, наноразмерные структуры и наносистемы).

Таблица 1

Возможности и ограничения платформ PhET и nanoHUB в преподавании дисциплины"Нанотехнология" (сравнительный анализ)

Критерии анализа	Интерактивные симуляции PhET	nanoHUB	Разработано в рамках исследования
Направление обучения	Общая физика и естественные науки	Нанотехнологии и наносистемы	Дисциплина Нанотехнологии, адаптированная для студентов высшего педагогического образования
Языковая среда	Английский язык	Английский язык	Образовательный контент на узбекском и русском языках
Стилистическая направленность	Объяснительно-ориентированный	Научно-исследовательский и инженерно-ориентированный	Развитие методической компетентности будущих учителей физики
Возможности визуализации	2D/простые интерактивные модели	Сложные симуляции	3D анимации и педагогические упрощенные модели
Виртуальные лаборатории	Ограниченный	Доступно, но сложно	Виртуальные лаборатории, подходящие для рекомендуемого учебного процесса
Система оценки	Неполностью интегрированный	Нет независимой оценки	Модули тестирования, мониторинга и анализа
Возможности для учителя	Ограниченный	Предназначен для научных пользователей	Панель учителя, статистика и анализ
Соответствие Национальной учебной программе	Не адаптировано	Не адаптировано	Платформа, соответствующая ГОС и учебным планам

Этап Evaluation

Пятый этап создания модели ADDIE - этап Evaluation (оценка) направлен на определение эффективности использования программного обеспечения в преподавании дисциплины “Нанотехнологии”.

Выбор модели ADDIE в качестве методологической основы объясняется ее возможностями системного и поэтапного проектирования образовательного процесса в преподавании сложных дисциплин [4].

Современное программное обеспечение, предназначенное для преподавания дисциплины “Нанотехнологии”, играет важную роль в повышении эффективности образовательного процесса. В этом контексте разработанная в рамках исследования веб - платформа *(nanotechnology.uz*) представляет собой комплексную систему, реализующую интерактивную и индивидуализированную модель обучения, совместимую с цифровыми образовательными технологиями. Одной из главных особенностей этой платформы является внедрение индивидуальной системы аутентификации (логин и пароль) для пользователей. В частности, в систему внедрены такие функции, как модульное представление учебных материалов, контроль знаний посредством интерактивных тестов, визуальное моделирование сложных научных понятий с использованием анимации и симуляций [5, 6]. Платформа также оптимизирована с точки зрения пользовательского интерфейса (UI/UX) и основана на принципах простоты, интуитивности и функциональной гибкости.

Основные требования

1. Педагогическая совместимость:

- соответствие учебным планам и учебникам, утвержденным для высших педагогический учебных заведений;
- по дисциплине “Нанотехнологии”: полный охват таких тем, как Углеродные наноструктуры, Нанотехнологическое оборудование, Графен, Нанотрубка, Наносинтез;
- для каждой выбранной темы: созданы теоретический материал, интерактивные симуляции и сборники тестов, презентации.

2. Технические функции:

- Интерактивная анимация в реальном времени (3D, Browen movement, Grafen structure);
- Онлайн-тесты и автоматическая система оценки;
- Внедрение туннельного эффекта;
- База данных и пользовательская статистика.

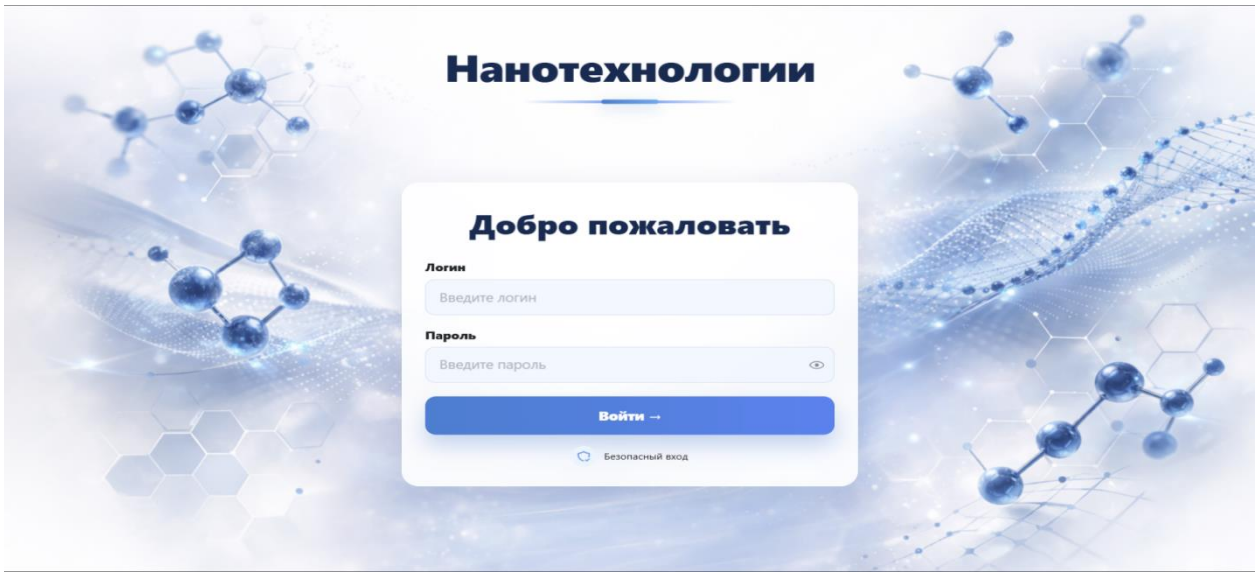

Рис. 1. Доступ к веб-платформе

На этом рисунке показан интерфейс входа в разработанную веб-платформу, представляющий собой начальный этап привлечения пользователя в цифровую среду обучения.

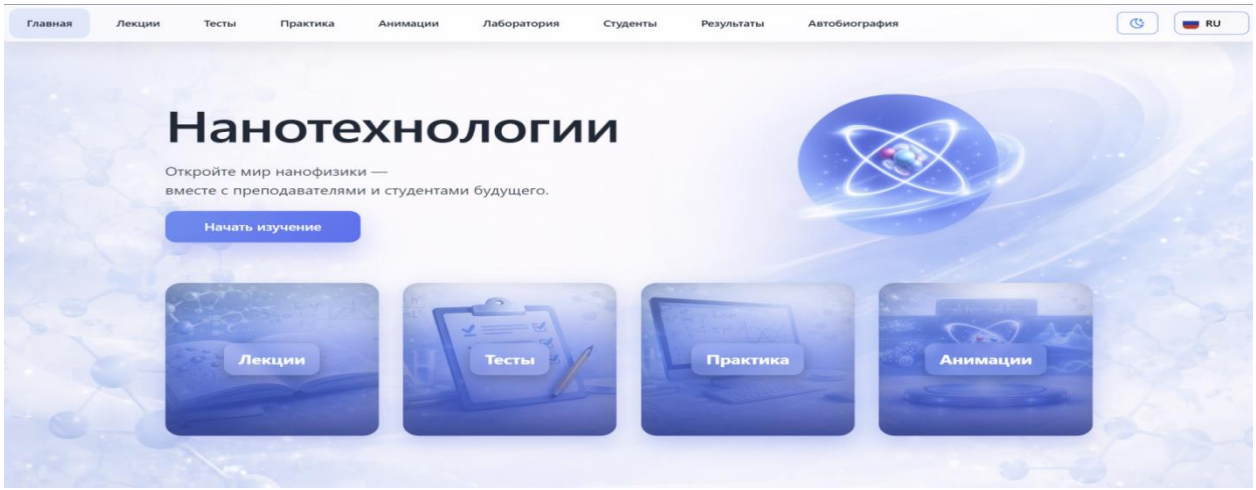

Рис. 2. Макет главной страницы веб-платформы

На рисунке 2 показано, что главная страница платформы организована по модульному принципу. На ней основные разделы, такие как «Лекции», «Тесты», «Практика» и «Анимация», расположены в соответствии с дидактическими этапами учебного процесса.

В рамках данного исследования была разработана новая дидактическая модель цифровой образовательной среды на основе интерфейса входа в систему и макета главной страницы веб-платформы, предназначенной для обучения Нанотехнологии [7]. Научная новизна данной модели отражена в следующем:

1. На основе вводной части платформы (рис. 1) предложена модель пользовательского интерфейса, ориентированная на пользователя и вовлекающая его в процесс обучения;

2. Разработана модульная (лекция - тест - практика - анимация) интегрированная дидактическая структура процесса обучения посредством макета главной страницы (рис. 2);

3. Разработаны методологические основы для проектирования предметно - ориентированной цифровой среды обучения в области Нанотехнологии;

4. Предложен механизм интегрированного применения технологических, педагогических и научных знаний в структуре платформы на основе модели TPACK;

5. Обоснован когнитивное - визуальный подход, направленный на упрощение сложных научных понятий и повышение эффективности их усвоения посредством интерактивных и визуальных компонентов.

Анимация позволяет показывать физические явления в движении во времени и пространстве. Для каждой темы разработана одна основная анимация:

- 3D анимация нанотрубки;
- Стадии падения графена 3D C60, C90, C120;
- Микроскопическая модель броуновского движения;
- Наносинтез.

Моделирование позволяет студентам самостоятельно управлять и тестировать физические явления.

3. Презентации и тесты

После каждой темы даются задания для закрепления знаний:

- составление 10 - 15 упражнений по выбранным темам;
- 15 - 20 закрытых тестовых вопросов;
- Предусматривается организация лекций по избранным темам (на английском языке);
- по каждой теме есть презентации на узбекском и русском языках, а также на английском языках.

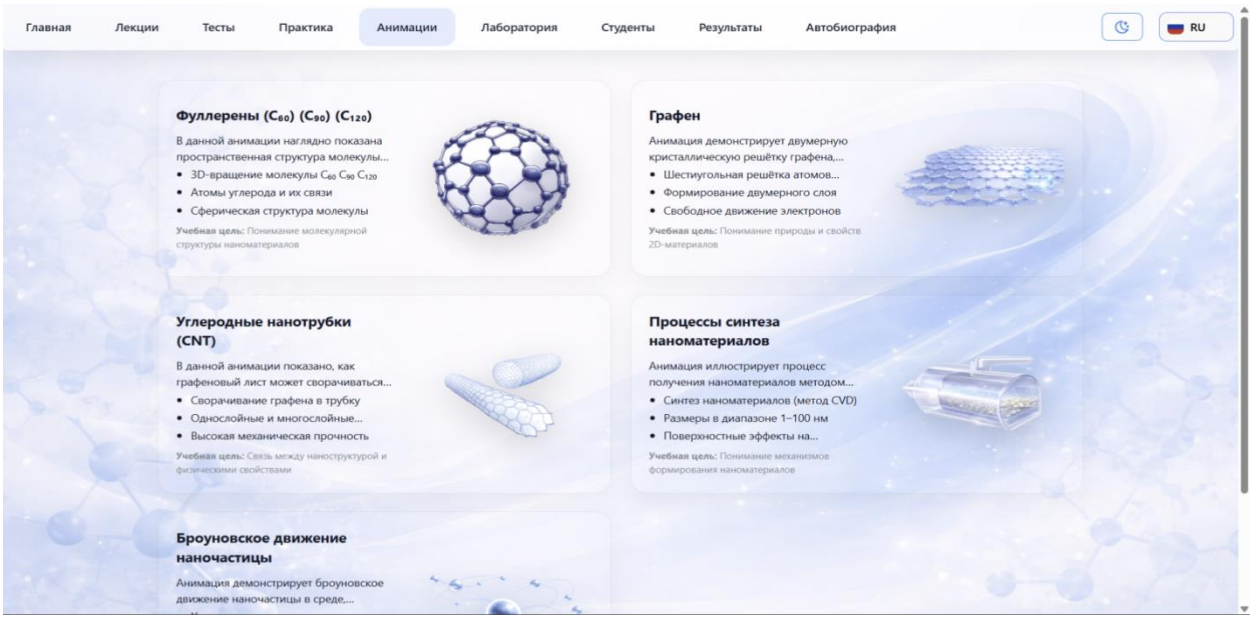

Рис. 3. Анимация платформы

Рисунок 3 отражает интегрированный дидактический подход, основанный на визуальном моделировании сложных научных концепций, связанных с наукой о Нанотехнологии, в рамках модуля «Анимации» платформы [8, 9].

Предложен предметно - ориентированный подход к преподаванию сложных научных понятий в Нанотехнологиях (фуллерены, графен, углеродные нанотрубки, броуновское движение) на основе визуального моделирования.

Технические возможности

1. Интерактивные модули:

- Интерактивные симуляции по нанотехнологиям;
- система обратной связи (вопрос-ответ, комментарий, оценка);

2. Автоматический анализ и персонализация:

- сохраняется вся информация по каждой деятельности студентов (лекция, тест, анимация);
- рекомендации, соответствующие уровню самостоятельного обучения (гибкое обучение);
- отчеты об оценке, аналитический мост для студентов и преподавателей.

3. Методические возможности

1. Модульное и поэтапное обучение:
- каждый урок выделяется в отдельный модуль;
- в модуле используется форма теория → пример → упражнение → тест → итоговый анализ.
- Модель ADDIE и модель TPACK:
- каждая тема представлена практическими и из жизни примерами;
- интегрирована с дисциплинами Химия, Биология, Информатика;

2. Общение и рефлексия:

- обмен вопросами и ответами со студентами через платформу;
- вопросы студентам;
- в конце каждого занятия: "насколько я усвоил сегодняшнюю тему?
- есть ли тема интереснее и полезнее, чем та, о которой я не знаю?

Эффективность использования студентами цифровой образовательной платформы зависит не только от технических возможностей, но и от гармонизации пользовательского интерфейса с педагогическими сценариями.

Модульность: Каждый раздел - отдельный модуль.

Поэтапность: Контент структурирован последовательно от простого к сложному [10].

Интерактивность: требования к платформе (темы, презентации, анимации, тесты, задания).

Рефлективность: В конце каждого раздел есть 15-20 тестов для самопроверки.

Геймификация: Итоговый рейтинг, система баллов.

Педагогический сценарий -это последовательность учебного процесса на цифровой платформе, методическая основа, определяющая деятельность студента на каждом этапе. Каждый сценарий составляется следующим образом:

1. Доступность:

Название темы, цель учения и ожидаемые результаты;

Контекстуальный вопрос или проблема, мотивирующая студента (связанная с реальной жизнью);

2. Основная часть:

Интерактивный теоретический материал (слайд, текст, аудио, видео);

Визуализация: модуль анимации или симуляции;

Практические упражнения (примеры, описание эксперимента, виртуальные измерения);

3. Заключительная часть:

Тестовые задания (адаптированные);

Вопросы для рефлексии;

Рекомендация или дополнительный материал, основанный на результатах обучения студента.

Заключение

Созданная нами электронная платформа для студентов педагогической вузах по дисциплине, “Нанотехнологии”, апробирована в 3-х педагогических заведениях Республики Узбекистан, и обосновано, что эффективно - повышает методические компетенций студентов, а также мотивацию к учебной и научной исследовательской деятельности.

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ИГРОВЫЕ ТЕХНОЛОГИИ ОБУЧЕНИЯ РУССКОМУ ЯЗЫКУ

Аннотация: *Названные три функции игры представляют собой ступени от игры-забавы к игре – увлечению познанием. Это высшая ступень – от игры к творчеству, к научной логике, к опережению школьных программ. Для младших школьников игра – это прощание с розовым детством. Дети нуждаются в шутке, в ласке, в красоте. В игровой методике с наибольшей полнотой проявляется артистизм учительницы, ее женская чуткость и теплота.*

Ключевые слова: *обучение, воспитание, игровые технологии, мотив, дидактическая игра, метод, соревнование, фраза.*

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GAME-BASED TECHNOLOGIES FOR TEACHING RUSSIAN

Abstract: *The three functions of play described above represent the stages from play as entertainment to play as a passion for learning. This is the highest stage – from play to creativity, to scientific logic, to advancing school curricula. For younger students, play is a farewell to the rosy days of childhood. Children need humor, affection, and beauty. The play-based approach fully expresses the teacher's artistry, feminine sensitivity, and warmth.*

Keywords: *teaching, education, game-based technologies, motive, didactic game, method, competition, phrase.*

Введение

Уроки с использованием игр или игровых ситуаций являются эффективным средством обучения и воспитания. Отход от традиционного построения урока и введение в него игрового сюжета привлекает внимание учащихся всего класса.

Значение игры невозможно исчерпать и оценить. В том и состоит ее феномен, что, являясь развлечением, отдыхом, она способна перерасти в обучение, в творчество, в терапию, в модель типа человеческих отношении и проявлений в труде. Это очень действенный метод для развития и совершенствования познавательных, умственных и творческих способностей обучающихся [1].

Психологи определяют игру как ведущую деятельность в младшем школьном возрасте. В ней ребенок активизируется как личность, через игру познает мир. В младшем школьном возрасте роль ведущей деятельности переходит к учению, к учебной деятельности. Этот переход не должен быть резким, поэтому игровые методики применяются главным образом в I и II классах.

Материалы и методы исследования

В основе исследования лежит комплексный педагогический подход, включающий теоретические и практические методы анализа эффективности игровых технологий в обучении русскому языку. В качестве материалов использованы научно-методические труды по педагогике и методике преподавания, учебные программы, а также примеры дидактических игр, применяемых в начальной школе.

Основным методом исследования является анализ научной литературы, позволивший определить теоретические основы игровой деятельности и её функции в образовательном процессе. Сравнительно-педагогический метод использовался для сопоставления традиционных и игровых форм обучения.

Метод наблюдения применялся для оценки влияния игровых технологий на активность, мотивацию и речевое развитие учащихся. Кроме того, использовался метод обобщения педагогического опыта, направленный на выявление наиболее эффективных игровых приёмов.

Комплексное применение данных методов позволило определить роль игровых технологий как средства повышения качества обучения и развития коммуникативных навыков учащихся.

Результаты исследования

Игры в школе должны быть дидактическими, т. е. вести школьников по пути познания, развития. Рассмотрим их функции.

Первая, простейшая функция – облегчать учебный процесс, оживлять его. Эту роль выполняют сказочные элементы, занимательные картинки, подбор занимательных текстов.

Вторая функция – «театрализация» учебного процесса: игровые формы вводят ролевой элемент, например вымышленных персонажей – Незнайки и Знайки, Буратино или Алисы из Страны чудес... Артистические приемы используются в ролевых диалогах и полилогах, в чтении по ролям, в инсценировании басен, сказок, в составлении силами самих учащихся различных упражнений, задач и даже в составлении страниц предполагаемого учебника.

Третья функция – соревновательная. Игра вносит элемент соревнования, конкурса, возбуждает активность, стремление к лидерству. Простейший вариант – «кто первый решит задачу, проверит орфограмму»; «придумать предложение: чье предложение лучше?». Но от этих простейших случаев игра переходит к олимпиадам, к тестированию, к литературному творчеству, к соревнованию в качестве и глубине знаний [3].

Названные три функции игры представляют собой ступени от игры-забавы к игре – увлечению познанием. Это высшая ступень – от игры к творчеству, к научной логике, к опережению школьных программ.

Для младших школьников игра – это прощание с розовым детством. Дети нуждаются в шутке, в ласке, в красоте. В игровой методике с наибольшей полнотой проявляется артистизм учительницы, ее женская чуткость и теплота.

Использование игровых технологий на уроках русского языка и литературы привлекательно тем, что они позволяют в непринужденной форме решать сложные задачи, а именно:

1. Дидактические: расширение кругозора, формирование определенных умений и навыков, необходимых в практической деятельности.

2. Воспитывающие: формирование нравственных, эстетических и мировоззренческих установок; воспитание сотрудничества, чувства коллективизма, воспитание самостоятельности, и воли.

3. Развивающие: развитие внимания, мышления, творческих способностей, умений сравнивать, сопоставлять, находить аналогии, оптимальные решения; развитие мотивации учебной деятельности.

4. Социализирующие: приобщение к нормам и ценностям общества; адаптация к условиям среды; стрессовый контроль, обучение общению; психотерапия [1,3].

Игра служит средством обучения языку, выработки у учащихся речевых навыков и умений.

Как и любой другой вид деятельности, игра начинается с побуждающей причины (мотива), преследует определенную цель, имеет конкретное, понятное ребенку содержание и исполнительную часть – игровые действия.

В отличие от трудовой деятельности игра не мотивирована конечными результатами. Мотив игры лежит в содержании самого игрового действия, в игровом процессе. «Не выиграть, а играть» – такова общая формула мотивации игры. В игре возникает необходимость что-то сказать. Она диктуется внутренним желанием ребенка принять участие в общении, в игровом действии.

Так, играя в «магазин», ученик-«покупатель» вынужден спрашивать о необходимом ему товаре, о его цене, размерах и т.п., «продавец» должен отвечать и предлагать «товар».

В подобных ролевых играх школьники искренне переживают свою роль, так как детям свойственна способность перевоплощаться в изображаемый образ: врача, шофера, капитана парохода, медведя, зайца. Особенное удовольствие такое перевоплощение доставляет младшим школьникам [4].

Эти многообразные переживания в процессе игры, связанные с выполнением роли, психологи считают основной причиной, побуждающей

детей играть. Так, в русской народной игре «Гуси-лебеди» дети изображают гусей, щиплющих травку на лугу. В стороне спрятался «волк». «Хозяин» зовет «гусей» домой. Они пытаются пробежать мимо «волка», стараясь, чтобы он их не поймал. Этот момент опасности вызывает у детей сильное волнение. В том случае, если «волк» никого не поймал, играющие выражают бурную радость.

Игра всегда связана с различными переживаниями учащихся: волнением, чувством ответственности, торжеством победы, радостью успеха, отчаянием, огорчением в случае неудачи. Внесение элементов занимательности, непосредственно связанных с изучением материала, создает положительные эмоции, которые обеспечивают успешное протекание целенаправленной деятельности школьников.

В «тихих» играх, когда школьники подбирают определенные правилами игры слова, фразы, они также испытывают удовлетворение от своих успехов («Я умею, Я могу, как все») или огорчение от неудачи. В последнем случае появляется желание повторить игру еще раз, мобилизовать все силы и выиграть. Каждая такая игра возбуждает в школьнике потребность испытать радость преодоления, особенно это относится к играм-соревнованиям («Кто быстрее?», «Кто первый?»).

Привлекает детей в игре и другая, тоже очень важная ее сторона – простота и доступность способов деятельности. Правила игры всегда просты, понятны и посильны для выполнения. Это помогает школьникам преодолеть робость в употреблении слов и фраз иностранного языка. Так, на первом этапе обучения дети учатся различать названия одушевленных и неодушевленных предметов. Проводится игра «Кто идёт?». Учитель называет предмет, человека или животное и произносит слово идёт. Если предмет одушевленный (умеет ходить), дети поднимают руку и повторяют за учителем: идёт! Если предмет неодушевленный, руку не поднимают, молчат. Группа разделяется на команды. Выигрывает команда, участники которой сделали меньше ошибок. Например, учитель говорит: Брат идёт! Ученик идёт! Стол идёт! Дерево идёт! Условия игры просты, но при ее выполнении неизбежны ошибки, они вызывают оживление, смех. Это поднимает эмоциональный тонус играющих, обостряет их слух и внимание [5].

Большое значение дидактические игры имеют для воспитания личности школьника, для формирования черт его характера.

В игре развиваются организованность, выдержка, умение планировать ряд последовательных действий, умение остановить свои желания, подчиниться коллективу, правилам игры. Это воспитывает умение преодолевать трудности, тренирует волю ребенка.

Игра развивает чувство товарищества, дружбы, так как в случае необходимости играющий должен уступить, помочь товарищу. Играя в составе команды, каждый ученик несет ответственность за весь коллектив, каждый заинтересован в лучшем результате своей команды, каждый

стремиться как можно быстрее и успешнее справиться с заданием. Таким образом, соревнование способствует усилению работоспособности всех учащихся.

Игра снимает напряжение, но повышает чувство ответственности перед одноклассниками. Итак, из сказанного о роли игры на уроках русского языка можно сделать следующие выводы:

1. Дидактическая игра – один приемов обучения русскому языку, помогающий создать на уроке речевую ситуацию; следовательно, игра – средство активизации деятельности учащихся на уроке;

2. Правильно организованная с учетом специфики материала игра тренирует память, помогает учащимся выработать речевые умения и навыки;

3. Игра стимулирует умственную деятельность учащихся, развивает внимание и познавательный интерес к предмету;

4. Игра – один из приемов преодоления пассивности учеников;

5. Игра воспитывает у школьников дисциплинированность, организованность, ответственность и коллективизм [6].

Виды игр на уроках

Игра «Верю-не верю»

Хорошо подходит для проверки домашнего задания. Задаются вопросы по теме. Учащиеся соглашаются либо не соглашаются с утверждениями учителя. Вопросы начинаются с фразы: «Верите ли вы, что…».

Игры-соревнования. Такие игры включают все виды дидактических игр. Учащиеся соревнуются, разделившись на команды.

«Стихотворный бой»

Такую игру можно провести на уроке чтения, когда пройдена тема лирики, и класс уже освоил несколько произведений поэзии того или иного поэта. Правила игры просты: команды друг другу по очереди рассказывают по стихотворению, проиграла та команда, чей участник не смог вспомнить стихотворные строки.

«Эстафета восторга» хорошо подходит при изучении глагола. Используя данные глаголы, обозначающие чувства (любить, радоваться, восхищаться, восторгаться, наслаждаться, обожать), составьте словосочетания или предложения.

Условие: для выполнения этого игрового задания школьники делятся на две команды и рассаживаются по рядам друг за другом. Ведущий дает членам команд, сидящим первыми, карточки с записанными на них глаголами чувства. Выполнив задания, члены команд передают карточки сидящим сзади. Побеждает та команда, которая быстрее и правильнее (выразительнее) составит словосочетания и предложения. Вместо глаголов можно подставить существительные или прилагательные.

«Найди пару»

Соединить половинки сложных предложений. Выделить среди них главное и придаточное. Побеждает та команда, которая соберет больше предложений.

Очень часто использую на уроке кроссворды, они не только разнообразят урок, но и заставляют учащихся мобилизовать все знания, полученные ими во время обучения. Это своеобразный тест на проверку знаний и умений их применить на практике.

Игры «в слова» и «со словами».

Игры «в слова» обогащают лексический запас ребенка, приучают быстро находить нужные слова («не лезть за словом в карман»), актуализируют пассивный словарь. Большинство таких игр рекомендуется проводить с ограничением времени, в течение которого выполняется задание (например, 3—5 мин.). Это позволяет внести в игру соревновательный мотив и придать ей дополнительный азарт.

«Дополни слово»

Ведущий называет часть слова (кни ...) и бросает мяч. Ребенок должен поймать мяч и дополнить слово (... га).

В роли ведущего ребенок и взрослый могут выступать поочередно.

Составить из предлагаемого набора букв как можно больше слов: а, к, с, о, и, м, р, m м, ш, а, н, и, ы, г, с

Назвать слова, противоположные по значению:

Тонкий —

Чистый —

Громкий —

Низкий —

«Кто больше сочинит»

Подбирается несколько предметных картинок. Ребенку предлагается найти рифму к названиям изображенных на них предметов. Рифмы можно подбирать и к словам, не сопровождая их показом соответствующих картинок.

Огурец — молодец. Заяц — палец. Очки — значки. Цветок — платок…

Примечание. Для объяснения понятия «рифма» можно привлечь отрывок из книги Н.Н.Носова «Приключения Незнайки и его друзей» о том, как Незнайка сочинял стихи.

«Перевернутые слова»

Ребенку предлагается набор слов, в которых буквы перепутаны местами. Необходимо восстановить нормальный порядок слов.

Пример: МАИЗ - ЗИМА.

«Из слогов — слова»

Из предварительно отобранных слов формируется несколько блоков слогов. Ребенку предлагается составить из них определенное количество слов, используя каждый слог только по одному разу.

Составь три слова, в каждом из которых по 2 слога, из следующих слогов: ван, мар, ко, ма, ди, ра. (Ответ: ра-ма, ко-мар, ди-ван).

Составьте 2 слова, в каждом из которых по 3 слога, из следующих слогов: ро, ло, мо, до, ко, га (Ответ: мо-ло-ко, до-ро-га)

Игра – цепочка

Первый ученики называет слово, например: имя существительное, а другие продолжает слова из последней буквы.

Школа – азбука – арбуз – зонтик – книга – автобус – стол – лампа – актер – рыба…

Заключение

Как мы уже сказали игровые формы, мы используем как элемент урока. Они легко подбираются по тематическому принципу для каждого раздела учебного курса. Игры являются удобной формой актуализации знаний (в начале урока или перед началом изучения новой темы); «разминки», необходимой по ходу урока, контроля в конце учебного занятия.

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ОСНОВНАЯ ЭНТОМОФАУНА АГРОБИОЦЕНОЗА ЧЕРЕШНИ И ЕЁ БИОЛОГИЧЕСКОЕ ЗНАЧЕНИЕ

Аннотация. *В данной статье проанализирована основная энтомофауна садов черешни (Cerasus avium L.) в условиях Ферганской долины с акцентом на её экологические особенности и биологическое значение. Выявлены вредные, полезные и нейтральные виды членистоногих. Полученные результаты служат научной основой для совершенствования системы мониторинга и разработки экологически безопасных интегрированных стратегий защиты растений.*

Ключевые слова: *агробиоценоз, черешня (Cerasus avium L.), энтомофауна, вредители, энтомофаги, нейтральные виды, биологическое равновесие, интегрированная защита растений, опылители, таксономический состав.*

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THE MAIN ENTOMOFAUNA OF THE SWEET CHERRY AGROCENOSIS AND ITS BIOLOGICAL SIGNIFICANCE

Annotation. *This article analyzes the main entomofauna of sweet cherry orchards (Cerasus avium L.) under the conditions of the Fergana Valley, with a focus on their ecological characteristics and biological significance. Harmful, beneficial, and neutral species of arthropods were identified. The obtained results*

serve as a scientific basis for improving monitoring systems and developing environmentally safe integrated plant protection strategies.

***Keywords**: agrobiocenosis, sweet cherry (Cerasus avium L.), entomofauna, pests, entomophages, neutral species, biological balance, integrated plant protection, pollinators, taxonomic composition.*

Изучение биологического разнообразия в агроэкосистемах, особенно определение видового состава и экологических особенностей фауны беспозвоночных животных, имеет важное научное и практическое значение для устойчивого сохранения урожайности и разработки интегрированных систем защиты растений. Агробиоценоз плодовых деревьев, в том числе черешни (*Cerasus avium* L.), представляет собой сложную биоценотическую систему, в которой обитают многочисленные фитофаги-вредители, энтомофаги и нейтральные виды. Экологические взаимоотношения между беспозвоночными организмами в данной системе оказывают непосредственное влияние на фитосанитарное состояние растений.

Состав энтомофауны, встречающейся в агробиоценозах черешни, формируется под воздействием климатических условий региона, агротехнических мероприятий, фенологических фаз развития растений, а также антропогенных факторов. Насекомые-вредители повреждают вегетативные и генеративные органы растений, снижая количественные и качественные показатели урожая, а в отдельных случаях способствуют распространению возбудителей заболеваний. В то же время энтомофаги и другие полезные беспозвоночные естественным образом регулируют численность вредителей и играют важную роль в поддержании биологического равновесия в агроэкосистеме.

В последние годы широкое внедрение интенсивных технологий садоводства, увеличение объёмов применения химических средств, а также факторы изменения климата приводят к изменениям видового состава энтомофауны и соотношения видов. Данная ситуация обусловливает необходимость углублённого изучения основных видов беспозвоночных животных, обитающих в агробиоценозах черешни, их экологических особенностей и биологического значения. Видовой состав энтомофауны, динамика её сезонного развития служат научной основой для разработки экологически безопасных мер борьбы с вредителями.

Целью настоящего исследования является выявление основных представителей энтомофауны, встречающихся в агробиоценозе черешни (*Cerasus avium* L.), а также оценка их экологических особенностей и биологического значения.

Исследования проводились в 2020–2025 годах в черешневых садах Андижанской, Наманганской и Ферганской областей. Основное внимание было уделено изучению состава энтомофауны агробиоценоза черешни (*Cerasus avium* L.), включая вредителей, их естественных врагов и нейтральные виды, а также определению их таксономического положения.

Для изучения состава энтомофауны проводились полевые наблюдения, осуществлялся сбор образцов с последующей идентификацией видового состава в лабораторных условиях. При сборе насекомых применялись энтомологический сачок, клеевые ловушки и метод стряхивания.

Собранные образцы изучались в лабораторных условиях с использованием стереомикроскопа; при определении видов применялись современные определители и научная литература. Вредители и энтомофаги были распределены по соответствующим группам, после чего оценивались частота их встречаемости и роль в агробиоценозе черешни (*Cerasus avium* L.).

Наблюдения проводились регулярно в период вегетации черешни (*Cerasus avium* L.), при этом анализировались время появления насекомых, стадии их развития и взаимосвязь с фенологическими фазами растений.

В результате исследований было установлено наличие в агробиоценозе черешни (Cerasus avium L.) беспозвоночных животных, относящихся к нескольким отрядам и семействам. Среди них зафиксировано 21 фитофаг-вредитель, 48 энтомофагов и 3 нейтральных вида (Таблица 1).

Таблица 1

Основная энтомофауна агробиоценоза черешни и её таксономическое положение в условиях Ферганской долины (2020–2025 гг.)

А) Энтомофаги

№	Таксон (латинское название)	Таксономическое положение	Были выявлены
1	*Phytoseiulus corniger* Wainstein, 1959	Arachnida, Acari, Phytoseiidae	+++
2	*Anystis baccarum* (Linnaeus, 1758)	Arachnida, Acari, Anystidae	++
3	*Pronematus rapidus* Kuznetsov, 1972	Arachnida, Acari, Tydeidae	+
4	*Eresus niger* (Petagna, 1787)	Arachnida, Araneae, Eresidae	++
5	*Xysticus cristatus* (Clerck, 1757)	Arachnida, Araneae, Thomisidae	++
6	*Agelena labyrinthica* (Clerck, 1757)	Arachnida, Araneae, Agelenidae	+
7	*Tetragnatha* sp.	Arachnida, Araneae, Tetragnathidae	++
8	Thomisidae spp.	Arachnida, Araneae	+++
9	Salticidae spp.	Arachnida, Araneae	++
10	Philodromidae spp.	Arachnida, Araneae	+++
11	*Phalangium opilio* (Linnaeus, 1758)	Arachnida, Opiliones	+++
12	*Gongylidium rufipes* (Linnaeus, 1758)	Arachnida, Araneae, Linyphiidae	++
13	*Clubiona* sp.	Arachnida, Araneae, Clubionidae	+++
14	*Forficula auricularia* (Linnaeus, 1758)	Insecta, Dermaptera	++
15	*Labidura riparia* (Pallas, 1773)	Insecta, Dermaptera,	+++

		Labiduridae	
16	*Coccinella septempunctata* (Linnaeus, 1758)	Insecta, Coleoptera, Coccinellidae	+++
17	*Adalia bipunctata* (Linnaeus, 1758)	Insecta, Coleoptera, Coccinellidae	++
18	*Exochomus quadripustulatus* (Linnaeus, 1758)	Insecta, Coleoptera, Coccinellidae	+++
19	*Hippodamia variegata* (Goeze, 1777)	Insecta, Coleoptera, Coccinellidae	++
20	*Chilocorus bipustulatus* (Linnaeus, 1758)	Insecta, Coleoptera, Coccinellidae	+++
21	*Chilocorus renipustulatus* Scriba, 1791	Insecta, Coleoptera, Coccinellidae	++
22	*Oenopia conglobata* (Linnaeus, 1758)	Insecta, Coleoptera, Coccinellidae	+
23	*Chrysoperla carnea* (Stephens, 1836)	Insecta, Neuroptera, Chrysopidae	+++
24	*Chrysopa formosa* Brauer, 1851	Insecta, Neuroptera, Chrysopidae	++
25	*Chrysopa septempunctata* Wesmael, 1841	Insecta, Neuroptera, Chrysopidae	++
26	*Chrysopa perla* (Linnaeus, 1758)	Insecta, Neuroptera, Chrysopidae	++
27	*Drepanopteryx phalaenoides* (Linnaeus, 1758)	Insecta, Neuroptera, Hemerobiidae	++
28	*Hemerobius nitidulus* Fabricius, 1777	Insecta, Neuroptera, Hemerobiidae	+
29	*Trichogramma pintoi* Voegele 1982	Insecta, Hymenoptera, Trichogrammatidae	++
30	*Trichogramma cacoeciae* Marchal, 1927	Insecta, Hymenoptera, Trichogrammatidae	+
31	*Trichogramma minutum* Riley, 1871	Insecta, Hymenoptera, Trichogrammatidae	+++
32	*Closterocerus cinctipennis Ashmead, 1888*	Insecta, Hymenoptera, Eulophidae	+
33	*Lathrolestes luteolator* (Gravenhorst, 1829)	Insecta, Hymenoptera, Ichneumonidae	+
34	*Mesoleius caninae* Bridgman, 1886	Insecta, Hymenoptera, Ichneumonidae	++
35	*Rhinotorus congruens (Fabricius, 1775)*	Insecta, Hymenoptera, Ichneumonidae	++
36	*Philonicus albiceps* (Meigen, 1820)	Insecta, Diptera, Asilidae	+
37	*Echthistus rufinervis (Meigen, 1820)*	Insecta, Diptera, Asilidae	+++
38	*Laphria gibbosa* (Linnaeus, 1758)	Insecta, Diptera, Asilidae	+
39	*Laphria marginata* (Linnaeus, 1758)	Insecta, Diptera, Asilidae	+
40	*Eupeodes corollae* (Fabricius,	Insecta, Diptera, Syrphidae	+++

	1794)		
41	*Syrphus ribesii* (Linnaeus, 1758)	Insecta, Diptera, Syrphidae	+++
42	*Sphaerophoria scripta* (Linnaeus, 1758)	Insecta, Diptera, Syrphidae	+++
43	*Blaesoxipha lineata* (Fallén,1817)	Insecta, Diptera, Sarcophagidae	+++
44	*Parasarcophaga* sp.	Insecta, Diptera, Sarcophagidae	+++
45	*Pseudosarcophaga* sp.	Insecta, Diptera, Sarcophagidae	++
46	*Alophora subcoleoptrata* (Linnaeus, 1758)	Insecta, Diptera, Tachinidae	++
47	*Eliozeta helluo (Fabricius, 1805)*	Insecta, Diptera, Tachinidae	++
48	*Vibrissina turrita* (Meigen, 1824)	Insecta, Diptera, Tachinidae	+++

В) Фитофаги

№	Таксон (латинское название)	Таксономическое положение	Были выявлены
1	*Tetranychus urticae* Koch, 1836	Arachnida, Acari, Tetranychidae	+++
2	*Schizotetranychus pruni* (Oudemans, 1931)	Arachnida, Acari, Tetranychidae	++
3	*Bryobia redikorzevi* Reck, 1947	Arachnida, Acari, Tetranychidae /Bryobiinae	++
4	*Empoasca meridiana Zachvatkin, 1946*	Insecta, Hemiptera, Cicadellidae	+
5	*Diaspidiotus perniciosus* (Comstock, 1881)	Insecta, Hemiptera, Diaspididae	+
6	*Pseudococcus comstocki* (Kuwana, 1902)	Insecta, Hemiptera, Pseudococcidae	++
7	*Caliroa cerasi* (Linnaeus, 1758)	Insecta, Hymenoptera, Tenthredinidae	+++
8	*Carpocoris coreanus* Distant, 1899	Insecta, Hemiptera, Pentatomidae	++
9	*Stephanitis pyri* (Fabricius, 1775)	Insecta, Hemiptera, Tingidae	++
10	*Agriotes meticulosus* Candeze, 1863	Insecta, Coleoptera, Elateridae	+
11	*Clon cerambycinus* Semenov, 1900	Insecta, Coleoptera, Elateridae	+
12	*Melolontha hippocastani* Fabricius, 1801	Insecta, Coleoptera, Scarabaeidae	+++
13	*Tropinota turanica Reitter, 1889*	Insecta, Coleoptera, Scarabaeidae: Cetoniinae	+
14	*Protaetia marginicollis* (Ballion, 1871)	Insecta, Coleoptera, Scarabaeidae: Cetoniinae	++
15	*Oxythyrea cinctella* (Schaum, 1841)	Insecta, Coleoptera, Scarabaeidae: Cetoniinae	+
16	*Rhynchites auratus* (Scopoli, 1763)	Insecta, Coleoptera, Attelabidae	++
17	*Sciaphobus squalidus* (Gyllenhal, 1834)	Insecta, Coleoptera, Curculionidae	+++
18	*Rhagoletis cerasi* (Linnaeus, 1758)	Insecta, Diptera, Tephritidae	+
19	*Leucoptera scitella* (Zeller, 1839)	Insecta, Lepidoptera, Lyonetiidae	++

20	*Grapholita molesta* (Busck, 1916)	Insecta, Lepidoptera, Tortricidae	++
21	*Cossus cossus* (Linnaeus, 1758)	Insecta, Lepidoptera, Cossidae	+

C) Нейтральные группы

№	Таксон	Примечание	Были выявлены
1	Apidae spp.	Опылители (пчёлы)	+++
2	Formicidae spp.	Муравьи	++
3	Tenebrionidae spp.	Чёрные жуки	++

На территории исследования были выявлены следующие вредители, представляющие наибольшую угрозу для урожайности черешни (*Cerasus avium* L.) и встречающиеся в высокой численности: Паутинный клещ (*Tetranychus urticae* Koch.) — питается соком листьев, нарушая процесс фотосинтеза. Вишнёвый слизистый пилильщик (*Caliroa cerasi* L.) — отличается тем, что скелетирует листовую пластинку. Майский жук (*Melolontha hippocastani*) — представляет опасность для корневой системы. Серый почковый долгоносик (*Sciaphobus squalidus* Gyll.) — повреждает почки и листья ранней весной, оказывая серьёзное влияние на урожайность.

Кроме того, в садах были зарегистрированы виды, встречающиеся в среднем количестве: садовая паутинная клещевка, бурый плодовый долгоносик, плодовая моль, яблонный щитовка и восточный плодоядный жук. Роль энтомофагов в естественном регулировании численности вредителей оказалась высокой. В исследовании наиболее активными и часто встречающимися полезными видами были акарифаги: *Phytoseiulus corniger* W., являющиеся основными природными врагами паутинных клещей. Среди хищников наивысшую эффективность против кокцидов показали 7-точечная божья коровка, 14-точечная экзохомус и 2-точечная хилокорус. Кроме того, обычная зелёная златоглазка (*Chrysopa carnea*) широко распространена в садах и питаясь яйцами и личинками множества вредителей, играет важную роль в их регулировании. Среди паразитических насекомых было установлено, что *Trichogramma minutum* Riley и тахиновые мухи *Vibrissina turitta* способствуют значительному сокращению численности вредителей.

Особое значение в агробиоценозе имеют опылители. В частности, пчёлы (*Apidae*) зарегистрированы с наибольшей численностью и являются основным фактором нормального опыления черешни (*Cerasus avium* L.) и формирования урожая.

В заключение следует отметить, что в агробиоценозе черешни (*Cerasus avium* L.) сформированы представители энтомофауны, относящиеся к различным группам, которые имеют важное значение для стабильности агроэкосистемы. Вредители оказывают отрицательное влияние на урожайность, тогда как энтомофаги естественным образом ограничивают их численность, обеспечивая биологическое равновесие. Изучение видового состава и экологических особенностей энтомофауны служит важной научной основой для разработки интегрированных систем защиты растений.

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ВОЗРАСТНЫЕ ОСОБЕННОСТИ МОРФОЛОГИЧЕСКИХ ИЗМЕНЕНИЙ СТЕНКИ ПИЩЕВОДА КРЫСЫ В НОРМЕ

Аннотация. *В ходе эксперимента изучено возрастные особенности морфологических изменений стенки пищевода на 33 белых беспородных крысах. Срезы толщиной 8-10 мкм окрашивали гематоксилином-эозином, по методу ван Гизона, по Вейгерту, ретикулярные волокна импрегнировали азотнокислым серебром по методу Фута в модификации Н.А.Юриной.*

Общая толщина стенки пищевода в шейной части составила в среднем 125,9±2,95 мкм, в грудной части пищевода на 17,1% меньше, чем в брюшной части, а в шейной - на 10,2% больше, чем в грудной.

Ключевые слова: *эксперимент, крысы, морфология, пищевод, методы гематоксилином-эозином, метод ван Гизона, по Вейгерту.*

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AGE-RELATED FEATURES OF MORPHOLOGICAL CHANGES IN THE ESOPHAGEAL WALL OF THE RAT IN NORMAL CONDITIONS

Abstract. *The experiment studied the age-related features of morphological changes in the esophageal wall in 33 white outbred rats. Sections 8–10 μm thick were stained with hematoxylin and eosin, by the van Gieson method, by the Weigert method; reticular fibers were impregnated with silver nitrate according to the Foot method in the modification by N.A. Yurina. The total thickness of the esophageal wall in the cervical part averaged 125.9 ± 2.95 μm. In the thoracic part, it was 17.1% less than in the abdominal part, while in the cervical part it was 10.2% greater than in the thoracic part.*

Keywords: *experiment, rats, morphology, esophagus, age-related changes, histological methods, hematoxylin-eosin, van Gieson stain, Weigert stain, silver impregnation by Foot (Yurina modification)*

Введение

Среди множества патологий, встречающихся у людей, значительная часть приходится на болезни желудочно-кишечного тракта. Большой удельный вес среди них занимают заболевания пищевода. Несмотря на

большое количество научных работ по пищеводу [1,2] целый ряд вопросов остался неосвещенным. Спорным остается вопрос о характере и строении эпителия пищевода млекопитающих. Так, одни авторы считают, что эпителий пищевода млекопитающих неороговевающий, а процесс ороговения наблюдается только при патологии [3], другие указывают на постоянное ороговевание и слущивание клеток поверхностного слоя. Существование мышечной пластинки слизистой оболочки пищевода человека и животных признают многие авторы. Однако, наибольшие споры вызывает мышечная оболочка пищевода. Нет единого мнения о характере и количестве слоев, по одним данным их два: наружный - продольный и внутренний - циркулярный [4], другие авторы опровергают это [5], обнаружив дугообразные волокна, косые, идущие под различными углами, участки, теряющие характерную двухслойность, а также взаимный переход продольных и циркулярных волокон друг в друга [6]. Следует отметить, что в литературе не представлены сведения о слизистой оболочке крысы - количестве рядов и слоев эпителия, наличии мышечной пластинки и ее особенностях, строении подслизистой основы.

Цель исследования

Изучить возрастную морфологию стенки пищевода крысы в норме.

Материалы и методы исследования

Исследование проведено на 33 белых беспородных крысах в экспериментальную группы: новорожденные, 6, 11, 16, 22-х дневного возраста, через один месяц после окончания эксперимента (52 дня) и 5-8 месячного возраста (крыса-самка). После вскрытия грудной и брюшной полостей животных фиксировали в растворе Буэна на 24 ч. На следующий день до извлечения органа его делили на три части: шейную, грудную и брюшную. Срезы толщиной 8-10 мкм окрашивали гематоксилином-эозином, по методу ван Гизона, по Вейгерту, ретикулярные волокна импрегнировали азотнокислым серебром по методу Фута в модификации Н.А.Юриной. При микроскопическом исследовании при помощи окулярной линейки измеряли толщину слизистой оболочки, подслизистой основы, циркулярного и продольного мышечных слоев, наружной оболочки стенки пищевода. Цифровые данные обработаны методами вариационной статистики.

Результаты исследования

Общая толщина стенки пищевода в шейной части составила в среднем 125,9±2,95 мкм, в грудной части пищевода на 17,1% меньше, чем в брюшной части, а в шейной - на 10,2% больше, чем в грудной.

Слизистая оболочка выстлана многослойным плоским неороговевающим эпителием, разделенным на три зоны. Базальная зона представлена одним рядом удлиненных клеток с темными ядрами, плотно прилежащими друг к другу. Промежуточный слой или слой шиповатых клеток образован тремя четырьмя рядами клеток многоугольной формы со светлой цитоплазмой. В поверхностном слое располагается один ряд плоских клеток, лежащих горизонтально. Толщина слизистой оболочки в

шейной (19,9±0,7 мкм) и грудной частях (19,7±0,4 мкм) незначительно отличается, а в брюшной на 23% больше, чем в грудной. Толщина подслизистой основы в шейной (29,8±0,4 мкм) и брюшной частях (29,1-0,4 мкм) не имеет значительных различий и на 23,8% больше, чем в грудной. Коллагеновые волокна подслизистой основы представлены извитыми волокнами, собранными в пучки. Толщина этих пучков в участках, прилегающих к мышечной оболочке больше, чем в складках, а сами пучки расположены более компактно. Коллагеновые волокна расположены параллельно. Эластические волокна, чаще прямые, собраны в тонкие пучки и лежат более рыхло, по сравнению с коллагеновыми. На границе с мышечной оболочкой, коллагеновые и эластические волокна меняют свое направление на круговое и окружают пучки миоцитов продольного слоя. Проникая в толщу циркулярного слоя, они не меняют направления и идут параллельно. Ретикулярные волокна тонкие идут в подслизистой параллельно собственной пластинке, а в складках в разных направлениях, образуя сеть, петли которой имеют на вершине складок удлиненную форму и более крупные размеры, чем в их основании. Мышечная оболочка пищевода представлена участками, образованными циркулярным и продольным слоями, а также участками, теряющими четкую двухслойность и содержащими косонаправленные волокна. Толщина мышечного слоя неодинакова на протяжении пищевода и меняется от шейной части к брюшной. Коллагеновые и эластические волокна, лежащие возле мышечной оболочки, меняют свое направление на циркулярное, образуя петли, окружающие пучки миоцитов циркулярного слоя. В продольном слое они идут параллельно, отделяя пучки миоцитов. Мышечная оболочка на протяжении пищевода характеризуется наличием разнонаправленных мышечных волокон. В шейной части пищевода мышечной оболочка составляет 64,5% от всей толщины стенки органа, в грудной - 64,9%, и 64,4% брюшной. В шейной части пищевода, мышечная оболочка нижней стенки представлена, в основном циркулярно расположенными мышечными пучками. На боковых стенках направление мышечных волокон меняется на косое. Верхняя стенка шейной части состоит из продольно и циркулярно ориентированных мышечных пучков, образующих два слоя. Мышечная оболочка в грудной части пищевода образуется как продольными, так и циркулярными мышечными волокнами, которые идут перекрещиваясь, переходя из слоя в слой и меняют свое направление на противоположное.

Вывод

Соотношение различных видов мышечных волокон в стенке пищевода на всем его протяжении неодинаково и меняется. Соотношение продольных и циркулярных мышечных волокон в шейной части пищевода составляет 2:1, в грудной - 1,1:1, а в брюшной - 0,8:1. Наибольшая толщина продольного слоя отмечена в шейном отделе, а циркулярного - в брюшном. Продольный слой шейной части пищевода на 31,9% больше грудной и брюшной. Циркулярный слой брюшного отдела на 77% толще, чем в шейном и на

50,8% больше грудного. Наружная оболочка пищевода представлена адвентициальной в шейной и грудной частях и серозной - в брюшной и месте перехода пищевода в желудок. Тоньше всего наружная оболочка в грудном отделе пищевода, ее толщина составляет в среднем 4,5±0,2 мкм.

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СТРАТЕГИЧЕСКОЕ УПРАВЛЕНИЕ МЕЖДУНАРОДНОЙ КОРПОРАЦИЕЙ: ПОВЫШЕНИЕ ЭФФЕКТИВНОСТИ НА ОСНОВЕ АНАЛИЗА МАРКЕТИНГОВОЙ СРЕДЫ

Аннотация. *Маркетинговая среда многих отраслей в последние годы претерпевает существенные изменения, связанные с геополитикой, протекционизмом, прогрессом технологий. Соответственно повышается актуальность и сложность анализа внешней и внутренней среды международных компаний, одновременно функционирующих на множестве зарубежных рынков. Нередко внешние факторы вынуждают акционеров и топ-менеджеров компаний корректировать не только цены, меню, логистику, операционные процессы, но и тактику, и даже стратегию развития. Это ярко проявляется на рынке фаст-фуд. Автор статьи предпринял попытку проведения кейс-анализа, обоснования рекомендаций по корректировке стратегии и тактики компании Yum! Brands, в том числе – по продаже Pizza Hut, сегмента, демонстрирующего убытки на протяжении ряда кварталов 2023-25 гг.*

Ключевые слова: *маркетинговая среда, анализ, стратегии, быстрое питание, компания Yum! Brands, эффективность.*

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STRATEGIC MANAGEMENT OF AN INTERNATIONAL CORPORATION: IMPROVING PERFORMANCE BASED ON MARKETING ENVIRONMENT ANALYSIS

Abstract. *The marketing environment for many industries has been undergoing significant changes in recent years due to geopolitics, protectionism, and technological advances. Consequently, analyzing the external and internal environments of international companies operating in multiple foreign markets has become increasingly relevant and complex. External factors often force shareholders and top managers to adjust not only prices, menus, logistics, and operational processes, but also tactics and even development strategies. This is particularly evident in the fast food market. The author of this article has undertaken a case study and substantiated recommendations for adjusting Yum! Brands' strategy and tactics, including the sale of Pizza Hut, a segment that has been posting losses for several quarters between 2023 and 2025.*

Keywords: *Marketing environment, analysis, strategies, fast food, Yum! Brands, efficiency.*

Глубокий детальный анализ маркетинговой среды позволяет менеджменту компаний своевременно и точно вносить необходимые изменения в реализуемую стратегию, модифицировать текущую бизнес-модель – это особенно актуально для таких видов деятельности как фаст-фуд, быстрое питание [3].

Н.Н. Зюзина, Е.С. Маркова, М.А. Пятница утверждают: «сфера быстрого питания - наиболее динамично развивающийся, высокодоходный, –следовательно, перспективный для инвестиций сегмент рынка. Укрепление конкурентной позиции связано с внедрением в повседневную практику ведения бизнеса современных достижений маркетинга». При этом авторы детально исследовали «..специфику стратегии маркетинга предприятий быстрого питания» [3].

М.Ф. Богданова в своей диссертации предприняла попытку проанализировать динамику результативности системы стратегического управления предприятиями [2].

Т.А. Бронская, анализируя маркетинговую среду компании (на базе методов «Пяти сил Портера» и PESTLE-анализа), отмечает, что «..конкурентоспособность в современной экономике является основным фактором коммерческого успеха предприятия, – это зависит от качества управления и конкурентоспособности предлагаемых услуг, продуктов» [1].

О.Н. Мороз, С.Е. Максимова, Е.О. Бакарасов рассматривали влияние маркетинговой среды на доминантные сферы стратегического развития предприятий – «..как экономические, социальные, технологические и правовые доминанты формируют маркетинговую среду организации». Особенное внимание при этом авторы уделили «..доминантам

стратегического развития организации». Авторы считают, что «ключевым аспектом маркетинговой среды является решение задач эффективного продвижения продукции в целях стратегического развития» [5].

Нами предпринята попытка анализа перечисленных аспектов проблемы в деятельности компании Yum! Brands, Inc. – значимого игрока в отрасли быстрого питания на глобальном рынке. Компания Yum! Brands, Inc. была основана в 1997 г. Это один из лидеров отрасли быстрого питания, собственник нескольких известных брендов. Компания открыла десятки тысяч ресторанов в ста пятидесяти странах (на середину 2025 года). Ее узнаваемые бренды – KFC, Pizza Hut, Taco Bell, The Habit Burger Grill [4]. В материковом Китае действует юридическое лицо Yum China Holdings Inc. как дочерняя компания, она выплачивает материнской компании лицензионный сбор (три процента от выручки).

Корпоративная стратегия всего холдинга нацелена на приобретения и глобальное присутствие на мировом рынке. Одним из важных факторов успеха компании является франчайзинговая модель. Будучи одним из мировых лидеров в ресторанной индустрии, Yum Brands Inc. преимущественно (на девять десятых всей сети) работает по франчайзинговой модели, которая доказала свою эффективность.

Важно, что Yum Brands, Inc. в последние годы сталкивается с все более серьезными вызовами, жесткой конкуренцией.

Финансовые показатели Yum Brands Inc. в третьем квартале 2025 года демонстрируют неоднозначную картину [4]. Рост выручки составил 11,6 процента (к аналогичному периоду 2024 года), в то время как прирост прибыли в расчете на одну обыкновенную акцию продолжает снижаться, достигнув минус 4,1 процента (во многом – за счет убыточных ресторанов сети Pizza Hut). Свободный денежный поток остается высоким (прирост 18,4%), что свидетельствует о сильном генерировании денежных средств, несмотря на давление на рентабельность. В целом, Yum Brands наращивает выручку, но сталкивается с проблемами в отношении рентабельности капитала, – это указывает на необходимость повышения эффективности управления [6].

Yum Brands имеет ряд преимуществ по сравнению с конкурентами. В их числе нами выделены следующие.

1) Сила бренда: Yum Brands извлекает выгоду из сильной узнаваемости брендов, а также диверсифицированного корпоративного портфеля, в который входят KFC, Pizza Hut, Taco Bell, The Habit Burger Grill. Бренды компании известны во всем мире, а ее маркетинговые усилия и PR успешно закрепили эти бренды в сознании потребителей множества стран. Сила бренда, в том числе, проявляется в способности компании получать значительные доходы от франчайзинга. Маркетинговая привлекательность ее брендов способствует формированию лояльной клиентской базы, обеспечивает конкурентное преимущество в индустрии быстрого питания [6].

2) Эффективность франчайзинговой модели является ключевым преимуществом компании, позволяющим снизить операционные риски, капитальные затраты, одновременно используя местный опыт франчайзи. Франчайзинговый подход позволил компании добиться широкого глобального присутствия (более 64 тысяч ресторанов). Успех модели проявляется в стабильном потоке доходов от франчайзинга, сравнительной привлекательности франчайзинговых предложений по сравнению с прямыми конкурентами.

3) Стратегические приобретения и инвестиции: приобретение десятков ресторанов на новых для компании рынках демонстрируют стремление Yum Brands Inc. расширить прямой контроль и рыночную долю. Такие приобретения направлены на ускорение роста, и повышают степень проникновения на новые и традиционные для компании рынки. Инвестиции приносят долгосрочные выгоды, укрепив рыночные позиции компании, и обеспечивая рост выручки в будущем.

Yum Brands имеет возможность расширения, – особенно на развивающихся рынках, где растет спрос на фастфуд. Устоявшиеся бренды компании и успешная франчайзинговая модель обеспечивают основу для выхода на новые территории, завоевания дополнительной доли рынка.

Внедрение технологических инноваций, хотя и требует значительных стартовых вложений, может повысить эффективность использования ресурсов, и качество обслуживания клиентов компании. Компания уже частично использует технологии для оптимизации процессов оформления заказов, управления цепочкой поставок, основанных на данных. Инвестиции в цифровые платформы и мобильные приложения привлекают технически подкованных потребителей, наращивают доходы, в том числе – за счет онлайн-продаж.

Предлагая новые, более «здоровые» варианты меню, наряду с традиционными блюдами, компания привлекает широкую клиентскую базу. Диверсификация меню также снижает операционные риски, связанные с изменением потребительских предпочтений, а также регуляторным давлением в сфере питания и здоровья.

У компании есть недостатки – нами выявлены следующие.

а) Зависимость от франчайзи: хотя франчайзинговая модель дает множество преимуществ, она также повышает зависимость от франчайзи с точки зрения репутационных потерь, утраты контроля, устойчивости денежных потоков. Yum Brands Inc. в значительной степени зависит от роялти по франшизам, а также от «маркетинговых» взносов, которые составляют существенную часть ее совокупного дохода. Эта зависимость создает риски, – если франчайзи столкнутся с операционными трудностями, это потенциально может повлиять на эффективность компании в целом, репутацию бренда [7].

б) Валютный риск: как глобальная компания Yum Brands Inc. подвержена валютному риску, который влияет на ее финансовые результаты.

Финансовые показатели компании в последние кварталы (2025 г.) часто демонстрируют негативное влияние валютных колебаний на прибыль подразделений в отдельных странах присутствия. Волатильность рынков в 2025 г. оказывала негативное воздействие валютных курсов на результаты зарубежных операций. Управление этим риском имеет важное значение для обеспечения стабильности финансовых показателей компании.

б) Насыщение рынка и конкуренция: Yum Brands Inc работает в высококонкурентной индустрии быстрого питания, где степень насыщения рынка ограничивает возможности роста. Имея значительное число точек продаж по всему миру, компания должна поддерживать захваченную ранее долю рынка в условиях жесткой конкуренции – как со стороны традиционных игроков (прямых конкурентов), так и со стороны новых концепций быстрого питания. Конкурентная среда требует постоянных инноваций, адаптации к предпочтениям потребителей и новым технологиям, что требует дополнительных ресурсов и текущих затрат [8].

Эта проблема, в частности, проявилась в убыточности многих ресторанов Pizza Hut. Проведенный нами анализ показывает, что продажа проблемного актива – Pizza Hut – может улучшить перспективы роста компании. Продажа Pizza Hut может устранить важный источник риска низкой доходности, повысить уверенность инвесторов в более устойчивом росте Yum Brands, в перспективе. Однако это приведет к временному снижению суммы добавленной стоимости, и прибыли холдинга в целом – поэтому такая корректировка стратегии понравится не всем стейкхолдерам компании – внутренним (франчайзи и акционеры), и внешним (потребители, местные власти, и др.).

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АДАПТАЦИЯ БИЗНЕС-МОДЕЛИ К ВНЕШНЕЙ СРЕДЕ: КЛЮЧ К ПОВЫШЕНИЮ ЭФФЕКТИВНОСТИ ФУНКЦИОНИРОВАНИЯ КОМПАНИИ БЫСТРОГО ПИТАНИЯ

Аннотация. *Отрасль быстрого питания («фаст фуд») в современном мире ориентирована на значительные масштабы, охват массовых рынков. В то же время традиционные сети быстрого питания зачастую проигрывают в конкурентной борьбе более молодым, высокотехнологичным компаниям. Наиболее актуальный фактор повышения эффективности функционирования компании быстрого питания – адаптация бизнес-модели на основе современных технологий, формирование нового ценностного предложения через цифровые, сетевые каналы распределения, коммуникации, продвижения. В статье предпринята попытка изучения лучших практик в этой области на примере международной компании Yum! Brands.*

Ключевые слова: *бизнес-модель, адаптация, внешняя среда, быстрое питание, компания Yum! Brands, эффективность.*

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ADAPTING THE BUSINESS MODEL TO THE EXTERNAL ENVIRONMENT: THE KEY TO IMPROVING THE EFFICIENCY OF A FAST-FOOD COMPANY

Abstract. *The fast-food industry today is focused on scale and mass market reach. At the same time, traditional fast-food chains often lose out to younger, high-tech companies in the competitive landscape. The most pressing factor for improving the efficiency of a fast-food company is adapting its business model to modern technologies and developing a new value proposition through digital and online distribution channels, communications, and promotion. This article examines best practices in this area using the example of the international company Yum! Brands.*

Keywords: *business model, adaptation, external environment, fast food, Yum! Brands, efficiency*

Отличия каждой из десятков сетей быстрого питания формируются исходя из местоположения, исторического опыта, стратегии развития. Но главное различие определяется внедряемой бизнес-моделью.

Бизнес-модели описывают, как компания создает, продвигает, реализует ценность (новую стоимость). Бизнес-модель включает в себя ценностные предложения, целевые сегменты рынка, целевую аудиторию, потоки доходов и затрат, каналы коммуникации, распределения, отношений с клиентами, ключевые ресурсы.

Среди стандартных типов бизнес-моделей выделяют модели производителя, розничного продавца, торговой площадки, франшизы, партнерской программы, подписки, платных услуг, иные [4]. Компании часто комбинируют две и более модели.

В зависимости от целевого рынка выделяют модели B2B («бизнес для бизнеса») – они предполагают транзакции между предприятиями; модели B2C («бизнес для частного потребителя») – обслуживание физических лиц, индивидуальных потребителей; модели C2C («частное лицо для частных лиц») – товарный обмен между частными лицами на разных платформах [5].

В отрасли «быстрого» питания бизнес-модели имеют свои особенности, зачастую они отдают приоритет скорости, доступности, масштабируемости для доходного обслуживания большого числа клиентов. Такие компании нередко полагаются на стандартизированные процессы, франчайзинг, технологии высокой оборачиваемости, контроля затрат [1].

Основные предложения в отрасли включают быстрое обслуживание, хороший вкус, относительно низкие цены, удобные варианты, такие как цифровые приложения. Многие сети фаст-фуд делают акцент на комплексных обедах, семейных предложениях, тем самым стремясь привлечь потребителей «эконом»-сегмента. Дополнительные к выручке источники доходов включают программы лояльности, сезонные акции, при этом высокие объемы продаж компенсируют небольшой чек.

Основные виды деятельности в отрасли включают приготовление пищи, управление запасами, обучение персонала, обеспечение скорости оборота ресурсов. Ресурсы включают кухонное оборудование, приложения, места расположения [2]. Расходы включают в себя в том числе сырье, пищевые ингредиенты, оплату труда, аренду, коммунальные услуги, маркетинг.

Компания Yum! Brands, Inc. (биржевой тикер YUM) была основана в 1997 г. Это видный представитель отрасли быстрого питания, владелец ряда успешных брендов. Компания имеет в управлении более 60 тысяч ресторанов в ста пятидесяти пяти странах (на осень 2025 года). Ее основные бренды — KFC (жареная курица), Pizza Hut и Taco Bell (мексиканская кухня), The Habit Burger Grill [3].

В ноябре 2016 года компания выделила свои торговые точки в материковом Китае в новое юридическое лицо – Yum China Holdings Inc. Инвесторы получили одну акцию Yum China за каждую принадлежащую им акцию Yum Brands. Китайская дочерняя компания выплачивает своей материнской компании лицензионный сбор в размере трех процентов продаж.

Несмотря на геополитическую неопределенность, компания продолжает открывать новые магазины, разрабатывать новые блюда, расширять свои мощности для цифровых заказов.

Инвесторы и топ-менеджмент компании нацелены на глобальный рост при минимальных затратах. Бизнес-модель компании основана на широком использовании франчайзинга, – это позволяет перенести капитальные единовременные затраты на франчайзи. Компания получает «роялти» без владения ресторанами сети. Такая стратегия в XXI веке оправдывает себя, обеспечивает прибыль, стимулирует расширение, рост дивидендов и рыночной цены акций, повышение капитализации компании.

В последние годы Yum Brands позиционирует себя в качестве ресторанной империи, ориентированной преимущественно на цифровые технологии [3]. Только в 2024 году продажи через цифровые платформы выросли на 15% и составили 51 процент общего объема продаж.

Компания Yum запустила «Byte by Yum!», новую облачную платформу, которая использует инструменты искусственного интеллекта для увеличения продаж, на основе предпочтений клиентов. Новое программное обеспечение помогает франчайзи оптимизировать некоторые функции, такие как заказ продуктов питания, учет запасов, а также сократить накладные издержки.

Более половины продаж (около 58% в 2025 г.) осуществляются в «цифровом формате» [3]. Отдельные инструменты искусственного интеллекта позволяют частично оптимизировать отдельные операции. Активное использование современных технологий позволяет компании адаптироваться к новым условиям конкурентного рынка быстрого питания.

Тем самым компания обеспечивает устойчивость своей бизнес-модели на будущее.

Важный для инвесторов показатель – отношение цены обыкновенной акции Yum Brands к прибыли – составляет 24,2 (сентябрь 2025 г.), это на 44 процента превышает среднеотраслевой показатель [6].

В настоящее время почти 99 процентов торговых точек компании находятся в управлении франчайзи. Основную часть доходов компания получает от роялти, комиссионных сборов, взимаемых с операторов (от трех до шести процентов от выручки).

Только за первый квартал 2025 года компания открыла 751 новую торговую точку. В результате ее выручка выросла с 1,6 до 1,8 млрд долларов. Однако консенсус-прогноз инвесторов (1,85 млрд долларов выручки) не был достигнут – это негативный фактор для цены акций [3].

Выручка в ранее работавших магазинах выросла в среднем на три процента (первый квартал 2025 г. к первому кварталу 2024 г.) – без учета колебаний валютных курсов. Продажи увеличились на девять процентов в Taco Bell (это лучший среди брендов компании показатель), и на два процента в KFC. Одновременно компания зафиксировала снижение на два процента в ресторанах Pizza Hut – это отрицательный для менеджмента факт.

Одновременно у компании были непредвиденные расходы, в том числе связанные с переездом штаб-квартиры KFC из штата Кентукки в штат Техас (в результате корпоративного конфликта политического характера). Но все же прибыль компании возросла на с 1,15 до 1,30 доллара в расчете на акцию (плюс 13 процентов, квартал к тому же кварталу 2024 г.). Это немного выше, чем консенсус-прогноз инвесторов (1,29 доллара).

Компания в 2025 г. увеличила квартальные дивиденды акционеров на шесть процентов – 0,71 доллара на акцию вместо прошлых 0,67 доллара [6]. Это положительный для акционеров и инвесторов факт.

Результаты проведенного анализа позволяют сделать вывод о том, что корпоративная бизнес-модель, основанная на франчайзинге, позволяет компании наращивать масштабы и доходы, перекладывая капитальные затраты на плечи франчайзи. Одновременно цифровые инновации, облачные технологии, искусственный интеллект позволяют компании успешно адаптироваться к новым реалиям рынка, способствуют росту продаж темпами, опережающими рост старой сети ресторанов компании.

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ПРОБЛЕМЫ РЕАЛИЗАЦИИ СТРАТЕГИИ ЦИФРОВОЙ ТРАНСФОРМАЦИИ

Аннотация: *Статья посвящена анализу проблем реализации стратегии цифровой трансформации в системе государственного управления в социальной сфере. Рассматриваются кадровые, организационные, технологические, нормативные и инфраструктурные барьеры, затрудняющие достижение целевых показателей цифрового развития.*

Ключевые слова: *цифровая трансформация, стратегия, государственное управление, цифровые сервисы, электронный документооборот, кадровый дефицит, информационная безопасность*

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PROBLEMS OF IMPLEMENTING THE DIGITAL TRANSFORMATION STRATEGY

Abstract: *The article analyzes the problems of implementing the digital transformation strategy in public administration and the social sphere. It examines кадровые, organizational, technological, regulatory, and infrastructure barriers that hinder the achievement of digital development targets.*

Keywords: *digital transformation, strategy, public administration, digital services, electronic document management, personnel shortage, information security*

Современная цифровая трансформация государственного управления выступает одним из ключевых направлений повышения эффективности публичной власти, доступности услуг и качества межведомственного взаимодействия. В то же время практика показывает, что формальное утверждение стратегических документов не гарантирует их успешной

реализации, поскольку цифровая трансформация требует согласованной работы органов власти, устойчивого финансирования, развития инфраструктуры и подготовки кадров.

Актуальность темы обусловлена тем, что в России стратегическое направление в области цифровой трансформации государственного управления утверждено до 2030 года и включает масштабные целевые ориентиры: переход органов власти на электронный документооборот, расширение онлайн-форматов оказания услуг, использование платформы «ГосТех», развитие цифрового профиля гражданина и интеграцию данных в государственные информационные системы. Однако достижение этих целей связано с рядом проблем, которые уже на стадии планирования и внедрения оказывают влияние на результативность цифровой политики.

Для дальнейшего рассмотрения необходимо определить содержание понятия стратегии цифровой трансформации. В практическом смысле цифровизация государственного управления включает цифровизацию процессов управления, развитие цифровых государственных услуг, управление данными, межведомственное взаимодействие, внедрение проектного подхода, KPI и механизмов оценки эффективности, а также управление изменениями. Следовательно, стратегия цифровой трансформации представляет собой не только набор технологических решений, но и комплекс организационных, правовых и управленческих мер, направленных на изменение модели работы органов власти.

Исходя из этого, проблемы реализации стратегии цифровой трансформации можно определить как совокупность факторов, которые ограничивают достижение поставленных целей цифрового развития, снижают темпы внедрения цифровых решений и усложняют их практическую интеграцию в деятельность органов власти и подведомственных учреждений. К таким факторам относятся дефицит компетенций, недостаточная координация, разнородность информационных систем, вопросы импортозамещения, ограничения по финансированию, а также риски информационной безопасности.

Одной из наиболее острых проблем является кадровый дефицит и недостаток цифровых компетенций. Реализация цифровой стратегии требует специалистов, способных сопровождать информационные системы, организовывать межведомственные процессы, работать с данными и обеспечивать внедрение новых сервисов. При этом в научных и аналитических материалах отмечается, что отсутствие необходимых цифровых компетенций и кадровых ресурсов выступает одним из ключевых барьеров цифровой трансформации. В результате даже при наличии нормативной базы и программных целей фактическое исполнение мероприятий замедляется.

Не менее значимой является организационная проблема межведомственной координации. Цифровая трансформация предполагает согласованность действий федеральных, региональных и муниципальных

органов власти, однако на практике нередко возникают дублирование функций, невыстроенность ответственности и недостаток методической поддержки со стороны центра. Такая ситуация снижает управляемость проектов и затрудняет единое внедрение цифровых решений на разных уровнях публичной власти.

Существенным барьером остается технологическая неоднородность и недостаточная зрелость информационной инфраструктуры. В государственных и муниципальных структурах продолжают сосуществовать различные информационные системы, архитектуры и стандарты, что осложняет интеграцию данных и переход к единому цифровому пространству. Актуализированное стратегическое направление 2024 года прямо ориентирует органы власти на использование платформы «ГосТех», электронного документооборота и централизованного хранения архивных документов, что показывает стремление государства устранить фрагментарность ИТ-среды. Однако сама необходимость такого перехода свидетельствует о наличии прежних инфраструктурных ограничений.

Отдельного внимания требует проблема импортозамещения и технологической независимости. В условиях ограниченного доступа к ряду зарубежных технологий вопросы замены программного обеспечения, серверного оборудования и технической поддержки становятся критически важными. В публикациях о цифровизации регионов отмечается, что импортозамещение является одним из главных вызовов, поскольку отечественные решения не всегда сопоставимы по стоимости, совместимости и зрелости с ранее используемыми зарубежными продуктами. Это повышает риски сбоев и замедления внедрения цифровых платформ.

Еще одна проблема связана с финансовыми ограничениями. Цифровая трансформация требует значительных затрат на разработку, сопровождение, обучение персонала, модернизацию оборудования и обеспечение информационной безопасности. При этом результативность вложений не всегда проявляется быстро, а в условиях ограниченных бюджетов возникает конкуренция между цифровыми проектами и иными приоритетами управления. Именно поэтому реализация стратегии должна сопровождаться не только планированием целей, но и реалистичной оценкой ресурсов.

Нельзя игнорировать и риски информационной безопасности и доверия к цифровым сервисам. В стратегическом направлении 2024 года отдельно подчеркивается необходимость обеспечения устойчивого и безопасного информационного взаимодействия между государством, гражданами и бизнесом. Это связано с тем, что рост количества электронных сервисов увеличивает нагрузку на защиту персональных данных, устойчивость инфраструктуры и надежность платформ. Недостаточная защищенность способна снижать доверие граждан и препятствовать расширению использования цифровых услуг.

Если рассматривать проявления этих проблем в социальной сфере, то цифровая трансформация здесь опирается на концепцию перехода к более проактивной, платформенной и адресной модели предоставления мер поддержки. При этом в научных и аналитических источниках подчеркивается, что такой переход требует не только цифровых платформ, но и устойчивой межведомственной интеграции, единых реестров, корректного обмена данными и готовности регионов к новым форматам работы. Следовательно, проблемы цифровой трансформации в социальной сфере во многом совпадают с общими проблемами цифровой стратегии государства.

Таким образом, реализация стратегии цифровой трансформации сталкивается не с одной, а с комплексом взаимосвязанных проблем. К числу наиболее существенных относятся кадровый дефицит, слабая межведомственная координация, технологическая разнородность, ограниченность ресурсов, зависимость от импортных решений и риски информационной безопасности. Решение этих проблем требует системного подхода, включающего развитие компетенций, унификацию архитектуры цифровых решений, усиление методической поддержки регионов и поэтапный мониторинг результатов внедрения. Именно при таком подходе стратегия цифровой трансформации может перейти из уровня декларации в уровень устойчивой практической реализации.

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ИСТОРИЯ И СОВРЕМЕННОСТЬ В ПРЕПОДАВАНИИ КЛИНИЧЕСКИХ ДИСЦИПЛИН: ТРАДИЦИИ, ИННОВАЦИИ, ПЕРСПЕКТИВЫ

Аннотация: *в статье рассматриваются исторические этапы становления преподавания клинических дисциплин в системе среднего профессионального медицинского образования. Анализируется вклад выдающихся отечественных клиницистов (Н.И. Пирогова, С.П. Боткина, И.П. Павлова) в развитие клинического обучения. Раскрываются современные подходы к преподаванию клинических дисциплин: симуляционное обучение, проблемно-ориентированный метод (PBL), клиническое мышление, междисциплинарный подход. Особое внимание уделяется интеграции традиционных (клинический разбор, курация пациентов) и инновационных (виртуальные симуляторы, телекоммуникационные технологии) методов обучения. Статья адресована преподавателям клинических дисциплин медицинских колледжей и вузов, а также всем интересующимся вопросами медицинской педагогики.*

Ключевые слова: *клинические дисциплины, преподавание в медицинском колледже, история медицины, клиническое мышление, симуляционное обучение, PBL (problem-based learning), компетентностный подход, медицинская педагогика.*

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HISTORY AND MODERNITY IN TEACHING CLINICAL DISCIPLINES: TRADITIONS, INNOVATIONS, PROSPECTS

Abstract. *The article examines the historical stages of the formation of teaching clinical disciplines in the system of secondary professional medical*

education. The contribution of outstanding Russian clinicians (N.I. Pirogov, S.P. Botkin, I.P. Pavlov) to the development of clinical teaching is analyzed. Modern approaches to teaching clinical disciplines are revealed: simulation training, problem-based learning (PBL), clinical thinking, interdisciplinary approach. Special attention is paid to the integration of traditional (clinical analysis, patient supervision) and innovative (virtual simulators, telecommunication technologies) teaching methods. The article is addressed to teachers of clinical disciplines of medical colleges and universities, as well as to everyone interested in medical pedagogy.

Keywords: *clinical disciplines, teaching in medical college, history of medicine, clinical thinking, simulation training, PBL (problem-based learning), competency-based approach, medical pedagogy.*

Подготовка квалифицированных специалистов среднего звена в системе медицинского образования — задача, имеющая не только образовательное, но и глубокое социальное значение. Именно медицинские сёстры, фельдшеры, акушерки первыми встречают пациента в амбулаторном звене, обеспечивают уход и выполнение врачебных назначений в стационаре, участвуют в профилактической работе. Поэтому качество преподавания клинических дисциплин в медицинском колледже напрямую влияет на безопасность и эффективность оказания медицинской помощи населению.

Преподавание клинических дисциплин прошло длительный и сложный путь развития — от схоластического заучивания догм до современных компетентностных моделей, ориентированных на формирование практических навыков и клинического мышления. Как отмечал выдающийся русский хирург и педагог Н.И. Пирогов, «учиться лечить можно только у постели больного». Этот принцип остаётся актуальным и сегодня, хотя методы обучения стали значительно разнообразнее и технологичнее [1; 4].

Цель настоящей статьи — проследить эволюцию преподавания клинических дисциплин от XIX века до наших дней, проанализировать вклад классиков отечественной клинической школы, а также охарактеризовать современные подходы и технологии обучения в медицинском колледже.

Исторические этапы становления преподавания клинических дисциплин

Период XVIII — первой половины XIX века: от схоластики к клинике. В европейских университетах (Падуя, Лейден, Эдинбург) постепенно утверждался принцип клинического преподавания. В России пионером клинического обучения стал Московский университет, где М.Ф. Мудров (1776–1831) ввёл практические занятия у постели больного, разработал систему клинического обследования и создал первую научную школу терапевтов [2].

Вторая половина XIX века — начало XX века: золотой век русской клинической школы. Именно в этот период были сформулированы основные

принципы преподавания клинических дисциплин, которые легли в основу отечественной медицинской педагогики.

Н.И. Пирогов (1810–1881) совершил настоящую революцию в преподавании, внедрив:

- систематический обход больных со студентами;
- клинические разборы сложных случаев;
- обязательное участие студентов в ночных дежурствах;
- принципы оперативной хирургии и топографической анатомии («ледяная анатомия»).

С.П. Боткин (1832–1889) создал крупнейшую терапевтическую школу и разработал методологию клинического мышления. Он учил студентов не просто констатировать симптомы, а понимать патогенез заболевания и прогнозировать его течение. Боткин ввёл в практику преподавания лабораторные исследования и функциональную диагностику.

И.П. Павлов (1849–1936) заложил основы экспериментального подхода в клинике, показав значение физиологии для понимания патологических процессов. Его исследования высшей нервной деятельности стали теоретическим фундаментом для преподавания неврологии и психиатрии [3].

Советский период (1917–1991): стандартизация и практическая направленность. После Октябрьской революции медицинское образование стало массовым и доступным. В средних медицинских учебных заведениях (фельдшерско-акушерские школы, медицинские училища, затем колледжи) преподавание клинических дисциплин было ориентировано на формирование чётких практических навыков по уходу за больными, выполнению инъекций, перевязок, оказанию неотложной помощи.

В этот период были созданы:

- типовые учебные программы по клиническим дисциплинам;
- учебники и методические пособия для среднего медперсонала;
- системы производственной практики под контролем опытных наставников.

Вместе с тем, жёсткая централизация и идеологизация образования приводила к недостаточной гибкости и замедленному обновлению содержания обучения [4].

Современное преподавание клинических дисциплин (рубеж XX–XXI веков — настоящее время)

Современный этап развития медицинского образования характеризуется рядом принципиальных изменений, обусловленных внедрением компетентностного подхода, стандартизацией профессиональной деятельности (профессиональные стандарты, WorldSkills), цифровой трансформацией образования и пандемией COVID-19, показавшей необходимость дистанционных и гибридных форматов обучения [5].

Основные современные подходы к преподаванию клинических дисциплин в медицинском колледже

1. Компетентностный подход и ФГОС СПО нового поколения. Обучение ориентировано не на объём усвоенной информации, а на способность выпускника решать профессиональные задачи в типичных и нетипичных ситуациях. Формируются общие и профессиональные компетенции (ОК и ПК), зафиксированные в Федеральных государственных образовательных стандартах.

2. Симуляционное обучение (Simulation-based learning). Это один из наиболее значимых прорывов последних двух десятилетий. Симуляционные центры и кабинеты оснащаются:

- фантомами и муляжами для отработки манипуляций (инъекции, катетеризация, перевязки, сердечно-лёгочная реанимация);
- манекенами-тренажёрами с электронным контролем;
- виртуальными симуляторами (например, для отработки действий в критических ситуациях);
- роботами-симуляторами (высокотехнологичные манекены, имитирующие физиологические реакции — пульс, дыхание, звуки сердца).

Симуляционное обучение позволяет многократно отрабатывать навыки без риска для пациента, создавать «контролируемую ошибку», разбирать алгоритмы действий в безопасной среде.

3. Проблемно-ориентированное обучение (PBL — Problem-Based Learning). Студентам предлагается клиническая задача (кейс), приближенная к реальной ситуации. Они работают в малых группах, самостоятельно выявляют проблему, формулируют гипотезы, ищут информацию и предлагают решение. Преподаватель выступает не транслятором знаний, а фасилитатором (модератором). Такой подход активно готовит к реальной работе, где медсестра или фельдшер часто принимает решение в условиях неопределённости [6].

4. Формирование клинического мышления. Это ключевая задача преподавания клинических дисциплин на современном этапе. Клиническое мышление включает:

- умение собирать и анализировать жалобы, анамнез;
- выявлять объективные симптомы;
- сопоставлять данные с патогенезом;
- дифференцировать заболевания;
- формулировать диагноз (в рамках компетенции среднего медперсонала — сестринский диагноз);
- определять тактику действий (неотложная помощь, наблюдение, направление к врачу).

Формирование клинического мышления достигается через:

- разбор клинических ситуаций;
- курацию пациентов (под контролем преподавателя);
- участие в клинических конференциях (в том числе онлайн);
- решение ситуационных задач на каждом занятии.

5. Междисциплинарный и интегративный подход. Клинические дисциплины не преподаются изолированно. Интегрируются знания по анатомии, физиологии, патологии, фармакологии, психологии, эпидемиологии, общественному здоровью. Например, при изучении темы «Сахарный диабет» рассматриваются нормальная физиология поджелудочной железы, патофизиология инсулинорезистентности, фармакология сахароснижающих препаратов, обучающие школы для пациентов, профилактика диабетической стопы.

6. Использование информационно-коммуникационных технологий и дистанционных форматов. Внедряются:

- электронные образовательные ресурсы (лекции, тесты, видео);
- виртуальные пациенты и симуляции;
- телемедицинские кейсы;
- онлайн-конференции и вебинары с участием практикующих врачей;
- возможности для самостоятельной работы через платформы (Moodle, Google Classroom).

Пандемия COVID-19 ускорила этот процесс. Однако дистанционные технологии рассматриваются как дополнение, а не замена практической подготовки у постели больного.

7. Профессиональные чемпионаты (WorldSkills, Абилимпикс). Участие в чемпионатах по компетенции «Медицинский и социальный уход», «Фельдшерская помощь» и другим позволяет студентам отрабатывать навыки в условиях «стресса успеха» и совершенствовать стандарты выполнения процедур.

Традиционные методы, сохраняющие своё значение

Наряду с инновациями, сохраняются и развиваются классические методы:

- Клинический разбор (у постели больного или на основе истории болезни). Н.И. Пирогов и С.П. Боткин считали это основой основ. Сегодня клинический разбор дополняется мультимедийными презентациями и телемедицинскими возможностями.
- Курация пациентов. Студент работает с конкретным пациентом под руководством преподавателя — это незаменимый опыт.
- Работа в малых группах. Обсуждение клинических ситуаций, «мозговые штурмы».
- Мастер-классы практикующих специалистов. Приглашение врачей и медсестёр из стационаров и поликлиник.

Проблемы и противоречия современного преподавания клинических дисциплин

1. Разрыв между учебной симуляцией и реальной клиникой. Даже самый совершенный робот-симулятор не заменит живого пациента с его эмоциональными реакциями и многогранностью проявлений болезни.

2. Снижение количества клинических баз и уменьшение объёмов практики. Реформа здравоохранения, оптимизация стационаров, высокая занятость персонала ограничивают возможности для полноценной курации.

3. Недостаточная подготовка преподавателей к работе с новыми технологиями. Не каждый преподаватель старой закалки готов внедрять PBL, электронные ресурсы и симуляционное оборудование.

4. Бумажная нагрузка. Заполнение огромного количества отчётной документации отнимает время, которое могло бы быть направлено на непосредственную работу со студентами.

5. Сопротивление инновациям. Часть преподавательского корпуса консервативна и продолжает использовать преимущественно лекционно-репродуктивные методы.

Перспективы развития преподавания клинических дисциплин

1. Гибридное обучение (blended learning) — оптимальное сочетание очных практических занятий, симуляций и дистанционных теоретических модулей.

2. Массовое внедрение стандартизированных пациентов (актёры, симулирующие различные патологии), что особенно актуально для отработки коммуникативных навыков (сбор анамнеза, сообщение неблагоприятного прогноза и др.).

3. Развитие системы наставничества (mentorship) — закрепление за каждым студентом опытного практикующего наставника на весь период обучения клиническим дисциплинам.

4. Цифровое портфолио студента — фиксация всех освоенных манипуляций, кейсов, результатов тестирования.

5. Интеграция с непрерывным медицинским образованием (НМО) — формирование навыков обучения на протяжении всей жизни.

6. Участие студентов в клинических исследованиях и научных кружках (в рамках колледжа — создание студенческого научного общества клинического профиля).

Заключение

Преподавание клинических дисциплин за два с лишним века прошло путь от отдельных клинических лекций у постели больного до высокотехнологичной системы симуляционного обучения, PBL-кейсов и цифровых образовательных ресурсов. Классические традиции русской клинической школы — уважение к пациенту, тщательность обследования, клиническое мышление, ответственность — остаются незыблемой основой, на которой базируются любые инновации.

Современный преподаватель клинических дисциплин в Армавирском медицинском колледже призван гармонично сочетать традиционные методы (клинический разбор, курацию) с инновациями (симуляторы, PBL, дистанционные технологии). Только такой интегративный подход позволяет подготовить конкурентоспособного, безопасного и компетентного специалиста среднего звена, отвечающего вызовам XXI века.

Дальнейшие исследования и методические разработки должны быть направлены на поиск оптимальных моделей гибридного обучения, создание банка качественных клинических кейсов для среднего медицинского персонала, а также на повышение квалификации преподавателей в области современной медицинской педагогики.

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РОЛЬ ПРЕДПРИНИМАТЕЛЬСТВА В ОБЕСПЕЧЕНИИ УСТОЙЧИВОГО ЭКОНОМИЧЕСКОГО РОСТА: ESG-ПОДХОД И «ЗЕЛЁНЫЕ» БИЗНЕС-МОДЕЛИ

Аннотация*: В статье рассматривается роль предпринимательства в обеспечении устойчивого экономического роста в контексте внедрения ESG-подхода и развития «зелёных» бизнес-моделей. Обоснована значимость интеграции экологических, социальных и управленческих факторов в предпринимательскую деятельность как ключевого условия повышения конкурентоспособности и инвестиционной привлекательности бизнеса. Проведён анализ современных тенденций развития устойчивого предпринимательства, включая распространение экологически ориентированных инноваций и циркулярных моделей экономики. Особое внимание уделено влиянию ESG-принципов на финансовые результаты компаний и устойчивость малых и средних предприятий. На основе обобщения международных исследований показано, что внедрение «зелёных» практик способствует снижению издержек и формированию долгосрочной экономической эффективности. Сделан вывод о необходимости активизации государственной поддержки и развития институциональной среды для стимулирования устойчивого предпринимательства.*

Ключевые слова: *предпринимательство, устойчивое развитие, ESG-подход, зелёная экономика, бизнес-модели, малый и средний бизнес, инновации, инвестиционная привлекательность, экологическая устойчивость, экономический рост.*

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THE ROLE OF ENTREPRENEURSHIP IN SUSTAINABLE ECONOMIC GROWTH: AN ESG APPROACH AND "GREEN" BUSINESS MODELS

Abstract: *This article examines the role of entrepreneurship in ensuring sustainable economic growth in the context of the implementation of an ESG approach and the development of "green" business models. The importance of integrating environmental, social, and governance factors into entrepreneurial activity is substantiated as a key condition for increasing the competitiveness and*

investment attractiveness of businesses. An analysis of current trends in the development of sustainable entrepreneurship is provided, including the spread of environmentally oriented innovations and circular economy models. Particular attention is paid to the impact of ESG principles on the financial performance of companies and the sustainability of small and medium-sized enterprises. A review of international research demonstrates that the implementation of green practices contributes to cost reduction and long-term economic efficiency. It concludes that increased government support and the development of an institutional environment are needed to stimulate sustainable entrepreneurship.

Keywords: *entrepreneurship, sustainable development, ESG approach, green economy, business models, small and medium businesses, innovation, investment attractiveness, environmental sustainability, economic growth.*

Введение

В условиях нарастающих глобальных вызовов, включая изменение климата, истощение природных ресурсов и усиление социально-экономического неравенства, особую значимость приобретает переход к модели устойчивого экономического роста. По данным международных организаций, к 2030 году глобальные экономические потери от климатических изменений могут достигнуть более **$23 трлн**, что делает вопросы экологической и социальной устойчивости ключевыми для развития национальных экономик. В этих условиях предпринимательство рассматривается как один из основных драйверов трансформации экономики в сторону устойчивых моделей развития.

Современные тенденции свидетельствуют о стремительном росте значимости ESG-подхода (Environmental, Social, Governance) в предпринимательской деятельности. Так, более 90% крупнейших компаний мира уже внедряют ESG-принципы в свою деятельность, а объем глобальных ESG-инвестиций превысил $18 трлн с прогнозом роста до $30 трлн к 2026 году. Это свидетельствует о формировании нового стандарта ведения бизнеса, ориентированного не только на прибыль, но и на долгосрочную устойчивость.

Особую роль в данном процессе играет малый и средний бизнес, на долю которого приходится около 90% всех предприятий и более 50% занятости в мире. Исследования показывают, что около 90% малых и средних предприятий, внедривших экологические практики, отмечают снижение издержек и повышение эффективности. Кроме того, в странах Европейского союза доля предприятий, инвестирующих в энергоэффективные технологии, увеличилась до 57,9%, что отражает рост интереса к «зелёным» бизнес-моделям.

Предпринимательство в условиях устойчивого развития выступает не только как экономический, но и как социально значимый институт, способствующий внедрению инноваций, созданию рабочих мест и развитию региональных экономик. В частности, исследования показывают, что в более

чем 90% случаев наблюдается положительная или нейтральная связь между внедрением ESG-принципов и финансовыми результатами компаний, что подтверждает экономическую целесообразность устойчивых практик.

Несмотря на положительную динамику, развитие ESG-ориентированного предпринимательства сталкивается с рядом ограничений. По оценкам экспертов, до 75% компаний не готовы в полной мере соответствовать требованиям ESG, а лишь около 36% малых и средних предприятий рассматривают устойчивое развитие как стратегический приоритет. Это свидетельствует о необходимости совершенствования институциональной среды и усиления государственной поддержки.

Целью настоящего исследования является анализ роли предпринимательства в обеспечении устойчивого экономического роста на основе внедрения ESG-подхода и развития «зелёных» бизнес-моделей. Для достижения поставленной цели в работе решаются следующие задачи: изучение теоретических основ устойчивого предпринимательства, анализ влияния ESG-принципов на экономические показатели бизнеса, а также выявление ключевых факторов и барьеров развития «зелёных» бизнес-моделей.

Научная новизна исследования заключается в комплексном рассмотрении взаимосвязи между предпринимательской активностью, ESG-подходом и устойчивым экономическим ростом, а также в обосновании значимости «зелёных» бизнес-моделей как инструмента повышения эффективности и конкурентоспособности бизнеса в современных условиях. Практическая значимость работы определяется возможностью использования полученных результатов при разработке стратегий развития предпринимательства и государственной политики в сфере устойчивого развития.

Материалы и методы исследования

Данное исследование носит обзорный (review) характер и направлено на систематизацию современных научных подходов к оценке роли предпринимательства в обеспечении устойчивого экономического роста в контексте ESG-подхода и развития «зелёных» бизнес-моделей.

В качестве материалов исследования использованы научные публикации отечественных и зарубежных авторов, индексируемые в международных базах данных (Scopus, Web of Science), аналитические отчёты международных организаций (ООН, OECD, Всемирный банк, Global Entrepreneurship Monitor), а также статистические данные, отражающие динамику развития ESG-инвестиций, малого и среднего предпринимательства и «зелёной» экономики. Дополнительно проанализированы нормативно-правовые документы и стратегические программы, регулирующие развитие устойчивого предпринимательства на национальном и международном уровнях.

Методологическую основу исследования составляют общенаучные и специальные методы анализа. Применён системный подход, позволяющий

рассматривать предпринимательство как комплексный социально-экономический институт в условиях устойчивого развития. Использованы методы сравнительного анализа для сопоставления международного опыта внедрения ESG-принципов, а также метод контент-анализа научных публикаций с целью выявления ключевых тенденций и закономерностей.

Для обобщения результатов применён метод научной абстракции, позволяющий выделить основные направления трансформации предпринимательства под влиянием ESG-факторов. Кроме того, использован метод структурно-логического анализа для формирования классификации «зелёных» бизнес-моделей и оценки их экономической эффективности.

Анализ статистических данных осуществлялся с применением методов описательной статистики, что позволило выявить количественные характеристики распространения ESG-практик и их влияния на экономические показатели предприятий. В рамках исследования также использован сравнительно-институциональный подход для оценки влияния регуляторной среды на развитие устойчивого предпринимательства в различных странах.

Цель статьи

Целью данной статьи является комплексное исследование роли предпринимательства в обеспечении устойчивого экономического роста на основе внедрения ESG-подхода и развития «зелёных» бизнес-моделей, а также выявление их влияния на экономическую эффективность, инвестиционную привлекательность и долгосрочную устойчивость бизнеса в современных условиях.

Результаты исследования

Понятие устойчивого экономического развития сформировалось во второй половине XX века как ответ на нарастающие глобальные экологические и социальные проблемы. Одним из ключевых этапов становления данной концепции стал доклад «Наше общее будущее» (1987 г.), подготовленный Комиссией ООН под руководством Г. Брундтланд, в котором устойчивое развитие было определено как развитие, удовлетворяющее потребности настоящего времени без ущерба для возможностей будущих поколений [3]. В дальнейшем данная концепция получила развитие в рамках международных соглашений, включая Повестку дня в области устойчивого развития до 2030 года, принятую ООН в 2015 году [7].

Параллельно с развитием концепции устойчивого развития формировалось понимание роли предпринимательства в обеспечении экономического роста. Классические теории предпринимательства, разработанные Й. Шумпетером, рассматривали предпринимателя как ключевого агента инноваций и экономической динамики [2]. В современных условиях данное понимание трансформировалось, включив в себя экологические и социальные аспекты, что привело к формированию

концепции устойчивого предпринимательства (sustainable entrepreneurship) [9].

В последние десятилетия значительное распространение получила концепция ESG (Environmental, Social, Governance), которая впервые была системно представлена в отчёте ООН «Who Cares Wins» в 2004 году [5]. ESG-подход предполагает интеграцию экологических, социальных и управленческих факторов в стратегию бизнеса и инвестиционную деятельность. В настоящее время ESG рассматривается как один из ключевых инструментов оценки устойчивости компаний и их долгосрочной эффективности [11].

Современные исследования показывают, что переход к устойчивой модели развития обусловлен не только экологическими, но и экономическими факторами. По оценкам Всемирного банка, ежегодные потери мировой экономики от климатических изменений и деградации окружающей среды составляют до 4% глобального ВВП, что эквивалентно более чем 3 трлн долларов США [6]. В долгосрочной перспективе, при отсутствии эффективных мер, данные потери могут превысить 20 трлн долларов к 2030 году [4].

В этих условиях предпринимательство приобретает ключевое значение как механизм адаптации экономики к новым вызовам. Предпринимательская деятельность обеспечивает внедрение инноваций, развитие новых рынков и повышение эффективности использования ресурсов. Согласно данным Global Entrepreneurship Monitor, более 60% предпринимателей в развитых странах учитывают экологические и социальные факторы при принятии стратегических решений, что свидетельствует о трансформации традиционных бизнес-моделей [8].

Теоретические основы устойчивого экономического роста включают как классические, так и современные подходы. Модель экономического роста Р. Солоу акцентировала внимание на капитале, труде и технологическом прогрессе как ключевых факторах роста [1]. Однако в современных условиях данная модель дополняется концепциями «зелёного роста» и циркулярной экономики, которые предполагают снижение экологической нагрузки при сохранении экономической эффективности [10]. В рамках данных подходов предпринимательство рассматривается как основной источник инноваций, способствующих переходу к устойчивым моделям развития.

Концепция ESG включает три ключевых компонента: экологический (Environmental), социальный (Social) и управленческий (Governance). Экологический аспект предполагает снижение выбросов парниковых газов, рациональное использование ресурсов и внедрение энергоэффективных технологий. Социальный компонент включает обеспечение достойных условий труда, соблюдение прав работников и взаимодействие с местными сообществами. Управленческий аспект связан с прозрачностью,

эффективным корпоративным управлением и соблюдением этических норм [12].

Распространение ESG-подхода в последние годы приобрело глобальный характер. По данным международных аналитических агентств, более 90% крупнейших компаний мира публикуют ESG-отчётность, а около 80% компаний привлекают независимую верификацию ESG-данных [5]. Объём глобальных ESG-инвестиций превысил 18 трлн долларов США, при этом ожидается их рост до 30 трлн долларов к 2026 году [9]. Это свидетельствует о формировании нового стандарта ведения бизнеса, ориентированного на долгосрочную устойчивость.

Особое значение в обеспечении устойчивого экономического роста имеет малый и средний бизнес. По данным Организации Объединённых Наций, на долю малого и среднего предпринимательства приходится около 90% всех предприятий и более 50% занятости в мире [7]. Несмотря на ограниченные ресурсы, малые предприятия обладают высокой гибкостью и способностью к внедрению инноваций. Исследования показывают, что около 90% малых и средних предприятий, внедривших экологические практики, отмечают снижение издержек и повышение эффективности [6].

Влияние ESG-принципов на финансовые показатели бизнеса является предметом многочисленных исследований. Анализ более 2000 эмпирических работ показывает, что в 90% случаев наблюдается положительная или нейтральная связь между ESG и финансовой эффективностью компаний [11]. Это подтверждает, что устойчивое развитие и прибыльность бизнеса не противоречат друг другу, а, напротив, взаимно усиливаются.

Развитие «зелёной» экономики представляет собой важнейшее направление трансформации предпринимательства. «Зелёные» бизнес-модели ориентированы на снижение негативного воздействия на окружающую среду и повышение эффективности использования ресурсов. По оценкам международных организаций, переход к «зелёной» экономике может создать более 24 млн новых рабочих мест к 2030 году [4]. Это свидетельствует о значительном потенциале устойчивого предпринимательства как фактора экономического роста.

Циркулярная экономика является одним из ключевых элементов «зелёной» трансформации. В отличие от линейной модели производства, циркулярная экономика предполагает повторное использование ресурсов, минимизацию отходов и продление жизненного цикла продукции. Исследования показывают, что внедрение циркулярных бизнес-моделей позволяет снизить производственные издержки на 15–30% [10].

Дополнительным фактором развития устойчивого предпринимательства является цифровизация экономики. Использование технологий искусственного интеллекта, больших данных и интернета вещей позволяет оптимизировать производственные процессы, снижать энергопотребление и повышать эффективность управления ресурсами. Компании, интегрирующие цифровые технологии с ESG-подходом,

демонстрируют более высокую производительность и устойчивость к внешним шокам [8].

В современных условиях предпринимательство выступает как ключевой элемент обеспечения устойчивого экономического роста. Интеграция ESG-принципов и развитие «зелёных» бизнес-моделей способствуют повышению эффективности бизнеса, снижению рисков и формированию долгосрочной конкурентоспособности.

В условиях усиления глобальных экологических и экономических вызовов особую значимость приобретает развитие «зелёных» бизнес-моделей как ключевого инструмента трансформации предпринимательства. «Зелёные» бизнес-модели представляют собой такие формы организации предпринимательской деятельности, которые ориентированы на минимизацию негативного воздействия на окружающую среду, рациональное использование ресурсов и создание долгосрочной экономической ценности [4]. В научной литературе выделяется несколько основных типов «зелёных» бизнес-моделей, включая циркулярные, низкоуглеродные (low-carbon), ресурсосберегающие и модели с нулевыми отходами (zero-waste) [10].

Циркулярные бизнес-модели основаны на принципах замкнутого цикла производства и потребления, при котором ресурсы используются повторно, а отходы минимизируются. По данным исследований Европейской комиссии, внедрение циркулярной экономики может повысить ресурсную продуктивность на 30% и снизить совокупные издержки предприятий на 15–25% [7]. Более того, переход к циркулярным моделям способен обеспечить дополнительный экономический эффект в размере до 4,5 трлн долларов США к 2030 году за счёт повышения эффективности использования ресурсов [9].

Низкоуглеродные бизнес-модели ориентированы на сокращение выбросов парниковых газов и переход к использованию возобновляемых источников энергии. В настоящее время более 70% крупных компаний внедряют стратегии декарбонизации, включая переход на возобновляемые источники энергии и оптимизацию производственных процессов [5]. По оценкам Международного энергетического агентства, переход к низкоуглеродной экономике может привести к снижению глобальных выбросов CO_2 на 40% к 2040 году [6].

Модели с нулевыми отходами (zero-waste) предполагают максимальное сокращение образования отходов за счёт переработки, повторного использования и изменения производственных процессов. Исследования показывают, что предприятия, внедряющие данные модели, могут снизить операционные расходы на 20–35% за счёт сокращения затрат на сырьё и утилизацию отходов [11]. В то же время такие модели способствуют формированию положительного имиджа компании и повышению лояльности потребителей.

Важным элементом устойчивого предпринимательства является интеграция ESG-принципов в стратегию бизнеса. Внедрение ESG-подхода требует трансформации бизнес-процессов, включая управление рисками, корпоративное управление и взаимодействие с заинтересованными сторонами. По данным исследований, более 75% инвесторов учитывают ESG-факторы при принятии инвестиционных решений, что делает ESG важным инструментом повышения инвестиционной привлекательности бизнеса [3].

Влияние ESG на финансовые показатели компаний подтверждается многочисленными эмпирическими исследованиями. В частности, компании с высоким уровнем ESG-показателей демонстрируют более низкую стоимость капитала и более высокую рентабельность активов [8]. Это обусловлено снижением рисков, связанных с экологическими и социальными факторами, а также повышением доверия со стороны инвесторов и потребителей. Более того, компании, активно внедряющие ESG-принципы, демонстрируют более высокую устойчивость к экономическим кризисам, что было подтверждено в ходе анализа последствий пандемии COVID-19 [12].

Особое значение ESG-подход имеет для малого и среднего предпринимательства. Несмотря на ограниченные ресурсы, малые предприятия обладают высокой гибкостью и способны быстрее адаптироваться к изменениям внешней среды. Согласно исследованиям, около 60% малых и средних предприятий, внедривших ESG-практики, отмечают улучшение финансовых показателей и рост конкурентоспособности [6]. Однако внедрение ESG в секторе МСП сталкивается с рядом ограничений, включая недостаток финансовых ресурсов и низкий уровень осведомлённости.

Практическая реализация «зелёных» бизнес-моделей и ESG-принципов подтверждается многочисленными кейсами. Так, крупные международные компании активно внедряют принципы устойчивого развития, включая переход к возобновляемым источникам энергии, сокращение выбросов и развитие циркулярных бизнес-моделей. Например, компании, внедряющие стратегии замкнутого цикла, достигают значительного снижения затрат и повышения эффективности использования ресурсов [10]. В развивающихся странах предприниматели также активно внедряют экологические инновации, что способствует устойчивому экономическому росту и созданию новых рабочих мест [7].

Важным фактором развития устойчивого предпринимательства является формирование предпринимательских экосистем, включающих государственные институты, финансовые организации, образовательные учреждения и инновационные центры. Исследования показывают, что наличие развитой предпринимательской экосистемы способствует ускорению внедрения инноваций и повышению устойчивости бизнеса [2]. В

частности, кластеры и инновационные хабы играют ключевую роль в распространении «зелёных» технологий и ESG-практик.

Несмотря на значительный потенциал устойчивого предпринимательства, его развитие сталкивается с рядом барьеров. Одним из основных ограничений является недостаток финансирования. По оценкам экспертов, около 40% малых и средних предприятий испытывают сложности с привлечением инвестиций для реализации «зелёных» проектов [5]. Кроме того, значительную роль играют институциональные ограничения, включая несовершенство нормативно-правовой базы и отсутствие стимулов для внедрения ESG-принципов.

Низкий уровень осведомлённости предпринимателей о преимуществах устойчивого развития также является существенным барьером. Исследования показывают, что только около 36% малых предприятий рассматривают ESG как стратегический приоритет [3]. Это свидетельствует о необходимости повышения уровня информированности и развития образовательных программ в области устойчивого предпринимательства.

Регуляторные барьеры также оказывают значительное влияние на развитие ESG-предпринимательства. В ряде стран отсутствуют чёткие стандарты и требования к ESG-отчётности, что затрудняет внедрение устойчивых практик. В то же время чрезмерное регулирование может создавать дополнительные издержки для бизнеса, особенно для малых предприятий [8].

Дополнительным фактором, ограничивающим развитие «зелёных» бизнес-моделей, является высокая стоимость внедрения экологических технологий. Несмотря на долгосрочные экономические выгоды, первоначальные инвестиции могут быть значительными, что сдерживает предпринимателей от перехода к устойчивым моделям [11]. В этой связи важную роль играет государственная поддержка, включая субсидии, налоговые льготы и программы финансирования.

Развитие «зелёных» бизнес-моделей и внедрение ESG-принципов является ключевым направлением трансформации предпринимательства в современных условиях. Несмотря на существующие барьеры, устойчивое предпринимательство обладает значительным потенциалом для обеспечения экономического роста, повышения конкурентоспособности бизнеса и решения глобальных экологических и социальных проблем.

В современных условиях дальнейшее развитие предпринимательства тесно связано с углублением процессов цифровизации и интеграцией ESG-подхода в бизнес-стратегии. Цифровая трансформация экономики способствует формированию новых возможностей для устойчивого развития, обеспечивая более эффективное использование ресурсов и снижение экологической нагрузки. В частности, применение технологий искусственного интеллекта, больших данных и интернета вещей позволяет предприятиям оптимизировать производственные процессы, снижать энергопотребление и минимизировать выбросы [8]. Исследования

показывают, что компании, активно внедряющие цифровые технологии, демонстрируют рост производительности на 20–30% и одновременно снижают экологическое воздействие [6].

Синергия цифровизации и ESG-подхода формирует новые модели предпринимательской деятельности, ориентированные на устойчивое развитие. Так называемые «умные» предприятия (smart enterprises) используют цифровые платформы для мониторинга экологических показателей, управления ресурсами и повышения прозрачности бизнес-процессов. По данным международных исследований, внедрение цифровых решений в сочетании с ESG-практиками позволяет снизить операционные издержки на 15–25% и повысить эффективность управления на 30% [10].

Особое значение в современных условиях приобретает развитие «зелёных» финансов, которые играют ключевую роль в поддержке устойчивого предпринимательства. Объём глобального рынка зелёных облигаций превысил 2 трлн долларов США, при этом ежегодный рост данного сегмента составляет более 10–15% [5]. Зелёные финансовые инструменты позволяют привлекать инвестиции в проекты, направленные на снижение выбросов, развитие возобновляемой энергетики и повышение энергоэффективности. В свою очередь, доступ к таким инструментам способствует ускорению перехода бизнеса к устойчивым моделям развития.

Государственная политика также играет важную роль в формировании условий для развития ESG-предпринимательства. В ряде стран реализуются программы поддержки «зелёного» бизнеса, включающие налоговые льготы, субсидии и льготное финансирование. Исследования показывают, что наличие эффективной государственной поддержки способствует увеличению доли устойчивых предприятий на 20–25% [7]. Кроме того, важным инструментом является разработка нормативных требований к ESG-отчётности, что повышает прозрачность бизнеса и стимулирует внедрение устойчивых практик.

Важным направлением развития предпринимательства является интеграция ESG-принципов в корпоративные стратегии. Компании всё чаще рассматривают устойчивое развитие как фактор долгосрочной конкурентоспособности. В частности, внедрение ESG-подхода позволяет не только снизить риски, но и создать новые источники дохода за счёт разработки экологически ориентированных продуктов и услуг [3]. По данным исследований, компании, активно внедряющие ESG-принципы, демонстрируют более высокие темпы роста выручки и прибыли по сравнению с традиционными предприятиями [11].

Одним из перспективных направлений является развитие предпринимательских экосистем, ориентированных на устойчивое развитие. Такие экосистемы включают взаимодействие бизнеса, государства, научных учреждений и финансовых организаций. Исследования показывают, что наличие развитой экосистемы способствует ускорению внедрения инноваций и повышению устойчивости бизнеса [2]. В частности,

инновационные кластеры и технологические парки играют важную роль в распространении «зелёных» технологий и ESG-практик.

Существенное влияние на развитие устойчивого предпринимательства оказывает глобализация. Расширение международных рынков и усиление конкуренции стимулируют компании к внедрению ESG-принципов, что становится важным фактором выхода на международные рынки. В частности, многие международные компании требуют от своих партнёров соблюдения экологических и социальных стандартов, что способствует распространению ESG-практик на глобальном уровне [9].

В то же время развитие устойчивого предпринимательства требует решения ряда структурных проблем. Одной из ключевых задач является повышение уровня доступности финансовых ресурсов для реализации «зелёных» проектов. Несмотря на рост рынка зелёных финансов, доступ к ним остаётся ограниченным для малых и средних предприятий [5]. Это требует разработки новых финансовых инструментов, ориентированных на поддержку МСП.

Дополнительным направлением является развитие человеческого капитала. В условиях перехода к устойчивой экономике возрастает потребность в специалистах, обладающих знаниями в области ESG, экологического менеджмента и цифровых технологий. Исследования показывают, что уровень квалификации работников напрямую влияет на эффективность внедрения устойчивых практик [6]. В этой связи важную роль играет развитие образовательных программ и повышение квалификации специалистов.

Перспективы развития устойчивого предпринимательства также связаны с усилением роли инноваций. Внедрение новых технологий, включая возобновляемую энергетику, биотехнологии и цифровые решения, способствует повышению эффективности бизнеса и снижению экологической нагрузки. По оценкам экспертов, инвестиции в «зелёные» технологии могут обеспечить рост мировой экономики на 2–3% ежегодно в долгосрочной перспективе [4].

Предпринимательство в современных условиях трансформируется в ключевой элемент устойчивого экономического роста. Интеграция ESG-принципов, развитие «зелёных» бизнес-моделей и использование цифровых технологий создают основу для формирования новой модели экономики, ориентированной на устойчивость и долгосрочное развитие. Несмотря на существующие барьеры, потенциал устойчивого предпринимательства остаётся значительным и требует дальнейшего развития институциональной среды, финансовых механизмов и инновационной инфраструктуры.

В целом можно отметить, что устойчивое предпринимательство представляет собой важнейший фактор обеспечения экономической стабильности и конкурентоспособности национальных экономик. Его развитие способствует не только экономическому росту, но и решению глобальных экологических и социальных проблем, что делает его одним из

приоритетных направлений современной экономической науки и практики [12].

Заключение

Проведённое исследование позволяет сделать вывод о том, что предпринимательство в современных условиях выступает ключевым фактором обеспечения устойчивого экономического роста, трансформируясь под влиянием глобальных экологических, социальных и технологических вызовов. Интеграция ESG-подхода и развитие «зелёных» бизнес-моделей формируют новую парадигму предпринимательской деятельности, ориентированную не только на достижение экономической эффективности, но и на обеспечение долгосрочной устойчивости и социальной ответственности бизнеса.

Анализ теоретических и эмпирических исследований показал, что внедрение ESG-принципов способствует повышению инвестиционной привлекательности компаний, снижению рисков и улучшению финансовых показателей. В большинстве случаев наблюдается положительная или нейтральная взаимосвязь между ESG и экономической эффективностью, что подтверждает экономическую целесообразность устойчивых практик. При этом особую роль играет малый и средний бизнес, который, несмотря на ограниченные ресурсы, демонстрирует высокую адаптивность и потенциал для внедрения инновационных и экологически ориентированных решений.

Развитие «зелёных» бизнес-моделей, включая циркулярную экономику, низкоуглеродные стратегии и концепции zero-waste, способствует снижению издержек, повышению ресурсной эффективности и формированию конкурентных преимуществ. Эти модели позволяют предприятиям не только минимизировать негативное воздействие на окружающую среду, но и создавать дополнительную экономическую ценность, что особенно важно в условиях усиливающейся глобальной конкуренции.

В то же время исследование выявило ряд существенных барьеров, сдерживающих развитие устойчивого предпринимательства. К ним относятся ограниченный доступ к финансированию, недостаточный уровень осведомлённости предпринимателей, несовершенство институциональной среды и регуляторные ограничения. Особенно остро данные проблемы проявляются в секторе малого и среднего бизнеса, где внедрение ESG-практик требует дополнительных ресурсов и компетенций.

Перспективы развития предпринимательства в контексте устойчивого экономического роста во многом связаны с дальнейшей цифровизацией экономики и развитием «зелёных» финансов. Использование современных технологий, таких как искусственный интеллект, большие данные и интернет вещей, открывает новые возможности для повышения эффективности бизнеса и снижения экологической нагрузки. В свою очередь, развитие финансовых инструментов, ориентированных на

устойчивые проекты, способствует привлечению инвестиций и ускорению перехода к «зелёной» экономике.

Важную роль в данном процессе играет государственная политика, направленная на создание благоприятной институциональной среды для развития устойчивого предпринимательства. Это включает разработку нормативной базы, стимулирование внедрения ESG-принципов, а также поддержку инноваций и «зелёных» технологий. Эффективное взаимодействие государства, бизнеса и научного сообщества является необходимым условием формирования устойчивых предпринимательских экосистем.

Устойчивое предпринимательство представляет собой важнейший инструмент обеспечения долгосрочного экономического роста и повышения конкурентоспособности экономики. Интеграция ESG-подхода и развитие «зелёных» бизнес-моделей создают основу для формирования новой модели экономического развития, ориентированной на баланс между экономическими, экологическими и социальными целями. В дальнейшем необходимы углублённые исследования, направленные на разработку эффективных механизмов внедрения ESG-принципов и оценку их влияния на развитие предпринимательства в различных экономических условиях.

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РЕГЕНЕРАЦИЯ ЩИТОВИДНО-ПОДЪЯЗЫЧНОЙ СВЯЗКИ В ЭКСПЕРИМЕНТЕ

Аннотация. *В данной статье изучено щитовидно-подъязычные связки (справа и слева), которые полностью рассекались поперек у кошек. Через различные сроки (от 3 дней до 3 месяцев) связки брались для гистологического исследования. Срезы окрашивались гематоксилином Караччи и эозином, пикрофуксином по Ван-Гизон, орсенном, а также на кислые мукополисахариды по Стидмену и по Хэлу. В основном дефект замещен рубцовой тканью. Слабое развитие эластических волокон связано, по-видимому, с ограниченной функциональной нагрузкой. В межклеточном веществе количество кислых мукополисахаридов постепенно снижается.*

Ключевые слова: *Эксперимент, кошки, щитовидно-подъязычные связки, мукополисахариды, пикрофуксином по Ван-Гизон, орсенном, рубец.*

Вот качественный перевод вашего текста на английский язык с сохранением научного стиля:

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REGENERATION OF THE THYROHYOID LIGAMENT IN AN EXPERIMENT

Abstract. *This study investigates the thyrohyoid ligaments (right and left), which were completely transected transversely in cats. At various time intervals (from 3 days to 3 months), the ligaments were collected for histological examination. Tissue sections were stained with Karacci hematoxylin and eosin,*

Van Gieson's picrofuchsin, orcein, and were also tested for acidic mucopolysaccharides using Steedman's and Hale's methods.

The defect was mainly replaced by scar tissue. The weak development of elastic fibers appears to be associated with limited functional load. The amount of acidic mucopolysaccharides in the intercellular substance gradually decreased over time.

Keywords: *Experiment, cats, thyrohyoid ligaments, mucopolysaccharides, Van Gieson's picrofuchsin, orcein, scar tissue.*

Ввдение

Последствия продленной интубации трахеи остаются одной из актуальных проблем современной детской оториноларингологии и хирургии. С каждым годом неуклонно увеличивается число пациентов, которым требуется проведение длительной респираторной поддержки [1,2]. Однако развитие интенсивной терапии и реанимации позволило не только значительно повысить выживаемость пострадавших, но и привело к увеличению количества больных с постреанимационной патологией гортани и трахеи. Тактика лечения хронических стенозов гортани и трахеи развивается в двух направлениях: совершенствуются методики хирургического лечения, и продолжается активный поиск новых факторов воздействия на ткани человека, способствующих оптимальному процессу ранозаживления [3,4]. Восстановлению связок после повреждения уделяют внимание многие авторы [5]. Однако морфологические исследования в этой области немногочисленны [6]. Относительно восстановления щитовидно-подъязычной связки сведений в литературе не найдено, что и послужило поводом для настоящей работы.

Цель исследования

Изучить регенерация щитовидно-подъязычной связки в эксперименте.

Материалы и методы исследования

Эксперимент был поставлен на щитовидно-подъязычных связках 20 кошек. Через кожный разрез по средней линии передней поверхности шеи обнажался щитовидный хрящ. Боковые мышцы шеи тупо расслаивались и обнажались щитовидно-подъязычные связки (справа и слева), которые полностью рассекались поперек. Через различные сроки (от 3 дней до 3 месяцев) связки брались для гистологического исследования. Материал фиксировался в 10% формалине, жидкости Карнуа, заливался в парафин. Срезы окрашивались гематоксилином Караччи и эозином, пикрофуксином по Ван-Гизон, орсенном, а также на кислые мукополисахариды по Стидмену и по Хэлу.

Результаты исследования

У кошек верхний рог щитовидного хряща и большой рог подъязычной кости соединены (справа и слева) двумя щитовидно-подъязычными связками - верхней и нижней. Изучение места повреждения верхней щитовидно-подъязычной связки на третьи-четвертые сутки после операции показало,

что в зоне разреза клетки не видны, ядра отсутствуют. В зоне повреждения начинает разрастаться рыхлая соединительная ткань. Клетки располагаются беспорядочно. Коллагеновые волокна тонкие, извитые. Эластические волокна единичные. Кислых мукополисахаридов много в межклеточном веществе. На 10-12 день после операции дефект в верхней щитовидно-подъязычной связке оказывается полностью замещенным рыхлой соединительной тканью. Клеточные элементы располагаются беспорядочно. Встречаются фигуры деления фиброцитов. Эластические волокна единичные тонкие и располагаются косопродольно. Коллагеновые волокна несколько утолщаются и имеют извитой ход. Количество кислых мукополисахаридов в основном веществе снижается. В нижней щитовидно-подъязычной связке на месте ее повреждения также разрастается рыхлая соединительная ткань. Видны фигуры прямого и непрямого деления клеток. Эластических волокон несколько больше, чем в верхней связке, и располагаются они беспорядочно. Коллагеновые волокна толще эластических и имеют извитой ход. Кислых мукополисахаридов в основном веществе содержится небольшое количество.

Через один-полтора месяца после операции непрерывность верхней щитовидно-подъязычной связки восстанавливается, хотя дефект в основном замещен рыхлой соединительной тканью. Однако отчетливо видны и элементы плотной оформленной соединительной ткани, что свидетельствует о частичном восстановлении клеточных и волокнистых структур самой связки. Клетки продолжают делиться. Эластические волокна единичные тонкие, слегка извитые. Коллагеновых волокон выявляется больше, чем в предыдущем сроке регенерации. Они утолщаются, становятся длиннее, заметно извиты. В основном веществе содержание кислых мукополисахаридов заметно не меняется. Спустя два-три месяца после операции ширина верхней щитовидно-подъязычной связки несколько увеличивается. Дефект замещен главным образом рыхлой соединительной тканью, однако ранее возникшие волокна самой связки заметны более отчетливо. Из клеточных элементов преобладают фиброциты, расположенные беспорядочно и местами продольно. Кровеносных сосудов становится меньше. Эластических волокон по-прежнему выявляется мало. Они тонкие, имеют извитой ход и располагаются косо-продольно. Коллагеновые волокна преобладают над эластическими. Количество кислых мукополисахаридов в межклеточном веществе снижается.

В нижней связке место повреждения также заполнено рыхлой соединительной тканью. Клеточные элементы располагаются более рыхло. Встречаются жировые клетки. Эластических волокон больше, чем в верхней связке. Они более толстые, извитые, располагаются беспорядочно и косо-продольно. Среди тонких коллагеновых волокон встречаются и более толстые. Кислые мукополисахариды распределены неравномерно.

Вывод

Исходя из приведенных данных, следует, что сближение краев поврежденной связки приводит к частичному ее восстановлению. В основном дефект замещен рубцовой тканью. Слабое развитие эластических волокон связано, по-видимому, с ограниченной функциональной нагрузкой. В межклеточном веществе количество кислых мукополисахаридов постепенно снижается.

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МНОГОЛЕТНИЕ ИЗМЕНЕНИЯ ПОТОКА ВОДЫ В ПОДВОДЯЩЕМ И ОТВОДЯЩЕМ КАНАЛАХ КАТТАКУРГАНСКОГО ВОДОХРАНИЛИЩА

Аннотация. *В статье проанализированы изменения водного баланса Каттакурганского водохранилища за период 2018–2024 гг. В ходе исследования изучены месячная и годовая динамика водных потоков, их взаимосвязь, а также формирование водного баланса. Результаты показали, что гидрологический режим водохранилища имеет выраженный сезонный характер. Также выявлена тенденция к снижению объёмов воды в последние годы.*

Ключевые слова: *водохранилище, расход воды, гидрологический режим, водный баланс, приток, отток, вегетационный период*

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LONG-TERM CHANGES IN WATER FLOW IN THE INLET AND OUTLET CHANNELS OF THE KATTAKURGAN RESERVOIR

Abstract. *This article analyzes changes in the Kattakurgan Reservoir's water balance for the period 2018–2024. The study examined the monthly and annual dynamics of water flows, their interrelations, and the formation of the water balance. The results showed that the reservoir's hydrological regime exhibits a pronounced* seasonal pattern. A trend toward decreasing water volumes

in recent years was also identified.

Keywords: *reservoir, water discharge, hydrological regime, water balance, inflow, outflow, vegetation period*

Введение

В засушливых регионах мира, включая нашу республику, орошение обрабатываемых земель, крупных промышленных предприятий и потребности населения в чистой воде удовлетворяются с помощью водохранилищ. [Гикматов]

Каттакурганское водохранилище — одно из крупнейших гидротехнических сооружений в бассейне реки Зарафшан, играющее важную роль в регулировании водных ресурсов региона. Основная функция водохранилища заключается в накоплении, хранении и использовании водных ресурсов реки для сельскохозяйственных нужд в течение вегетационного периода. В связи с этим особое значение приобретает анализ объёмов притока и расхода воды, что позволяет глубже понять гидрологические процессы и обеспечить эффективное управление водными ресурсами.

При этом горизонтальные составляющие водообмена, такие как приток и отток, являются ключевыми параметрами для оценки водного баланса (Obukhov, 2017). Этот баланс основывается на принципе сохранения массы, где изменение объёма воды в водохранилище за определённый период времени равно разнице между суммарным притоком и оттоком, включая потери на испарение и фильтрацию (Murtaqi et al., 2023). Для точного определения полезного объёма водохранилища, необходимо учитывать эти потери, а также сопоставлять помесячно сток и отдачу, вычисляя избытки и дефициты для определения максимально допустимого дефицита (Михневич & Li, 2022).

Основные результаты и их обсуждение

Как известно, при оценке эффективности функционирования водохранилища важное значение имеет изучение расходов воды, проходящих через входные и выходные каналы. В связи с этим в данном исследовании были роанализированы объёмы воды, проходившие через входные и выходные каналы водохранилища за период 2018–2024 гг. в помесячном разрезе. На основе полученных данных были исследованы гидрологический режим водохранилища, формирование водного баланса, а также взаимосвязь между приточными и сбросными потоками.

Гидрологические характеристики выходного канала

Распределение объёма воды, сбрасываемой из водохранилища через выходной канал, в течение года носит неравномерный характер и регулируется в основном в зависимости от нужд сельского хозяйства. Анализ показывает, что в зимние месяцы объём забора воды минимален, а в отдельные годы и вовсе не наблюдается. К примеру, в январе и феврале 2018, 2019 и 2024 годов сброс воды практически не осуществлялся. В этот

период в водохранилище проводился процесс накопления запасов воды.

Объёмы сброса воды из водохранилища значительно возрастают к весенним месяцам. С началом ирригационного сезона в марте наблюдается резкое увеличение расхода воды. Например, если в марте 2018 года расход воды составлял 24,0 м³/с, то в апреле этот показатель достиг 41,9 м³/с. В 2023 году объём сброса воды в апреле был увеличен до 45,3 м³/с, что является одним из самых высоких показателей за анализируемый период.

В летние месяцы объём забора воды достигает своего максимума. В частности, наиболее высокие показатели наблюдаются в июне и июле. Так, если в июне 2021 года расход воды составил 57,1 м³/с, то в июле этот показатель был увеличен до 57,8 м³/с. Данная ситуация объясняется ростом потребности сельскохозяйственных культур в воде в период летней вегетации.

В осенние месяцы объём забора воды постепенно снижается. В сентябре и октябре расход воды сокращается в связи с уменьшением объёмов ирригационных работ. К зимнему же периоду сброс воды достигает минимального уровня.

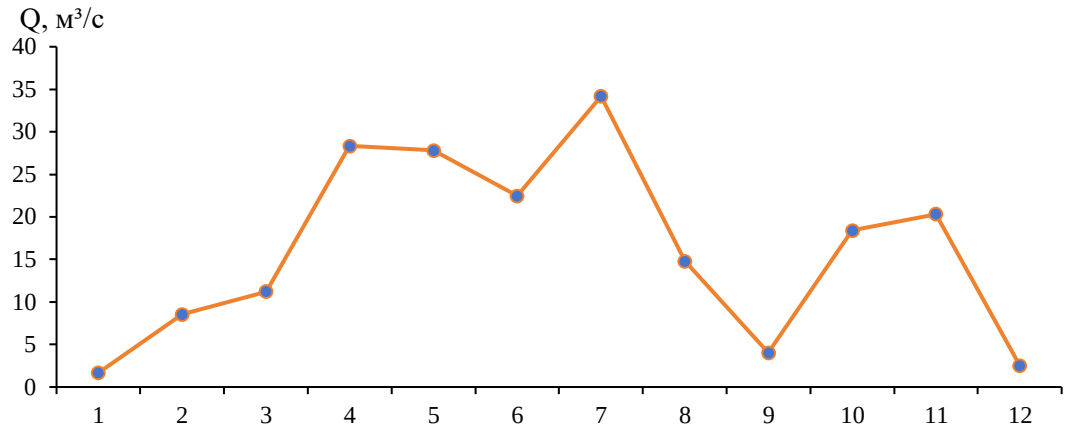

Рис. 1. Колебания многолетних средних ежемесячных расходов воды в Каттакурганском водохранилище (расходная часть).

Гидрологический режим приточного канала

Объём воды, поступающей в водохранилище через приточный канал, в основном зависит от речного стока и сезонных гидрологических процессов. Согласно изученным данным, приток воды в канале также распределяется неравномерно в течение года.

В зимние месяцы приток воды остается на относительно низком уровне. В этот период расход воды в реках сокращается, и объем поступающей в водохранилище воды также становится минимальным. В отдельные годы приток воды в зимний период практически не наблюдался.

В весенние месяцы приток воды постепенно увеличивается. В этот период уровень воды в реках повышается под влиянием таяния снегов и

весенних осадков. В результате объем поступающей в водохранилище воды также возрастает. Например, если в апреле 2018 года через приточный канал поступило 40,9 м³/с воды, то в апреле 2023 года этот показатель составил 44,3 м³/с.

В летние месяцы в отдельные годы приток воды сохраняется на высоком уровне. Например, если в июне 2021 года приток составил 56,0 м³/с, то в июле этот показатель достиг 56,7 м³/с. В данный период, наряду с высокими объемами поступающей в водохранилище воды, также осуществляется значительный сброс через выходной канал. В осенние месяцы приток постепенно снижается и к концу года достигает своего минимального значения.

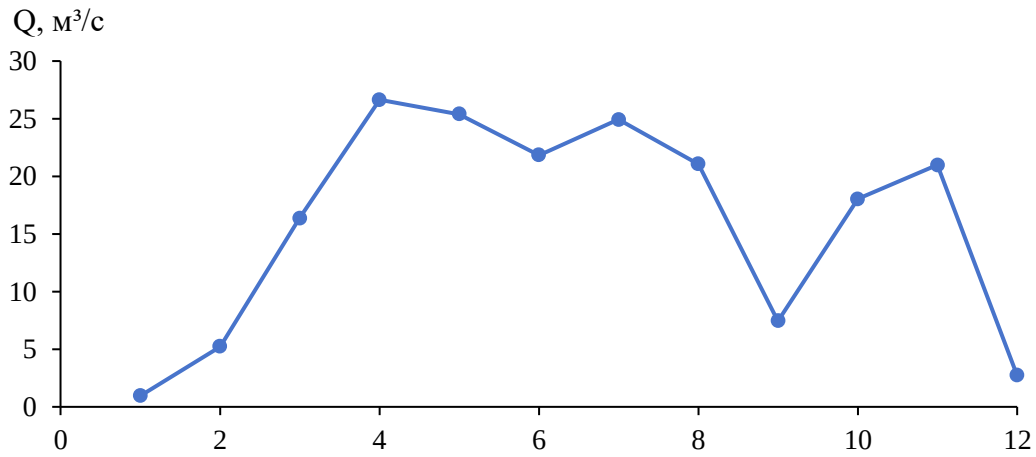

Рис. 2. Колебания многолетних средних ежемесячных расходов воды в Каттакурганском водохранилище (приходная часть).

Взаимосвязь между приточным и выходным каналами

Между приточным и выходным каналами водохранилища существует прямая гидрологическая связь. Объём воды, поступающей через приточный канал, определяет степень наполнения водохранилища, в то время как вода, сбрасываемая через выходной канал, служит для удовлетворения потребностей ирригационной системы.

Результаты анализа показывают, что в большинстве случаев значения притока и сброса воды близки друг к другу. Это свидетельствует о стабильном поддержании водного баланса водохранилища. Например, в июне 2021 года приток составил 56,0 м³/с, в то время как сброс составил 57,1 м³/с. Это указывает на то, что в данный период также использовались накопленные в водохранилище запасы воды.

Также в некоторые периоды наблюдается превышение притока над сбросом. Такая ситуация означает, что в водохранилище идет процесс накопления запасов воды. И наоборот, в определенные периоды объем сброса превышает объем притока, что свидетельствует об использовании водных ресурсов, накопленных в водохранилище ранее.

В целом, разница между приточным и выходным каналами формирует водный баланс водохранилища. Эта разница определяет увеличение или уменьшение запасов воды в водохранилище.

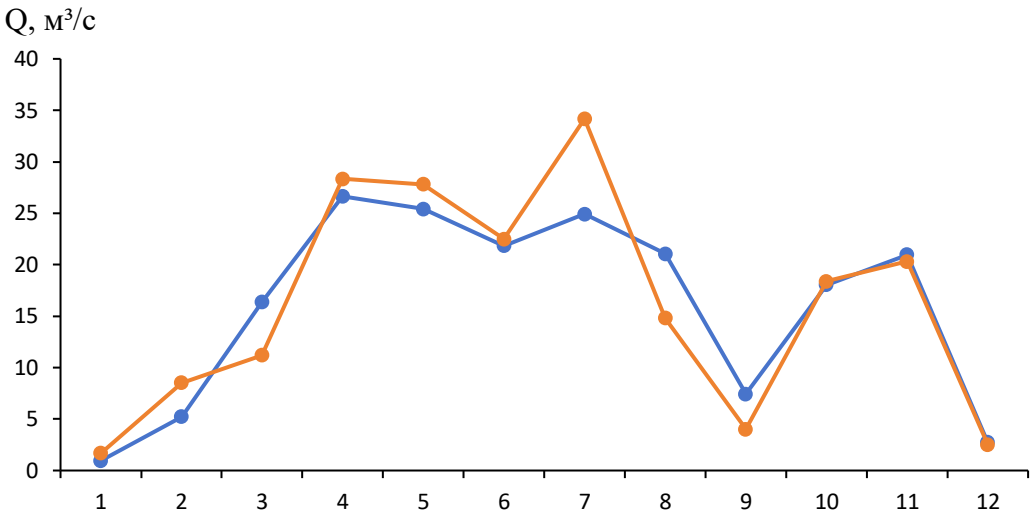

Рис. 3. Колебания многолетних средних ежемесячных расходов воды в Каттакурганском водохранилище (приходная часть).

Водный баланс водохранилища формируется под влиянием притока, сброса, испарения, инфильтрации и других гидрологических факторов. Данные, полученные по приточным и выходным каналам, являются важным источником для определения водного баланса.

Можно заметить, что в анализируемый период водный баланс водохранилища оставался относительно стабильным. В большинстве лет разница между притоком и сбросом воды была незначительной. Это свидетельствует об эффективном выполнении водохранилищем своей функции по регулированию водных ресурсов.

Также водохранилище играет важную роль в обеспечении ирригационных систем водой в периоды её дефицита. Наличие запасов воды помогает минимизировать нехватку водных ресурсов в течение вегетационного периода.

Изменение водного потока в вегетационный период

Вегетационный период обычно начинается в марте и продолжается до конца сентября. В этот период потребность сельскохозяйственных культур в воде резко возрастает, в связи с чем увеличивается и объём сброса воды из водохранилища. Согласно анализируемым данным, объём забора воды достигает своего максимума, особенно в апреле, мае, июне и июле. В это же время наблюдается относительно высокий приток воды в водохранилище, что позволяет поддерживать стабильность его гидрологического режима. Например, в летние месяцы разница между притоком и сбросом воды минимальна. Это свидетельствует о том, что поступающая в водохранилище вода практически полностью расходуется на нужды орошения. В то же

время, в определённые периоды используются и запасы воды, хранящиеся в водохранилище в качестве резерва. Такое распределение водного потока в вегетационный период подтверждает эффективность выполнения основной задачи водохранилища — бесперебойного обеспечения ирригационных систем водой.

Особенности водного потока в зимний сезон

В зимние месяцы количество воды, проходящей через приточный и выходной каналы, значительно сокращается. В этот период сельскохозяйственная деятельность практически прекращается, в результате чего потребность в воде для орошения также снижается.

По этой причине объем сброса воды из водохранилища падает до минимального уровня. Однако в отдельные годы даже в зимние месяцы наблюдается выпуск определенного количества воды. Это может быть объяснено техническими нуждами водохозяйственной системы или необходимостью регулирования уровня воды.

Приток воды в водохранилище зимой также остается относительно низким. В этот период расход воды в реках уменьшается, так как снежный покров еще не начал таять, а осадков выпадает мало. В результате создаются условия для формирования запаса воды в водохранилище, который впоследствии будет использован в вегетационный период.

Данные, полученные по приточным и выходным каналам Каттакурганского водохранилища за период 2018–2024 годов, показали, что его гидрологический режим имеет четко выраженный сезонный характер.

В то время как приток формируется преимущественно под влиянием естественных гидрологических процессов, сброс воды регулируется в соответствии с потребностями сельского хозяйства. Взаимосвязь между приточным и выходным каналами определяет водный баланс водохранилища, который играет ключевую роль в эффективном управлении водными ресурсами региона.

Таким образом, комплексный анализ данных по приточным и выходным каналам позволил глубже понять режим работы водохранилища и сделать следующие выводы по эффективному управлению водными ресурсами.

Во-первых, гидрологический режим водохранилища имеет четко выраженный сезонный характер. Основная часть сброса воды приходится на весенние и летние месяцы.

Во-вторых, между приточным и выходным каналами существует сбалансированная гидрологическая связь. Это позволяет обеспечивать стабильность водного баланса водохранилища.

В-третьих, водохранилище играет важную роль в обеспечении системы орошения региона водой. Увеличение объема сброса воды в вегетационный период подтверждает выполнение этой задачи.

В-четвертых, запас воды в водохранилище формируется в зимние и весенние месяцы и эффективно используется в течение вегетационного

периода.

В целом, проведенный анализ по приточным и выходным каналам показывает, что Каттакурганское водохранилище эффективно выполняет задачи по регулированию водных ресурсов и обеспечению ирригационных систем водой.

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ПОЧЕМУ МЫ БОЛЬШЕ НЕ ЧИТАЕМ: ТРАНСФОРМАЦИЯ ЧИТАТЕЛЬСКИХ ПРАКТИК В ЦИФРОВУЮ ЭПОХУ

Аннотация*: В статье рассматривается проблема трансформации читательских практик под влиянием цифровых технологий. На основе анализа исследований в области нейронауки, социологии чтения и медиапсихологии выявляются ключевые факторы, обусловливающие изменения в восприятии длительных текстов: нейропластичность мозга, адаптирующегося к требованиям гипертекстовой среды; архитектура цифровых интерфейсов, формирующая стратегии сканирующего и фрагментированного чтения; экономика внимания, ориентирующая медиапроизводство на короткие форматы. Выделены три типа читательских стратегий в цифровой среде: сканирующий, фрагментированный и погруженный. Делается вывод, что наблюдаемые изменения представляют собой не деградацию, а адаптацию к новой медиасреде, однако эта адаптация сопряжена с утратой когнитивных способностей, формировавшихся веками через практику линейного, глубокого чтения.*

Ключевые слова*: чтение, цифровая коммуникация, внимание, гипертекст, нейропластичность, читательские практики.*

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WHY WE NO LONGER READ: THE TRANSFORMATION OF READING PRACTICES IN THE DIGITAL AGE

Abstract: *This article examines the transformation of reading practices under the influence of digital technologies. Based on an analysis of research in*

neuroscience, the sociology of reading, and media psychology, key factors determining changes in the perception of long texts are identified: the neuroplasticity of the brain adapting to the demands of a hypertext environment; the architecture of digital interfaces shaping scanning and fragmented reading strategies; An attention economy that is orienting media production toward short formats. Three types of reading strategies in the digital environment are identified: scanning, fragmented, and immersive. It is concluded that the observed changes represent not a degradation but an adaptation to the new media environment. However, this adaptation is associated with the loss of cognitive abilities shaped over centuries through the practice of linear, deep reading.

Keywords: *reading, digital communication, attention, hypertext, neuroplasticity, reading practices*

Введение

В публичном дискурсе последних лет устойчиво воспроизводится тезис о снижении интереса к чтению длинных текстов. Педагоги, журналисты и исследователи фиксируют симптоматическое явление: представители поколений, выросших в цифровой среде, демонстрируют иные, чем у предшественников, паттерны взаимодействия с текстом. Однако за моралистическими оценками часто упускается системный анализ причин происходящего.

Настоящее исследование представляет собой попытку такого анализа. В работе ставятся следующие вопросы: какие когнитивные, технологические и социокультурные факторы обусловливают изменение читательских практик; как трансформируется архитектура внимания в условиях цифровой среды; формируется ли новый тип читательской грамотности.

Теоретические основания

Нейропластичность и чтение

Фундаментальное положение, на котором строится современное понимание чтения, заключается в том, что человеческий мозг не имеет врожденной нейронной сети для чтения. Чтение является культурным изобретением, которое осваивается путем перестройки нейронных структур, изначально предназначенных для распознавания объектов, обработки визуальной информации и языковых процессов. Как отмечает исследовательница М. Вольф, мозг «перепрофилирует» существующие нейронные сети для выполнения задачи чтения [2].

Важнейшее следствие из этого положения: способы чтения меняют нейронную архитектуру мозга. Переход от чтения на бумаге к чтению на экране, от линейной навигации к гипертекстовой, от непрерывного чтения к фрагментированному — все это ведет к перестройке нейронных коррелятов чтения. Н. Карр в работе «Пустышка» развивает данную мысль, утверждая, что среда интернета перепрограммирует мозг, ослабляя способность к глубокой, линейной концентрации и усиливая навыки быстрой навигации и сканирования [5]. Эта позиция, хотя и вызывает дискуссии, опирается на

устойчивые данные нейронауки о пластичности мозга и его чувствительности к характеру когнитивной нагрузки.

Архитектура внимания в цифровой среде

Цифровые интерфейсы обладают специфическими свойствами, которые структурируют распределение когнитивных ресурсов пользователя.

Ключевые из них:

· бесконечная лента (infinite scroll) устраняет естественные точки остановки, провоцируя непрерывное скольжение;

· гипертекстовая навигация предлагает множественные пути движения по тексту, требуя от читателя одновременного решения двух задач: понимания содержания и навигационного ориентирования;

· система уведомлений приучает мозг к постоянным прерываниям, формируя режим «готовности к переключению».

Исследования когнитивного контроля показывают, что регулярное переключение между задачами (медиамногозадачность) связано с изменениями в структуре внимания: снижается способность к длительному удержанию фокуса, повышается порог отвлечения [8]. Хотя вопрос о причинно-следственной связи остается открытым, корреляция между интенсивным использованием цифровых платформ и изменениями в когнитивном контроле зафиксирована в ряде исследований.

Экономика внимания и эволюция медиа

Понятие «экономика внимания» фиксирует фундаментальный сдвиг: в условиях информационного избытка дефицитным ресурсом становится внимание человека [4]. Медиаплатформы конкурируют за этот ресурс, оптимизируя интерфейсы и контент для максимизации времени удержания пользователя.

Издательские стратегии также трансформируются под влиянием экономики внимания. Как показано в исследованиях книжного рынка, наблюдается рост популярности коротких форматов (эссе, списки, «короткая проза»), адаптированных к экранному чтению, и снижение коммерческой привлекательности длинных нарративов [3].

Материалы и методы

Исследование основано на анализе вторичных данных: публикаций в рецензируемых научных журналах по нейронауке чтения, социологии чтения и медиапсихологии за последние 15 лет, а также данных крупных международных и российских исследований читательских практик (Pew Research Center, Национальная программа поддержки чтения в РФ).

Методы: мета-анализ эмпирических исследований, сравнительный анализ данных, теоретическое обобщение.

Результаты

Трансформация читательских практик: данные исследований

Анализ доступных эмпирических данных позволяет выделить несколько устойчивых тенденций. Исследование З. Лю. проведенное в середине 2000-х годов, зафиксировало изменение поведения читателей в

цифровой среде: увеличение доли времени, затрачиваемого на сканирование и выборочное чтение, снижение времени, отводимого на чтение от начала до конца, рост частоты отвлечений [9]. Данные Pew Research Center (2018–2022) показывают, что доля американцев, не прочитавших ни одной книги за год, увеличилась с 8% в 1978 году до 23–27% в последние годы, при этом наиболее выраженное падение интереса к чтению наблюдается среди молодежи (18–29 лет). Однако эти данные требуют осторожной интерпретации, так как они не учитывают чтение на экранах, которое может замещать бумажное чтение. Российские исследования (Фонд «Общественное мнение», ВЦИОМ) фиксируют аналогичные тенденции: доля регулярно читающих книги сокращается, при этом растет доля тех, кто читает исключительно в цифровом формате, преимущественно короткие тексты [10].

Типология читательских стратегий

На основе обобщения эмпирических исследований можно выделить три типа читательских стратегий, характерных для цифровой среды.

Сканирующий тип. Характеризуется быстрым движением по тексту, выборочным вниманием к заголовкам, выделенным фрагментам, началу и концу абзацев. Понимание текста снижено по сравнению с линейным чтением. Данная стратегия доминирует при чтении новостных лент и социальных сетей [1]. Фрагментированный тип. Характеризуется чтением с возвратами, перерывами, отвлечениями. Текст читается не линейно, а по частям; читатель возвращается к уже прочитанному, пропускает фрагменты, переключается между задачами. Данная стратегия характерна для чтения на экране в условиях многозадачности [6]. Погруженный тип. Характеризуется сохранением линейной, сфокусированной стратегии чтения. Время чтения и показатели понимания близки к бумажному чтению. Данная стратегия требует сознательного отключения отвлекающих факторов и, по данным исследований, сохраняется у меньшинства читателей, преимущественно с высокой читательской компетенцией [2].

Факторы трансформации. Выделяются три группы факторов, обусловливающих наблюдаемые изменения. Технологические факторы. Интерфейсные решения (бесконечная лента, гипертекст, уведомления) проектировались для максимизации времени удержания пользователя, но их побочным эффектом стало формирование стратегий поверхностного, сканирующего чтения [7]. Нейрофизиологические факторы. Нейропластичность мозга означает, что регулярное взаимодействие с гипертекстовой средой ведет к укреплению нейронных связей, ответственных за быстрое сканирование и навигацию, и к ослаблению связей, обеспечивающих глубокое, линейное чтение [2]. Социокультурные факторы. Экономика внимания стимулирует производство коротких, «упакованных» форматов, что формирует у аудитории ожидание быстрого получения информации и снижает толерантность к когнитивным затратам, связанным с длительным чтением [4]. Обсуждение. О чем говорят данные.

Анализ эмпирических исследований позволяет сделать несколько обоснованных выводов. Во-первых, изменение читательских практик — зафиксированный факт, подтвержденный данными социологических и нейронаучных исследований. Споры вызывает не само наличие изменений, а их оценка [10]. Во-вторых, наблюдаемые изменения носят характер адаптации к новой медиасреде. Формируется новый тип грамотности (цифровая грамотность), включающий навыки, необходимые для функционирования в гипертекстовой среде: быстрая оценка достоверности источников, навигация по нелинейным структурам, синтез фрагментированной информации [6]. В-третьих, цена этой адаптации — утрата некоторых способностей, связанных с глубоким, линейным, эмпатическим чтением. Как отмечает М. Вольф, способность к «глубокому чтению» — медленное, вдумчивое, рефлексивное погружение в текст — формируется только через практику длительного, непрерывного, линейного чтения [2].

Ограничения исследований

Важно отметить ограничения существующих исследований. Большинство из них фиксируют корреляции, но не доказывают причинно-следственные связи. Изменения в читательских практиках могут быть обусловлены не только технологическими факторами, но и более широкими социокультурными сдвигами. Кроме того, данные о чтении часто основываются на самоотчетах, которые могут быть неточными [1].

Заключение

В результате проведённого исследования установлено, что длинный линейный текст утрачивает свои позиции в системе современных коммуникативных практик вследствие глубинных изменений в когнитивной организации читателя, детерминированных спецификой интернет-среды. Данный процесс не является следствием временного снижения интереса к чтению или культурной деградации, но представляет собой закономерный этап эволюции взаимодействия человека с текстом в условиях информационной избыточности и гипертекстуальной фрагментарности.

Ключевым фактором, обусловливающим снижение восприимчивости к длинным текстам, выступает перестройка нейрокогнитивных механизмов обработки информации. Регулярное взаимодействие с гипертекстовыми структурами формирует и закрепляет стратегию поверхностного сканирования, при которой внимание распределяется между множеством фрагментов, а глубокая обработка информации, требующая временны́х затрат и концентрации, вытесняется как когнитивно неэкономичная. Линейный текст, напротив, предполагает последовательное развёртывание смысла, удержание в памяти сложных нарративных структур и эмпатическое вовлечение — процессы, которые в цифровой среде оказываются когнитивно невостребованными и, следовательно, постепенно атрофируются.

Дополнительным фактором выступает трансформация языковой среды интернет-коммуникации. Синтаксическая редукция, проявляющаяся в

сокращении доли сложноподчинённых конструкций, активном использовании парцелляции и номинативных предложений, приводит к снижению референциальной плотности текста. В результате у читателя, чья речевая практика преимущественно осуществляется в интернет-пространстве, формируется когнитивный порог, при котором восприятие сложноорганизованных синтаксических структур становится затруднительным и избегаемым.

Прагматический аспект трансформации заключается в смещении целевых установок чтения. В интернет-среде доминирует информационная функция текста, ориентированная на оперативное извлечение фактов и практических рекомендаций. Эстетическая и рефлексивная функции, составляющие сущность взаимодействия с художественным и философским длинным текстом, отодвигаются на периферию. Чтение перестаёт быть процессом и превращается в операцию, результат которой должен быть получен с минимальными временными затратами.

Таким образом, снижение интереса к длинному тексту представляет собой следствие системной трансформации когнитивных стратегий, языковых навыков и прагматических установок современного читателя под влиянием интернет-коммуникации. Длинный текст не исчезает окончательно, но переходит в разряд элитарных культурных практик, требующих от читателя осознанного культивирования навыков глубинного чтения. Перспективным направлением дальнейших исследований является разработка методов диагностики уровня сформированности этих навыков, а также поиск компенсаторных механизмов, позволяющих сохранить способность к восприятию сложных текстовых форм в условиях цифровой трансформации коммуникативной среды.

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ТЕКУЩЕЕ СОСТОЯНИЕ ОЦЕНКИ КРЕДИТОСПОСОБНОСТИ КОРПОРАТИВНЫХ КЛИЕНТОВ В БАНКОВСКОМ СЕКТОРЕ УЗБЕКИСТАНА: ПРОБЛЕМЫ И ОГРАНИЧЕНИЯ

Аннотация: *Статья посвящена оценке кредитоспособности корпоративных клиентов в банковском секторе Узбекистана в условиях несоответствия традиционных методов анализа современным масштабам кредитования, ограниченности информационной базы и недостаточной автоматизации процессов.*

Ключевые слова. *кредитоспособность; корпоративные клиенты; коммерческие банки; кредитный риск; скоринг; финтех; big data; NPL; IFRS 9; цифровизация банковского сектора*

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CURRENT STATE OF CREDIT ABILITY ASSESSMENT FOR CORPORATE CLIENTS IN THE BANKING SECTOR OF UZBEKISTAN: CHALLENGES AND LIMITATIONS

Annotation: *The article is dedicated to assessing the creditworthiness of corporate clients in the banking sector of Uzbekistan amid the inconsistency of traditional analysis methods with modern lending scales, limited information base, and insufficient automation of processes.*

Keywords: *creditworthiness; corporate clients; commercial banks; credit risk; scoring; fintech; big data; NPL; IFRS 9; digitalization of the banking sector*

Цель исследования.

Проанализировать текущее состояние оценки кредитоспособности корпоративных клиентов в банковском секторе Узбекистана, выявить ключевые ограничения действующей практики и определить направления её модернизации.

Материалы и методы

Исследование выполнено в аналитико-прикладном формате. Использованы нормативные документы по реформированию банковской системы, статистика Центрального банка Республики Узбекистан, сведения о динамике проблемных кредитов и кредитовании частного сектора, данные о запросах в КАТМ, материалы внутреннего обзора коммерческого банка, а

также межстрановое сопоставление практики Казахстана, Индии и Турции. Применялись структурный анализ, сопоставление показателей, экспертная интерпретация и сравнительный анализ.

Результаты

Действующая система сохраняет высокую долю ручных операций, ограниченно использует скоринг и слабо интегрирована с внешними официальными источниками данных. В 2025 году число запросов в КАТМ превысило 2,29 млн, однако только 0,7% запросов пришлись на юридических лиц. По внутренним данным одного из банков подготовка заключения занимала 5–7 дней, а доля ошибок при ручном расчёте финансовых показателей достигала 13%. До внедрения современных инструментов лишь около 6% корпоративных заявок классифицировались на ранней стадии как высокорисковые. На конец 2024 года официальный уровень NPL удерживался около 4%, тогда как доля Stage 3 по IFRS 9 на декабрь 2023 года составляла 7,8% при официальном NPL 4,2%.

Выводы

Корпоративный кредитный анализ в Узбекистане нуждается в переходе от фрагментарного документ-ориентированного режима к модели, основанной на интеграции официальных данных, стандартизированных расчётах и раннем цифровом отборе заявок. При сохранении текущей архитектуры рост корпоративного кредитования будет сопровождаться повышенной чувствительностью портфеля к скрытым рискам.

ВВЕДЕНИЕ

Реформирование банковской системы Узбекистана в 2020–2025 годах закрепило цифровизацию процессов, повышение прозрачности кредитных операций и развитие современных методов риск-менеджмента в числе базовых направлений государственной политики [1]. Дополнительный акцент на совершенствовании анализа корпоративных заёмщиков и на укреплении системы управления риском был сделан в постановлении Президента от 12 апреля 2021 года [1]. На уровне стратегических ориентиров задача сформулирована достаточно ясно. Практика корпоративного кредитования при этом меняется медленнее. Кредитные решения по-прежнему во многом опираются на консервативную логику. В её центре остаются документы, представленные самим заёмщиком, локальные данные банка-кредитора и экспертная оценка кредитного комитета.

Такая модель ограничивает качество аналитики. Предприятие может вести расчёты в нескольких банках, перераспределять долговую нагрузку между кредиторами и иметь обязательства, не попадающие в поле зрения одного банка. При неполной базе расчёта даже корректно выведенные коэффициенты ликвидности, покрытия долга или долговой нагрузки теряют часть своей аналитической ценности. Ошибка возникает не столько на этапе интерпретации, сколько на этапе наблюдения хозяйственной реальности. Отсюда растёт значение кредитной инфраструктуры, межведомственного обмена данными и автоматизированной проверки сведений [2], [10].

Актуальность темы усиливается и на макроуровне. Объём кредитов частному сектору по отношению к ВВП увеличился с 24% в 2018 году примерно до 42% в 2023 году [3]. При расширении кредитного рынка цена аналитической неточности возрастает. Даже умеренный разрыв между формально приемлемыми и фактически более рискованными заявками начинает влиять на качество портфеля, на потребность в резервах и на скорость оборота кредитного конвейера.

Цель исследования состоит в аналитической оценке действующей системы оценки кредитоспособности корпоративных клиентов в банковском секторе Узбекистана, в выявлении её основных ограничений и в определении направлений последующей модернизации с опорой на национальную статистику и межстрановое сравнение.

МАТЕРИАЛЫ И МЕТОДЫ

Исследование выполнено как аналитико-прикладное. В качестве базовых источников использованы нормативные документы, статистические материалы Центрального банка Республики Узбекистан, данные о динамике кредитования и проблемной задолженности, сведения о запросах в кредитное бюро КАТМ, а также внутренние обзорные материалы коммерческого банка. Внутренний блок источников применялся для оценки продолжительности подготовки кредитного заключения, характера расчётных ошибок и качества раннего распознавания рискованных заявок.

Методический инструментарий включал анализ нормативной среды, сравнение официальных статистических показателей, обзор литературы и практических кейсов, а также межстрановое сопоставление. Для внешнего контура сопоставления были выбраны Казахстан, Индия и Турция. Такой выбор связан с тем, что в этих юрисдикциях цифровая кредитная инфраструктура и автоматизация оценки риска развиваются заметно быстрее и уже дают измеримые организационные эффекты [7], [8], [9].

При интерпретации результатов использовался принцип триангуляции. Он объединял официальную статистику, внутренние практические данные и экспертные оценки специалистов банковского сектора. Это дало возможность связать количественные индикаторы с реальными особенностями кредитного процесса и избежать одностороннего чтения отдельных показателей.

РЕЗУЛЬТАТЫ

Анализ действующей практики выявил устойчивое сочетание классического финансового анализа и ограниченного применения цифровых инструментов. Стандартная процедура включает сбор финансовой отчётности, анализ ликвидности, рентабельности и долговой нагрузки, проверку кредитной истории, а также оценку обеспечения [2], [6]. Существенная часть этих действий выполняется вручную. По внутренним данным одного из коммерческих банков средний срок подготовки кредитного заключения по корпоративному клиенту до внедрения цифровых модулей достигал 5–7 дней. Финансовые расчёты выполнялись аналитиками вручную, а доля ошибок при вычислении показателей достигала 13%. Одновременно на кредитные комитеты поступало значительное число заявок, которые в дальнейшем признавались высокорисковыми. Это указывает на слабость предварительного фильтра и на высокую бюрократическую нагрузку кредитного процесса.

Второй блок ограничений связан с информационной архитектурой. Банковские системы длительное время не имели полноценных связей с данными налогового комитета, залогового реестра и кредитной инфраструктуры. В результате совокупный риск-профиль корпоративного клиента формировался фрагментарно. Анализ строился преимущественно на тех сведениях, которые представил сам заёмщик, и на данных, накопленных в банке-кредиторе. При такой конструкции скрытая задолженность в других банках, налоговые обязательства и часть оборотов могли не попасть в расчёт. До появления современных инструментов лишь около 6% корпоративных заявок распознавались на ранней стадии как высокорисковые. Основной массив проблем смещался на более поздние этапы, когда цена решения уже возрастала.

Слабым остаётся и использование кредитного бюро в корпоративном сегменте. В 2025 году число запросов в КАТМ превысило 2,29 млн, что означало рост на 114% по сравнению с предыдущим годом. Однако только 0,7% этих запросов пришлись на юридических лиц [2]. Для розничного сегмента кредитная инфраструктура уже стала рутинным элементом анализа. Для корпоративного кредитования её потенциал пока реализован частично. Эта диспропорция снижает полноту оценки долговой нагрузки и истории обслуживания долга именно там, где цена единичной ошибки наиболее высока.

Отдельного внимания требует соотношение между официальным NPL и более жёстким учётом проблемных активов по IFRS 9. По данным Центрального банка, доля проблемных кредитов в 2018–2021 годах увеличилась примерно до 5–6%, после чего начала снижаться и на конец 2024 года удерживалась около 4% [3], [4]. По международному стандарту IFRS 9 картина была жёстче. На декабрь 2023 года кредиты Stage 3 составляли 7,8%, тогда как официальный NPL находился на уровне 4,2% [5]. Разрыв между двумя индикаторами означает наличие пласта риска, который

не полностью фиксируется через привычный регуляторный показатель. Для корпоративного анализа это важный сигнал. Он связан не только с макроэкономикой, но и с качеством раннего выявления проблемных заёмщиков.

Полученные данные дают возможность свести ограничения действующей модели к пяти устойчивым позициям. Первая касается низкой автоматизации и высокой доли ручных операций. Вторая связана с бюрократической перегруженностью процесса, когда слабые заявки доходят до дорогих стадий рассмотрения. Третья относится к ограниченному использованию скоринга и прогнозных аналитических инструментов. Четвёртая затрагивает узость информационной базы, почти не включающей альтернативные и межведомственные данные. Пятая связана с фрагментацией источников, когда разные аспекты риска существуют в разрозненных контурах и не собираются в единый профиль корпоративного клиента.

ОБСУЖДЕНИЕ

Диагностическая картина, полученная в исследовании, имеет системный характер. Рост корпоративного кредитования сам по себе не создаёт проблему. Напряжение возникает в тот момент, когда увеличение объёма кредитного портфеля сопровождается прежней логикой анализа. В такой среде ручные расчёты, дублирование проверок и неполный периметр данных становятся не частной организационной сложностью, а фактором портфельного риска. Банк принимает решение медленнее, а часть риска видит позже, чем это требуется для качественного структурирования сделки.

Межстрановое сопоставление усиливает этот вывод. В Казахстане к 2025 году большинство банков использовали AI-технологии в скоринге, антифроде и таргетинге услуг. В Индии развитие альтернативного скоринга было поддержано цифровыми данными о платежной активности и инфраструктурой Account Aggregator. В Турции единый Risk Center обеспечил масштабный доступ банков к централизованной информации о заёмщиках и вывел число запросов к системе на уровень свыше 500 млн в год [7], [8], [9]. Для Узбекистана важна не механическая калька этих моделей, а сам принцип. Кредитное решение становится устойчивее тогда, когда оно строится на более полном массиве верифицируемых данных и на стандартизированном процессе их обработки.

С точки зрения банковской практики это означает необходимость перехода от локального анализа в пределах одного банка к комплексному рисковому профилю клиента. В такой логике КАТМ, налоговые источники, реестры обеспечения и данные по внешним обязательствам перестают быть вспомогательным материалом. Они становятся частью ядра корпоративного андеррайтинга. Одновременно возрастает роль стандартизированных скоринговых и pre-screen механизмов. Они не заменяют эксперта, но освобождают его от избыточной рутинной работы и смещают фокус на качественную интерпретацию устойчивости бизнеса.

Практический смысл проведённого анализа состоит в том, что он задаёт исходную точку для построения более полной цифровой модели оценки кредитоспособности. Без такой модели разрыв между формально умеренным NPL и скрытым пластом проблемных активов будет сохраняться, а кредитный конвейер останется чувствительным к техническим ошибкам, задержкам и неполноте сведений.

Таблица 1.
Количественные индикаторы ограничений действующей модели оценки корпоративных клиентов

Индикатор	Значение	Содержательная интерпретация
Число запросов в КАТМ в 2025 году	> 2,29 млн	Кредитная инфраструктура активно используется, но её корпоративный сегмент остаётся слабым
Доля запросов от юридических лиц	0,7%	Корпоративное кредитование ограниченно использует данные кредитного бюро
Средний срок подготовки заключения	5–7 дней	Высокая доля ручных процедур замедляет анализ
Доля ошибок при ручном расчёте показателей	13%	Техническая вариативность влияет на точность финансовой оценки
Ранняя идентификация высокорисковых заявок	около 6%	Предварительный фильтр на входе функционирует слабо
NPL на конец 2024 года	около 4%	Регуляторный уровень проблемной задолженности выглядит умеренным
Stage 3 по IFRS 9 на декабрь 2023 года	7,8%	Экономический контур риска более жёсткий, чем официальный NPL
Официальный NPL на декабрь 2023 года	4,2%	Возникает разрыв между двумя способами идентификации проблемных активов
Кредиты частному сектору к ВВП	24% в 2018 г.; около 42% в 2023 г.	Рост кредитного рынка повышает цену аналитической ошибки

Таблица 1 отражает измеряемые параметры, характеризующие текущую эффективность корпоративного кредитного анализа. В ней представлены показатели длительности подготовки заключения, доли ошибок при ручных расчётах, уровня раннего выявления рисковых заявок, а также соотношения NPL и Stage 3 по IFRS 9. Совокупность данных позволяет зафиксировать разрыв между формальными индикаторами качества портфеля и фактической глубиной риск-оценки, а также оценить влияние ручных процедур на точность и скорость анализа.

Таблица 2.
Структурные ограничения действующей системы оценки кредитоспособности корпоративных клиентов

Ограничение	Проявление в текущей практике	Риск для кредитного процесса
Низкая автоматизация	Сбор и расчёт значимой части показателей выполняется вручную	Рост сроков и числа технических ошибок
Бюрократическая перегруженность	Слабые заявки доходят до кредитного комитета	Избыточная нагрузка на аналитиков и коллегиальные органы
Ограниченное использование скоринга	Решения опираются преимущественно на экспертную интерпретацию	Низкая сопоставимость кейсов и слабый ранний отбор
Узкая информационная база	Анализ строится на данных заёмщика и на локальном контуре банка	Неполное наблюдение денежных потоков и обязательств
Фрагментация данных	Кредитная история, налоговые сведения и обеспечение существуют в разрозненных источниках	Отсутствие единого риск-профиля клиента

Таблица 2 систематизирует ключевые организационные и информационные ограничения действующей модели. В ней выделены такие блоки, как фрагментация источников данных, преобладание ручных операций, ограниченное использование скоринга и недостаточная интеграция внешних информационных систем. Представленная структура позволяет связать выявленные проблемы не с отдельными этапами анализа, а с общей архитектурой кредитного процесса.

Таблица 3.
Отдельные ориентиры зарубежной практики, использованные для сравнительного анализа

Страна	Ключевой элемент практики	Практическое значение для корпоративного анализа
Казахстан	75% банков используют AI в скоринге, антифроде и таргетинге услуг	Высокая цифровая зрелость ускоряет оценку и снижает роль ручных операций
Индия	Используются альтернативные данные и инфраструктура Account Aggregator	Расширяется аналитическая база по клиентам с неполной кредитной историей
Турция	Функционирует единый Risk Center, число запросов превысило 500 млн в год	Централизация кредитной информации снижает информационную асимметрию

Таблица 3 содержит сопоставление отдельных элементов корпоративного кредитного анализа в зарубежных банковских системах, включая уровень автоматизации, использование скоринговых моделей, интеграцию данных и роль централизованных кредитных инфраструктур. Приведённые ориентиры используются как база для оценки разрыва между текущей практикой в Узбекистане и международными подходами, а также для обоснования направлений модернизации системы оценки кредитоспособности.

ЗАКЛЮЧЕНИЕ

Проведённый анализ выявил, что действующая система оценки кредитоспособности корпоративных клиентов в банковском секторе Узбекистана остаётся чувствительной к трём связанным факторам. Речь идёт о неполноте данных, о высокой доле ручных процедур и о слабом раннем распознавании риска. При расширении корпоративного кредитования такая конфигурация становится всё менее устойчивой.

Практическое направление модернизации связано с интеграцией официальных источников данных, расширением использования КАТМ в корпоративном сегменте, внедрением стандартизированного скоринга и двухэтапного отбора заявок. Эта логика создаёт основу для более полной оценки корпоративного заёмщика и для сокращения разрыва между регуляторной и фактической картиной риска.

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ОСОБЕННОСТИ СТРАТЕГИИ ФОРМИРОВАНИЯ КАПИТАЛА КРУПНОЙ ПРОИЗВОДСТВЕННОЙ КОМПАНИИ

Аннотация. *Стратегия привлечения заемных средств, и шире – формирования капитала компании в целом, оказывает влияние на корпоративные риски, динамику затрат, финансовых результатов. Цель работы – отслеживание динамики структуры капитала компании Haier – результата реализации ее финансовой стратегии. Методы исследования: библиографический, кейс-стади, динамических рядов, сравнения, финансового левериджа. Результаты анализа свидетельствуют: консервативная стратегия формирования капитала позволяет компании оптимизировать кредитные риски, и обеспечить высокую финансовую устойчивость развития.*

Ключевые слова: *структура капитала, стратегия, заемные средства, собственный капитал, финансовое плечо, компания Haier.*

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FEATURES OF A CAPITAL FORMATION STRATEGY FOR A LARGE MANUFACTURING COMPANY

Abstract. *Borrowing strategy, and more broadly, the company's overall capital formation, impacts corporate risks, cost dynamics, and financial*

performance. The objective of this study is to track the dynamics of Haier's capital structure as a result of its financial strategy implementation. Research methods include case studies, time series, comparisons, and financial leverage. The analysis demonstrates that a conservative capital formation strategy allows the company to optimize credit risks and ensure high financial sustainability.

Keywords: *capital structure, strategy, borrowings, equity, financial leverage, Haier.*

Для осуществления операционной и инвестиционной деятельности компании нуждаются в капитале. Собственные источники, такие как уставный капитал, нераспределенная прибыль, дополнительная эмиссия акций, всегда ограничены. Большинство компаний реального сектора экономики, особенно в кризисных обстоятельствах, вынужденно привлекают заемные средства – кредиты и ссуды банков, товарные кредиты поставщиков, партнеров, облигационные займы, и др. При этом появляются кредитные риски, и снижаются показатели финансовой устойчивости бизнеса.

Проблемы формирования и реализации финансовой стратегии коммерческих организаций исследует ряд авторов. Так, Г.Л. Толкаченко, Н.Е. Царева изучали динамику капитала организаций с позиций формирования с позиций рационализации его структуры. Авторы утверждают: «компания устойчива и конкурентоспособна при наличии двух факторов: обеспеченность достаточным размером капитала, и необходимость наличия надежных рынков сбыта продукции». На этой основе Г.Л. Толкаченко, Н.Е. Царева предприняли попытку разработки нового подхода к формированию рациональной структуры капитала организации [4].

В.В. Баранов уверен: «Формирование и реализация финансовой стратегии ориентированы на достижение целей собственников бизнеса, характеризуют целеустремленность менеджмента, способность на системной основе преследовать и реализовывать интересы сторон управления во всех ключевых финансовых и производственных процессах» [1].

Ф.М. Дашдемиров, А.Д. Воробьев детально рассматривали связи между операционной, инвестиционной и финансовой стратегиями компаний, при этом отмечая, что «процесс формирования иерархии стратегий может быть различным» [2].

Ч.Р.М. Куигниа, В.Н. Пищулин изучали проблемы разработки финансовой стратегии организаций с позиций влияния инновационной деятельности. Авторы утверждают: «Финансовая стратегия, построенная с учетом финансовых возможностей, учитывающая внутренние и внешние факторы, оказывающие влияние на финансово-хозяйственную деятельность, позволяет обеспечить устойчивое положение организации на рынке» [3].

В данной статье нами рассмотрены показатели структуры капитала крупной китайской компании Haier – производителя бытовой техники и

электроники. Корпоративная стратегия компании Haier на разных этапах концентрировала внимание сотрудников на качестве, диверсификации, интернационализации, инновациям, экосистеме.

Финансовая стратегия – в ряду других функциональных стратегий Haier – ответственна в том числе за оптимизацию структуры капитала. В последние годы темпы роста заемного капитала компании опережали темпы роста активов и собственного капитала (табл. 1).

Таблица 1.
Динамика активов и капитала компании Haier в 2023-25 гг.
(суммы в млрд юаней)

Годы	2023	2024	2025	2025/ 2024	2025 / 2023
Активы	261,1	290,7	295,8	1,018	1,133
Заемный капитал	36,7	44,5	45,3	1,018	1,234
Собственный капитал	224,4	246,2	250,5	1,017	1,116
Финансовое «плечо»	0,164	0,181	0,181	-	-

Источник – разработано автором по: [5]

По итогам 2025 года индексы роста трех анализируемых показателей почти одинаковы: 1,017-1,018, то есть годовой прирост составил 1,7-1,8 процента. Соответственно показатель «финансового плеча» (отношение заемного капитала к собственному) в 2024-25 гг. практически не изменился (0,181). Но в 2023 г. финансовое «плечо» компании составляло 0,164 – на каждый юань собственных средств компания привлекала 0,16 юаня заемных средств.

За два последних года активы компании (стоимость имущества) возросли на 13,3 процента. Величина собственного капитала возросла на 11,6 процентов – за счет увеличения стоимости акций компании, а также использования прибыли прошлых периодов. Заемный капитал в тот же период рос в два раза быстрее, и вырос почти на четверть (плюс 23,4%) – компания стала активнее занимать деньги в форме ссуд, денежного, товарного кредита, облигационных займов, и др.

Кредитный риск компании соответственно повысился, но по сравнению со среднеотраслевыми показателями (0,733 в материковом Китае), этот риск минимален (0,181).

Вывод: в 2023-25 гг. компания стала активнее привлекать заемные средства, но в рамках устоявшейся консервативной финансовой стратегии. Осторожное отношение к заимствованиям позволяет удерживать показатели финансового «плеча» компании на уровне в четыре раза ниже среднеотраслевого. Кредитные риски компании невысоки.

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ДИНАМИКА ПОКАЗАТЕЛЕЙ ДОХОДНОСТИ И РЕНТАБЕЛЬНОСТИ КРУПНОЙ ПРОИЗВОДСТВЕННОЙ КОМПАНИИ

Аннотация. *Цель работы – оценка динамики показателей доходов и затрат компании Haier в 2023-25 гг. Методы исследования: библиографический, кейс-стади, динамических рядов, сравнения. Результаты анализа свидетельствуют: под влиянием «рыночной власти» покупателей компания сдерживает рост отпускных цен продукции, несмотря на повышение себестоимости под влиянием роста цен сырья и комплектующих.*

Ключевые слова: *себестоимость продукции, маржинальный доход, прибыль, рентабельность оборота, компания Haier.*

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REVENUE AND PROFITABILITY DYNAMICS OF A LARGE MANUFACTURING COMPANY

Abstract. *The objective of this study is to assess the dynamics of revenue and cost indicators at Haier in 2023-2025. Research methods include bibliographic analysis, case studies, time series, and comparisons. The analysis reveals that, influenced by buyers' market power, the company restrains increases*

in selling prices, despite increases in production costs driven by raw material and component prices.

Keywords: *production cost, marginal income, profit, return on sales, Haier.*

Нестабильность товарных рынков, связанная с причинами геополитического характера, вынуждает многих производителей варьировать отпускные цены, учитывая поведение своих поставщиков и потребителей. В таких условиях показатели выручки, маржинального дохода, себестоимости продукции имеют противоречивую динамику.

Проблемы формирования и распределения маржинального дохода организаций исследует ряд авторов. Так, Б.А. Досалиев изучал структуру маржинального дохода с позиций ценообразования, повышения доли «постоянных» расходов в себестоимости, и в цене реализуемой продукции [3].

П.А. Гусейнова, О.И. Рябичева исследовали долю маржинального дохода в цене товара, утверждая, что «показатель маржинального дохода является одним из важных параметров, использующихся во время анализа результативности производственной деятельности» [2].

Другие авторы обращают внимание на структуру себестоимости продукции в связи с ее ценой.

В.С. Тихонов, А.Н. Сунтеев рекомендуют проведение постоянного мониторинга структуры себестоимости продукции промышленного предприятия, с целью ее снижения, перераспределения затрат. Авторы связывают эту проблему с разработкой «механизма, направленного на активизацию инновационной деятельности, интенсивное развитие промышленных предприятий в направлении цифровых технологий [4].

Р.М. Богданова, С.С. Горбанев исследуют пути снижения затрат предприятия на основе внедрения концепции «бережливого производства», анализируют структуру производственной себестоимости продукции и факторы, влияющие на ее снижение в современных условиях [1].

В данной статье нами изучены показатели доходности и рентабельности продаж крупного производителя бытовой техники – компании Haier.

За два последних года выручка компании возросла на 10,2% (табл. 1).

Таблица 1.
Динамика доходов и прибыли компании Haier в 2023-25 гг.
(суммы в млрд юаней)

Годы	2023	2024	2025	2025/ 2024	2025 / 2023
Выручка	274,2	286,1	302,3	1,057	1,102
Себестоимость	198,8	206,4	221,7	1,074	1,115
Маржинальный доход: сумма	75,4	79,7	80,6	1,011	1,069
%% к выручке	27,5	27,9	26,7	-	-
Прибыль чистая	16,6	18,7	19,6	1,048	1,181
Рентабельность оборота	6,05	6,54	6,48	-	-

Источник – разработано автором по: [5]

В то же время себестоимость продукции выросла на 11,5%. Сравнение этих показателей позволяет сделать вывод: поставщики сырья и комплектующих повышают свои цены быстрее, чем Haier. Компания вынуждена учитывать так называемую «рыночную власть» покупателей, поэтому сознательно отстает по росту цен от поставщиков сырья и комплектующих. Это сказывается на динамике показателей маржинального дохода. Если в 2023 г. его уровень составлял 27,5, в 2024 г. – 27,9 (самый высокий показатель), то по итогам 2025 г. – 26,7 процентов к обороту. При прогнозировании показателей на ближайшую перспективу необходимо учитывать сложившуюся тенденцию – она сохранилась и в 2025 г., когда выручка компании увеличилась на 5,7%, а себестоимость – на 7,4%.

Но при этом сумма прибыли Haier после уплаты налогов росла опережающими темпами – на 18,1% за два года, в том числе на 4,8% за 2025 год. Можно сделать вывод о том, что при стабильной ставке налогов влияние оказала экономия управленческих и коммерческих затрат компании.

Относительный размер прибыли характеризует показатель ROS (возврат на продажи), иначе – рентабельность продаж: в 2023 г. он составлял 6,05; в 2024 г. – 6,54 (лучший показатель); в 2025 г. – 6,48 процентов к выручке. В целом за два года наблюдается повышение рентабельности оборота, но за последний год – снижение на 0,06 процентов (к выручке). Казалось бы, это небольшое снижение, но при годовой выручке, превышающей триста млрд юаней, такое снижение в сумме означает для компании потерю доходов в размере более 180 млн юаней.

Вывод. Мониторинг себестоимости продукции и маржинального дохода дает менеджерам дополнительную информацию, необходимую для принятия решений в области ценообразования. При установлении отпускных цен на произведенную продукцию в современных условиях, помимо калькуляции затрат, целесообразно учитывать динамику «рыночной власти» покупателей.

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ARTERIAL HYPERTENSION IN PREGNANCY: CLINICAL ASPECTS AND OUTCOMES

Abstract: *This study examined the characteristics of pregnancy in women with hypertensive disorders who were treated in the maternity ward of the Republican Clinical Hospital of Samarkand State Medical University. A total of 45 pregnant women with gestational hypertension, preeclampsia, and c hronic hypertension were examined. An analysis of clinical manifestations, delivery methods, and perinatal outcomes was conducted. The results showed that hypertension during pregnancy is associated with a higher rate of cesarean sections, preterm births, and low birth weight. Major risk factors included age over 30 years, obesity, primiparity, and a history of hypertension.*

Keywords: *hypertension in pregnancy, preeclampsia, gestational hypertension, pregnancy, delivery.*

Introduction

Hypertensive disorders during pregnancy represent a significant problem in obstetric practice. According to the World Health Organization, up to 10% of pregnant women experience elevated blood pressure, which can lead to complications for both mother and fetus.

In the Republic of Uzbekistan, this pathology remains relevant; however, local data on the course of pregnancy, delivery methods, and perinatal outcomes are limited. Studying these characteristics is necessary to optimize preventive and therapeutic measures.

Objective

To study the clinical course, delivery methods, and perinatal outcomes in women with hypertensive disorders who were hospitalized in the maternity ward of the Republican Clinical Hospital of Samarkand State Medical University.

Materials and Methods

The study was retrospective and descriptive. A total of 45 women with a diagnosis of hypertensive disorders were examined:

- Gestational hypertension — 24 women (53.3%)
- Preeclampsia — 16 women (35.6%)
- Chronic hypertension — 5 women (11.1%)

Inclusion criteria:

- Singleton pregnancy ≥ 20 weeks

- Diagnosis of arterial hypertension

Exclusion criteria:

- Multiple pregnancies
- Severe comorbidities (cardiovascular, renal, etc.)

Methods: Analysis of medical records, laboratory data, patient history, delivery methods, and perinatal outcomes. Statistical analysis included calculation of mean values, percentages, and testing for significance ($p < 0.05$).

Results

The mean age of the patients was 30.8 ± 4.5 years, with primiparas accounting for 58%. Overweight or obesity was found in 46.7% of women, and a hereditary predisposition in 40%.

Clinical manifestations:

- Headaches, edema, and proteinuria were more common in preeclampsia.
- Average blood pressure readings reached 160/100 mmHg.

Delivery methods:

- Cesarean section — 26 women (57.8%)
- Vaginal delivery — 19 women (42.2%)

Primary indications for cesarean section included severe preeclampsia, risk of intrauterine hypoxia, and ineffective therapy.

Perinatal outcomes:

- Mean birth weight: 2700 ± 480 g
- Preterm birth: 22.2%
- Low birth weight (< 2500 g): 31%
- Perinatal mortality: 2.2% (1 case)

A significant correlation was found between the severity of hypertension and the frequency of adverse outcomes ($p < 0.05$).

Conclusions

1. Hypertensive disorders occur in a significant proportion of pregnant women, accounting for 10.7% of all deliveries in the ward.
2. Major risk factors include age over 30, primiparity, obesity, and a history of hypertension.
3. Pregnancy in women with hypertension is more often complicated by preterm birth, antenatal hypoxia, and the need for operative delivery.
4. Timely diagnosis and treatment reduce the risk of complications for both mother and fetus.

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RAK OLDI HOLATLARINI DAVOLASHNI OPTIMALLASHTIRISH

Annotatsiya: *Og'iz bo'shlig'i shilliq pardasining rak oldi holatlari stomatologiya, onkologiya va patologik morfologiyaning dolzarb muammolaridan biri hisoblanadi. Ushbu patologiyalar vaqt o'tishi bilan malign transformatsiyaga uchrash xavfiga ega bo'lgani sababli ularni o'z vaqtida aniqlash, to'g'ri baholash va samarali davolash muhim klinik ahamiyat kasb etadi. Rak oldi holatlarini davolashni optimallashtirish faqat simptomlarni bartaraf etish bilan cheklanmay, balki etiologik omillarni yo'qotish, morfologik xavfni baholash, individual yondashuvni tanlash va kasallikning qaytalanishini oldini olishga qaratilgan kompleks tizimni talab etadi. Mazkur maqolada rak oldi holatlarini davolashni optimallashtirishning klinik, morfologik, profilaktik va tashkiliy jihatlari tahlil qilinadi. Tadqiqotda davolash taktikasini belgilashda patologik o'choqning lokalizatsiyasi, klinik shakli, davomiyligi, displaziya darajasi, travmatik va toksik omillar, mikrotsirkulyatsiya buzilishlari hamda bemorning umumiy somatik holati muhim mezonlar sifatida ko'rib chiqilgan. Olingan natijalar rak oldi holatlarida individual va bosqichli davolash yondashuvi malignizatsiya xavfini kamaytirish, klinik natijalarni yaxshilash va stomatologik onkologiyada erta profilaktika samaradorligini oshirishini ko'rsatadi.*

Kalit so'zlar*: rak oldi holatlari, og'iz shilliq pardasi, davolashni optimallashtirish, displaziya, leykoplakiya, eritroplakiya, kompleks terapiya, malignizatsiya, profilaktika, stomatologik onkologiya.*

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OPTIMIZATION OF THE TREATMENT OF PRECANCEROUS CONDITIONS

Abstract: *Precancerous conditions of the oral mucosa are among the pressing problems of dentistry, oncology, and pathological morphology. Since these pathologies carry the risk of malignant transformation over time, their timely detection, proper assessment, and effective treatment are of great clinical importance. Optimization of the treatment of precancerous conditions is not limited to the elimination of symptoms alone, but requires a comprehensive system aimed at eliminating etiological factors, assessing morphological risk, selecting an individual approach, and preventing disease recurrence. This article analyzes the clinical, morphological, preventive, and organizational aspects of optimizing*

the treatment of precancerous conditions. In determining treatment tactics, the study considers the localization of the pathological lesion, its clinical form, duration, degree of dysplasia, traumatic and toxic factors, microcirculatory disorders, and the patient's general somatic condition as important criteria. The obtained results show that an individual and stepwise treatment approach in precancerous conditions reduces the risk of malignization, improves clinical outcomes, and increases the effectiveness of early prevention in dental oncology.

***Keywords**: precancerous conditions, oral mucosa, optimization of treatment, dysplasia, leukoplakia, erythroplakia, complex therapy, malignization, prevention, dental oncology.*

Kirish

Og‘iz bo‘shlig‘i shilliq pardasi kasalliklari orasida rak oldi holatlari alohida klinik va prognostik ahamiyatga ega. Bunday holatlarga leykoplakiya, eritroplakiya, surunkali travmatik yaralar, diskeratozlar, eroziyaga moyil giperkeratotik o‘choqlar va boshqa displastik o‘zgarishlar kiradi. Ularning asosiy xavfi shundaki, vaqt o‘tishi bilan ushbu holatlar epiteliy hujayralarida strukturaviy va funksional qayta qurilishlarni kuchaytirib, malign transformatsiya uchun zamin yaratishi mumkin. Shu sababli rak oldi holatlarini davolash masalasi oddiy simptomatik yordam ko‘rsatishdan ko‘ra ancha chuqur va ko‘p bosqichli yondashuvni talab qiladi.

Zamonaviy klinik amaliyotda rak oldi holatlarini davolashning asosiy muammosi ularning klinik jihatdan turlicha namoyon bo‘lishi, morfologik tuzilishining bir xil bo‘lmasligi va etiologik omillarning ko‘p qirraliligidir. Ayrim hollarda o‘choq uzoq vaqt davomida nisbatan barqaror qoladi, boshqa holatlarda esa qisqa muddat ichida displaziya chuqurlashib, malignizatsiya xavfi ortadi. Bu esa davolash taktikasini tanlashda klinik ko‘rinish bilan birga gistologik mezonlar, xavf omillari va bemorning umumiy holatini birgalikda baholash zarurligini ko‘rsatadi.

Rak oldi holatlarini davolashni optimallashtirish deganda patologik jarayonni imkon qadar erta bosqichda to‘xtatish, zararlovchi omillarni bartaraf etish, regenerativ jarayonlarni normallashtirish, hujayraviy atypizm chuqurlashuvining oldini olish va qaytalanish ehtimolini kamaytirishga qaratilgan ratsional terapiya tizimi tushuniladi. Bunda nafaqat konservativ yoki jarrohlik usullarni qo‘llash, balki bemorni dispanser kuzatuviga olish, individual xavf guruhini aniqlash va muntazam monitoring olib borish ham muhim o‘rin tutadi.

Etiologik jihatdan rak oldi holatlarining rivojlanishida tamaki chekish, alkogol iste’moli, surunkali mexanik travma, og‘iz bo‘shlig‘i gigiyenasining yetarli emasligi, noto‘g‘ri tayyorlangan protezlar, o‘tkir qirrali tishlar, yallig‘lanish o‘choqlari, trofik va immun buzilishlar muhim rol o‘ynaydi. Ushbu omillar doimiy ta’sir ko‘rsatganda epiteliyda moslashuv reaksiyalari avval giperkeratoz, akantoz va parakeratoz shaklida namoyon bo‘ladi, keyinchalik esa displaziya, atypizm va to‘qima arxitektonikasining buzilishiga olib keladi. Demak, davolashni

optimallashtirish patologik o‘choqni emas, balki uni shakllantiruvchi butun etiopatogenetik zanjirni nishonga olishi kerak.

Mazkur maqolaning maqsadi og‘iz bo‘shlig‘i shilliq pardasi rak oldi holatlarida davolashni optimallashtirishning ilmiy asoslarini yoritish, klinik va morfologik mezonlarga tayangan holda samarali davolash taktikasini asoslash hamda kompleks yondashuvning amaliy ahamiyatini ko‘rsatishdan iborat.

Materiallar va usullar

Mazkur maqola tahliliy-tavsifiy xarakterga ega bo‘lib, rak oldi holatlarini davolashga oid klinik kuzatuv tamoyillari, morfologik baholash mezonlari va zamonaviy stomatologik-onkologik yondashuvlar asosida tayyorlandi. Tadqiqot metodologiyasi sifatida og‘iz shilliq pardasi rak oldi holatlarining klinik shakllari, xavf omillari, displaziya darajasi va ularga nisbatan qo‘llanadigan davolash usullarining samaradorligini qiyosiy tahlil qilish usuli tanlandi.

Tahlilda quyidagi rak oldi holatlari asosiy obyekt sifatida ko‘rib chiqildi: leykoplakiya, eritroplakiya, verrukoz va eroziv shakllar, surunkali travmatik yaralar, cheklangan giperkeratoz o‘choqlari, diskeratoz va boshqa epitelial displastik o‘zgarishlar. Ushbu holatlarda davolash usulini tanlashda quyidagi mezonlarga e’tibor qaratildi: patologik o‘choqning lokalizatsiyasi, davomiyligi, o‘lchami, klinik shakli, subyektiv shikoyatlar, yallig‘lanish komponentining darajasi, qonashga moyillik, standart konservativ terapiyaga javob berishi va gistologik tekshiruv natijalari.

Morfologik baholashda epiteliy displaziyasi darajasi, keratinizatsiya xususiyatlari, bazal qavat hujayralarining proliferativ faolligi, yadro-hujayra nisbatining o‘zgarishi, stromal yallig‘lanish infiltratsiyasi, mikrotsirkulyatsiya buzilishlari hamda to‘qima arxitektonikasining qay darajada izdan chiqqani hisobga olindi. Ayniqsa, yengil, o‘rtacha va og‘ir displaziya mavjud hollarda davolash strategiyasining turlicha bo‘lishi ilmiy jihatdan asoslab berildi.

Davolashni optimallashtirish tamoyillari quyidagi yo‘nalishlar bo‘yicha tahlil qilindi: etiologik omillarni bartaraf etish, konservativ davo usullarini tanlash, mahalliy va umumiy terapiyani muvofiqlashtirish, jarrohlik aralashuvga ko‘rsatmalarni aniqlash, reabilitatsion chora-tadbirlarni ishlab chiqish va dinamik kuzatuvni tashkil etish. Shuningdek, davolash samaradorligini baholashda klinik regressiya, epitelizatsiya tezligi, subyektiv belgilar kamayishi, qaytalanish chastotasi va malignizatsiya xavfining pasayishi asosiy ko‘rsatkichlar sifatida qabul qilindi.

Natijalar

Tahlil natijalari shuni ko‘rsatdiki, rak oldi holatlarini davolash samaradorligi ko‘p jihatdan terapiyaning individual va bosqichli tashkil etilishiga bog‘liq. Faqat patologik o‘choqqa qaratilgan qisqa muddatli mahalliy davo aksariyat hollarda yetarli bo‘lmaydi. Davolashning optimal modeli etiologik omillarni yo‘qotish, mahalliy yallig‘lanishni kamaytirish, trofikani yaxshilash, epiteliy regeneratsiyasini rag‘batlantirish va morfologik xavf darajasiga qarab zarur hollarda invaziv usullarni qo‘llashni o‘z ichiga olishi kerak.

Rak oldi holatlarining dastlabki bosqichlarida, ayniqsa yengil displaziya yoki reaktiv giperkeratotik o‘zgarishlar bilan kechuvchi shakllarda, etiologik omillarni bartaraf etish va konservativ davo ko‘pincha sezilarli ijobiy natija beradi. O‘tkir qirrali tishlarni silliqlash, noto‘g‘ri tayyorlangan protezlarni almashtirish, plombalarning chetlarini korreksiya qilish, og‘iz gigiyenasini tiklash va surunkali yallig‘lanish o‘choqlarini sanatsiya qilish natijasida ko‘plab bemorlarda o‘choq hajmi kamayishi, shilliq pardada yallig‘lanish reaksiyasi susayishi va subyektiv noqulayliklarning yo‘qolishi kuzatiladi.

Mahalliy konservativ terapiya tarkibida antiseptik ishlov, yallig‘lanishga qarshi vositalar, epitelizatsiyani rag‘batlantiruvchi preparatlar, keratoplastik ta’sir ko‘rsatuvchi moddalar, antioksidant va vitamin komplekslaridan foydalanish maqsadga muvofiq ekani aniqlandi. Ayniqsa, A, E, C vitaminlari, mikroelementlar, trofik va reparativ jarayonlarni faollashtiruvchi vositalar epiteliy tiklanishini tezlashtirishda foydali bo‘lishi mumkin. Shuningdek, ikkilamchi infeksiyaning oldini olish uchun og‘iz bo‘shlig‘ining muntazam antiseptik sanitariyasi davolashning muhim qismi hisoblanadi.

Biroq o‘rtacha va og‘ir displaziya bilan kechuvchi holatlarda, ayniqsa eritroplakiya, eroziv leykoplakiya, verrukoz shakllar va uzoq bitmaydigan travmatik yaralarda faqat konservativ usullar yetarli bo‘lmasligi qayd etildi. Bunday hollarda patologik o‘choqni jarrohlik yo‘li bilan eksiziya qilish, lazer ablatsiyasi, kriodestruksiya yoki boshqa destruktiv usullarni qo‘llash ko‘proq asosli hisoblanadi. Ayniqsa, yuqori xavfli anatomik hududlarda joylashgan, klinik jihatdan infiltrativ yoki qaytalanuvchi o‘choqlarni kechiktirmay radikalroq davolash malignizatsiya xavfini pasaytiradi.

Natijalar shuni ham ko‘rsatdiki, morfologik tekshiruv natijalari davolash taktikasi tanlashda hal qiluvchi ahamiyatga ega. Yengil displaziya qayd etilgan bemorlarda konservativ davo va kuzatuv yetarli bo‘lishi mumkin bo‘lsa, o‘rtacha displaziyada ehtiyotkor, kombinatsiyalashgan yondashuv zarur bo‘ladi. Og‘ir displaziya yoki carcinoma in situ ga yaqin o‘zgarishlar aniqlanganda esa o‘choqni to‘liq olib tashlash va keyingi histologik nazorat optimal taktika sifatida qaraladi.

Davolashni optimallashtirishda bemorning umumiy holatini hisobga olish muhimligi ham aniqlandi. Surunkali somatik kasalliklar, endokrin buzilishlar, immun tanqislik, moddalar almashinuvi izdan chiqishi va stress omillari shilliq parda regeneratsiyasini sekinlashtiradi. Shu sababli faqat mahalliy davolash bilan cheklanmasdan, umumiy sog‘lomlashtirish, ovqatlanish tartibini yaxshilash, zararli odatlardan voz kechish va zarur hollarda tor mutaxassislar bilan hamkorlikda kompleks terapiya o‘tkazish kerak bo‘ladi.

Tadqiqot natijalariga ko‘ra, davolashning bosqichli modeli eng maqbul deb baholandi. U quyidagi ketma-ketlikni o‘z ichiga oladi: birinchi bosqichda etiologik va travmatik omillarni bartaraf etish; ikkinchi bosqichda mahalliy konservativ terapiya va yallig‘lanishga qarshi choralar; uchinchi bosqichda morfologik xavf saqlanib qolsa yoki o‘choq regressiyaga uchramasa, invaziv usullarni qo‘llash; to‘rtinchi bosqichda esa uzoq muddatli dispanser kuzatuvini

olib borish. Aynan shu tizimli yondashuv qaytalanish va malignizatsiya ehtimolini kamaytirishda eng yaxshi natijalarni beradi.

Muhokama

Rak oldi holatlarini davolashni optimallashtirish masalasi bugungi kunda stomatologik onkologiyaning eng muhim yo‘nalishlaridan biri bo‘lib qolmoqda. Bunga sabab shundaki, ushbu patologiyalar tashqi ko‘rinishidan nisbatan zararsizdek tuyulishi mumkin, biroq ularning ichki morfologik tuzilishida chuqur displastik o‘zgarishlar yuz berayotgan bo‘lishi ehtimoli yuqori. Shu bois, davolash taktikasini tanlashda faqat klinik tasvirga tayanish yetarli emas; har bir bemor uchun individual xavf profili tuzilishi zarur.

Muhokama qilingan ma’lumotlar rak oldi holatlarida “bir xil usul hamma uchun mos” tamoyili samarasiz ekanini ko‘rsatadi. Masalan, oddiy tekis leykoplakiya bilan kechuvchi va travmatik omillar bartaraf etilgach regressiyaga moyillik ko‘rsatadigan o‘choqlar uchun konservativ va kuzatuvga asoslangan yondashuv maqsadga muvofiq bo‘lsa, eroziv yoki verrukoz shakllarda vaqtni cho‘zish klinik xatoga aylanishi mumkin. Demak, optimallashtirishning markaziy g‘oyasi davolashni morfologik xavf darajasiga moslashtirishdan iborat.

Klinik nuqtayi nazardan jarrohlik usullarini qo‘llashga ko‘rsatmalarni to‘g‘ri aniqlash alohida ahamiyatga ega. O‘choqning uzoq muddat saqlanishi, konservativ davoga bo‘ysunmasligi, qonash, eroziya, infiltratsiya, og‘riqlilik va qaytalanishga moyilligi malign xavfni oshiruvchi belgilar bo‘lib, bunday hollarda faolroq taktikaga o‘tish lozim. Biroq jarrohlik davolash ham faqatgina o‘choqni olib tashlash bilan cheklanmasligi kerak. Agar asosiy etiologik omillar saqlanib qolsa, yangi o‘choqlar paydo bo‘lishi yoki patologik jarayon qaytalanishi mumkin. Shu sababli radikal va profilaktik yondashuv bir-birini to‘ldirishi zarur.

Morfologik monitoringning davolashni optimallashtirishdagi o‘rni ham nihoyatda muhimdir. Birlamchi biopsiya natijasi davolash rejasini tanlashda asosiy rol o‘ynaydi, ammo bu bilan cheklanib qolmaslik kerak. Ayniqsa, displaziya darajasi o‘rtacha yoki og‘ir bo‘lgan holatlarda takroriy histologik nazorat va dinamik kuzatuv zarur. Bu nafaqat davolash samaradorligini baholash, balki malign transformatsiyaning dastlabki belgilarini o‘z vaqtida aniqlash imkonini beradi.

Davolashni optimallashtirishda profilaktika komponenti alohida ustuvor yo‘nalish hisoblanadi. Tamaki va alkogoldan voz kechish, og‘iz bo‘shlig‘i gigiyenasini yaxshilash, protez va ortopedik konstruksiyalarni to‘g‘ri moslashtirish, surunkali yallig‘lanish o‘choqlarini sanatsiya qilish va bemorni davolashdan keyin muntazam nazoratga jalb etish patologik jarayonning qayta rivojlanish xavfini sezilarli kamaytiradi. Demak, samarali terapiya nafaqat klinik sharoitda o‘tkazilgan davolash, balki bemorning keyingi hayot tarzini sog‘lomlashtirish bilan chambarchas bog‘liq.

Shuningdek, zamonaviy stomatologik amaliyotda multidissiplinar yondashuvning ahamiyati tobora ortib bormoqda. Rak oldi holatlari bilan og‘rigan bemorlarga stomatolog, patolog, onkolog, terapevt va zarur hollarda endokrinolog yoki immunolog hamkorligida yordam ko‘rsatish klinik natijalarni yaxshilaydi.

Chunki ayrim hollarda mahalliy patologik jarayon ortida umumiy somatik fondagi buzilishlar yotgan bo‘lishi mumkin. Shu bois davolashni optimallashtirishni faqat bir usulni tanlash emas, balki butun klinik boshqaruv tizimini takomillashtirish deb tushunish lozim.

Xulosa

Og‘iz shilliq pardasining rak oldi holatlarini davolashni optimallashtirish malignizatsiya xavfini kamaytirish, klinik natijalarni yaxshilash va kasallikning qaytalanishini oldini olishda muhim ilmiy-amaliy ahamiyatga ega. Tadqiqot tahlillari shuni ko‘rsatdiki, samarali davolash uchun patologik o‘choqning klinik shakli, lokalizatsiyasi, davomiyligi, etiologik omillar bilan bog‘liqligi va morfologik xavf darajasi albatta hisobga olinishi kerak.

Yengil displastik va reaktiv shakllarda etiologik omillarni bartaraf etish hamda konservativ davo ko‘pincha yetarli bo‘lsa, o‘rtacha va og‘ir displaziya bilan kechuvchi, eroziv, verrukoz yoki uzoq bitmaydigan o‘choqlarda kombinatsiyalashgan va invaziv yondashuv ko‘proq asoslangan hisoblanadi. Bunda biopsiya va histologik nazorat davolash taktikasini belgilashning ajralmas qismidir.

Davolashni optimallashtirishning eng to‘g‘ri modeli bosqichli va individual yondashuvga asoslanadi. Etiologik omillarni bartaraf etish, mahalliy va umumiy konservativ terapiya, zarur hollarda jarrohlik yoki destruktiv usullarni qo‘llash, keyingi dispanser kuzatuv va profilaktik choralar yagona tizimda olib borilgandagina barqaror ijobiy natijaga erishish mumkin.

Shunday qilib, rak oldi holatlarini davolashni optimallashtirish stomatologik yordam sifatini oshirish, og‘iz bo‘shlig‘i saratonining erta profilaktikasini kuchaytirish va bemorlarning hayot sifatini yaxshilashga xizmat qiluvchi muhim strategik yo‘nalishdir.

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OG'IZ SHILLIQ PARDASI RAK OLDI KASALLIKLARINING KLINIK VA MORFOLOGIK XUSUSIYATLARI

Annotatsiya*:Og'iz bo'shlig'i shilliq pardasi rak oldi kasalliklari stomatologiya va onkologiyaning dolzarb muammolaridan biri bo'lib, ularni erta bosqichda aniqlash, klinik kechish xususiyatlarini baholash va morfologik o'zgarishlarni chuqur o'rganish kasallikning xavfli o'smaga aylanish ehtimolini kamaytirishda muhim ahamiyat kasb etadi. Ushbu maqolada og'iz shilliq pardasi rak oldi kasalliklarining klinik belgilari, ularning kechishi, mahalliy va umumiy xavf omillari hamda morfologik tuzilishi tahlil qilingan. Shuningdek, leykoplakiya, eritroplakiya, surunkali travmatik jarayonlar, chegaralangan giperkeratoz va boshqa rak oldi holatlarida kuzatiladigan epiteliy displaziyasi, keratinizatsiya jarayonlarining buzilishi, hujayra atipiyasi va to'qima arxitektonikasining o'zgarishi keng yoritilgan. Tadqiqot natijalari og'iz shilliq pardasidagi patologik jarayonlarning erta tashxisi, differensial diagnostikasi va samarali profilaktikasi uchun klinik-morfologik yondashuvning ahamiyatini asoslab beradi.*

Kalit so'zlar*: og'iz shilliq pardasi, rak oldi kasalliklari, leykoplakiya, eritroplakiya, displaziya, morfologiya, klinik xususiyatlar, giperkeratoz, epiteliy atipiyasi, malignizatsiya.*

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CLINICAL AND MORPHOLOGICAL FEATURES OF PRECANCEROUS DISEASES OF THE ORAL MUCOSA

Abstract: *Precancerous diseases of the oral mucosa are one of the pressing issues in dentistry and oncology. Early detection, evaluation of the clinical course, and in-depth study of morphological changes are of great importance in reducing the likelihood of transformation into a malignant tumor. This article analyzes the clinical signs of precancerous diseases of the oral mucosa, the characteristics of their course, local and general risk factors, as well as their morphological structure. In addition, epithelial dysplasia, disorders of keratinization processes, cellular atypia, and changes in tissue architectonics observed in leukoplakia, erythroplakia, chronic traumatic processes, localized hyperkeratosis, and other precancerous conditions are discussed in detail. The results of the study substantiate the importance of a clinical and morphological approach for the*

early diagnosis, differential diagnosis, and effective prevention of pathological processes in the oral mucosa.

Keywords: *oral mucosa, precancerous diseases, leukoplakia, erythroplakia, dysplasia, morphology, clinical features, hyperkeratosis, epithelial atypia, malignization.*

Kirish

Og‘iz bo‘shlig‘i shilliq pardasi kasalliklari ichida rak oldi jarayonlari alohida o‘rin tutadi, chunki ularning ma’lum qismi vaqt o‘tishi bilan xavfli o‘smaga, xususan, yassi hujayrali rakka aylanishi mumkin. Zamonaviy stomatologiya va klinik onkologiyada rak oldi kasalliklarini erta aniqlash, ularning klinik kechish xususiyatlarini tahlil qilish va morfologik mezonlarini baholash kasallikning prognozini yaxshilashga xizmat qiladi. Og‘iz shilliq pardasi to‘qimalari doimiy ravishda mexanik, kimyoviy, termik va mikrobiologik ta’sirlarga uchrab turadi. Bunday ta’sirlar, ayniqsa, surunkali kechganda, epiteliy tuzilishi va funksiyasida izchil patologik o‘zgarishlarni keltirib chiqaradi.

Rak oldi holatlarining shakllanishida tamaki chekish, alkogol iste’moli, og‘iz gigiyenasiga rioya qilmaslik, o‘tkir qirrali tishlar, sifatsiz protezlar, vitaminlar yetishmovchiligi, gormonal va immunologik o‘zgarishlar kabi omillar muhim rol o‘ynaydi. Ushbu omillar ta’sirida shilliq pardada giperkeratoz, parakeratoz, akantoz, epiteliy displaziyasi, bazal qavat hujayralari polimorfizmi, mitotik faollikning ortishi va to‘qimaviy arxitektonikaning buzilishi kuzatiladi.

Og‘iz shilliq pardasi rak oldi kasalliklariga oid klinik manzara doim ham bir xil emas. Ayrim hollarda jarayon simptomsiz kechishi, ayrim bemorlarda esa og‘riq, achishish, qichishish, noqulaylik, ovqatlanishda qiyinchilik, shilliq pardada oqish yoki qizg‘ish dog‘lar, yuzaki eroziyalar va infiltrativ o‘zgarishlar bilan namoyon bo‘lishi mumkin. Klinik belgilarning turli-tumanligi, ularning boshqa stomatologik kasalliklar bilan o‘xshashligi va ba’zan uzoq vaqt davomida jiddiy shikoyatlar bermasligi erta tashxisni qiyinlashtiradi.

Shu nuqtayi nazardan, og‘iz shilliq pardasi rak oldi kasalliklarini klinik va morfologik jihatdan birgalikda baholash, ya’ni makroskopik ko‘rinish bilan bir qatorda biopsiya va gistologik tahlil natijalarini ham hisobga olish, eng ishonchli yondashuv hisoblanadi. Mazkur maqolaning maqsadi og‘iz shilliq pardasi rak oldi kasalliklarining asosiy klinik belgilari va morfologik xususiyatlarini tizimli tahlil qilish hamda ularning erta tashxis va profilaktikadagi ahamiyatini yoritishdan iborat.

Materiallar va usullar

Ushbu maqola tahliliy va tavsifiy xarakterdagi ilmiy manbalar, klinik kuzatuv tamoyillari va morfologik baholash mezonlariga asoslangan holda tayyorlandi. Tadqiqotda og‘iz shilliq pardasi rak oldi kasalliklariga oid stomatologiya, patologik anatomiya, onkostomatologiya va morfologiya sohalaridagi mavjud nazariy ma’lumotlar umumlashtirildi. Asosiy e’tibor rak oldi holatlarining klinik kechishi bilan morfologik o‘zgarishlari o‘rtasidagi bog‘liqlikni ochib berishga qaratildi.

Tahlil jarayonida rak oldi kasalliklarining klinik belgilari quyidagi mezonlar bo‘yicha o‘rganildi: patologik o‘choqning lokalizatsiyasi, shakli, rangi, o‘lchami, chegarasining aniqligi, yuza relyefi, og‘riq va subyektiv shikoyatlar mavjudligi, surunkalilik darajasi hamda mahalliy qo‘zg‘atuvchi omillar bilan bog‘liqligi. Morfologik xususiyatlarni baholashda epiteliyning qalinligi, keratinizatsiya turi, bazal membrana holati, epiteliy qavatlarining differensiatsiyasi, hujayraviy va yadroviy polimorfizm, giperxromiya, patologik mitozlar, akantoz, parakeratoz, displaziya darajasi va yallig‘lanish infiltratsiyasi kabi ko‘rsatkichlarga tayandi.

Maqolada og‘iz shilliq pardasi rak oldi kasalliklarining eng ko‘p uchraydigan klinik turlari sifatida leykoplakiya, eritroplakiya, verrukoz shakllar, surunkali travmatik yaralar, chegaralangan diskeratoz va boshqa displastik holatlar misolida umumlashtirilgan tahlil olib borildi. Klinik va morfologik ma’lumotlarni qiyosiy o‘rganish orqali malignizatsiya xavfini baholash imkoniyatlari yoritildi.

Natijalar

Tahlillar shuni ko‘rsatdiki, og‘iz shilliq pardasi rak oldi kasalliklari klinik jihatdan turli shakllarda namoyon bo‘lsa-da, ularni birlashtiruvchi umumiy xususiyat — epiteliy va uning ostidagi to‘qimalarda uzoq muddat saqlanuvchi patologik qayta qurilish jarayonining mavjudligidir. Bemorlarda ko‘pincha surunkali kechuvchi, aniq chegaralangan, oqish, oq-sarg‘ish, kulrang yoki qizg‘ish rangli o‘choqlar kuzatiladi. Ayrim hollarda bu o‘choqlar shilliq parda sathidan ko‘tarilib turadi, ba’zan esa yuzaki eroziya, yoriq yoki atrofik o‘zgarishlar bilan kechadi.

Klinik jihatdan eng ko‘p uchraydigan holatlardan biri leykoplakiya bo‘lib, u ko‘pincha yonoq shilliq pardasida, til yon yuzasida, lab qizil hoshiyasida va og‘iz tubida aniqlanadi. Leykoplakiyaning oddiy shaklida shilliq pardada oq rangli, artib tashlab bo‘lmaydigan, biroz qalinlashgan o‘choqlar aniqlanadi. Verrukoz yoki eroziv shakllarda esa patologik o‘choqning yuzasi notekis, g‘adir-budur, ba’zan og‘riqli bo‘lib, displastik o‘zgarishlar xavfi yuqoriroq bo‘ladi. Eritroplakiya nisbatan kamroq uchrasa-da, klinik jihatdan eng xavfli turlardan biri hisoblanadi. U asosan yorqin qizil, atrof to‘qimalardan aniq farqlanib turuvchi, yumshoq va oson jarohatlanavchi o‘choq ko‘rinishida namoyon bo‘ladi.

Kuzatilgan klinik holatlarning katta qismida mahalliy travmatik omillar muhim ahamiyatga ega ekanligi aniqlandi. O‘tkir qirrali tishlar, sifatsiz ortopedik konstruksiyalar, buzilgan prikus, protez qirralarining shilliq pardaga doimiy bosimi va surunkali infeksion yallig‘lanish jarayonlari epiteliyda kompensator va keyinchalik displastik o‘zgarishlarni rivojlantirishi mumkin. Bunday vaziyatlarda dastlab giperkeratoz va akantoz ustun bo‘lsa, keyinchalik hujayra atipiyasi va differensiatsiyaning buzilishi rivojlanadi.

Morfologik jihatdan rak oldi kasalliklarida eng muhim belgilardan biri epiteliy displaziyasidir. Yengil displaziyada patologik o‘zgarishlar asosan epiteliyning quyi uchdan bir qismi bilan chegaralanadi. Bu bosqichda bazal va parabazal hujayralarda nisbiy giperxromiya, yadrolarning kattalashishi, qatorlanishning qisman buzilishi kuzatilishi mumkin. O‘rtacha displaziyada ushbu o‘zgarishlar epiteliyning yarmigacha tarqaladi, mitozlar soni ortadi, hujayralar

polyarligi buziladi. Og‘ir displaziyada esa atipik hujayralar epiteliyning deyarli barcha qatlamlarini egallaydi, ammo bazal membrana yaxlitligi saqlanib qoladi. Bu holat invaziv o‘smaga o‘tish oldi bosqichi sifatida qaraladi.

Leykoplakiyaning morfologik tekshiruvida giperkeratoz, parakeratoz, akantoz va ba’zan epiteliy o‘sish qatlamlarining notekis qalinlashishi kuzatiladi. Verrukoz shakllarda papillomatozga moyillik, keratin qatlamlarining keskin qalinlashishi va to‘qima arxitektonikasining buzilishi namoyon bo‘ladi. Eroziv shakllarda esa yallig‘lanish komponenti kuchliroq bo‘lib, epiteliyning ayrim joylarida destruksiya va yaralanish belgilari aniqlanadi. Eritroplakiyada, aksincha, epiteliy atrofiyasi, keratin qavatining keskin yupqalashishi va atipik hujayralar miqdorining ko‘payishi bilan birga yuqori darajali displaziya ko‘proq uchraydi.

Shuningdek, tadqiqotda rak oldi kasalliklarida stromal o‘zgarishlar ham muhim ahamiyatga ega ekanligi qayd etildi. Epiteliy osti biriktiruvchi to‘qimasida surunkali yallig‘lanish infiltratsiyasi, tomirlar kengayishi, kollagen tolalarining qayta qurilishi va mikrosirkulyatsiya buzilishlari kuzatiladi. Bu o‘zgarishlar epiteliy trofikasining yomonlashuviga, hujayralar differensiatsiyasining izdan chiqishiga va patologik jarayonning barqarorlashuviga olib keladi.

Olingan ma’lumotlar klinik manzaraning og‘irlashuvi bilan morfologik atipiya darajasi o‘rtasida muayyan bog‘liqlik borligini ko‘rsatdi. Ayniqsa, eroziv va eritematoz ko‘rinishdagi o‘choqlar, uzoq vaqt davom etuvchi, qayta-qayta takrorlanuvchi, konservativ terapiyaga qiyin javob beruvchi holatlar morfologik jihatdan yuqori xavfli guruhga kiradi. Demak, faqat vizual baholash bilan cheklanish to‘g‘ri emas, balki har bir shubhali o‘choqni morfologik tekshirish klinik amaliyot uchun zarurdir.

Muhokama

Og‘iz shilliq pardasi rak oldi kasalliklarini o‘rganishda klinik va morfologik yondashuvlarni birlashtirish eng to‘g‘ri taktika hisoblanadi. Chunki klinik ko‘rinish har doim ham patologik jarayonning haqiqiy biologik faolligini aks ettirmaydi. Masalan, tashqi tomondan nisbatan barqaror ko‘ringan oqish giperkeratotik o‘choqda ham gistologik jihatdan o‘rtacha yoki og‘ir displaziya aniqlanishi mumkin. Aksincha, vizual jihatdan yaqqol yallig‘langan ayrim o‘choqlarda reaktiv o‘zgarishlar ustun bo‘lib, atipiya unchalik chuqur bo‘lmasligi mumkin. Shu sababli klinik tajriba morfologik tekshiruv bilan mustahkamlanishi shart.

Og‘iz shilliq pardasida rak oldi holatlarining shakllanishi ko‘p omilli jarayon hisoblanadi. Mahalliy ta’sirlar — mexanik jarohat, tamaki mahsulotlari, noqulay protezlar, og‘iz bo‘shlig‘i gigiyenasining past darajasi — epiteliyda doimiy stress holatini yuzaga keltiradi. Bu esa hujayralarning regeneratsiya va differensiatsiya mexanizmlarini izdan chiqaradi. Uzoq davom etuvchi qo‘zg‘atuvchi ta’sir natijasida dastlab moslashuv reaksiyasi sifatida giperkeratoz va akantoz rivojlanadi. Agar zararlovchi omil bartaraf etilmasa, ushbu o‘zgarishlar asta-sekin displastik jarayonga aylanadi. Shu nuqtayi nazardan, rak oldi kasalliklarini erta bosqichda aniqlash va qo‘zg‘atuvchi omillarni o‘z vaqtida bartaraf etish profilaktikaning eng muhim qismi hisoblanadi.

Morfologik tahlilda epiteliy displaziyasining darajasi asosiy prognostik mezonlardan biri sifatida qaraladi. Displaziya qanchalik yuqori bo‘lsa, malignizatsiya xavfi shunchalik ortib boradi. Biroq amaliyotda bu xavfni baholash faqat bir belgining o‘zi bilan emas, balki klinik kechish, o‘choq lokalizatsiyasi, bemorning yoshi, zararli odatlari, kasallikning davomiyligi va qayta retsidivlanish holatlari bilan birga tahlil qilinishi maqsadga muvofiq. Masalan, og‘iz tubi, tilning yon qismi va yumshoq tanglay sohasida joylashgan o‘choqlar ancha xavfli hisoblanadi. Bu sohalardagi o‘zgarishlar qon ta’minoti, funksional yuklanish va tashqi ta’sirlarga moyillik bilan bog‘liq ravishda tezroq progressiyaga uchrashi mumkin.

Klinik-diagnostik jihatdan leykoplakiya va eritroplakiya alohida e’tibor talab qiladi. Leykoplakiya tarqalishi yuqori bo‘lgani bilan uning barcha shakllari bir xil xavf tug‘dirmaydi. Oddiy tekis shakl nisbatan kamroq xavfli bo‘lsa, eroziv va verrukoz shakllari yuqori xavfli hisoblanadi. Eritroplakiya esa nisbatan kam uchrasa ham, unda yuqori darajali displaziya va hatto carcinoma in situ aniqlanish ehtimoli yuqori bo‘ladi. Demak, qizil rangli, oson qonaydigan, aniq chegaralangan va uzoq davom etuvchi o‘choqlar onkologik hushyorlik nuqtayi nazaridan juda muhimdir.

Shu bilan birga, og‘iz shilliq pardasi rak oldi kasalliklarining tashxisida faqat klinik va oddiy gistologik baholash bilan cheklanib qolmaslik kerak. Zamonaviy yondashuvlarda immunogistokimyoviy markerlar, hujayra proliferatsiyasi indekslari, apoptoz bilan bog‘liq omillar va molekulyar o‘zgarishlarni o‘rganish ham muhim ahamiyat kasb etmoqda. Garchi ushbu maqolada asosiy e’tibor klinik va morfologik xususiyatlarga qaratilgan bo‘lsa-da, kelajakda ushbu sohada kompleks diagnostika usullarini keng joriy etish og‘iz shilliq pardasi rak oldi jarayonlarining xavf darajasini yanada aniqroq baholash imkonini beradi.

Tadqiqot natijalari stomatologlarning onkologik hushyorligini oshirish, shubhali o‘choqlarni o‘z vaqtida biopsiya qilish, xavf omillarini aniqlash va bemorlarni dispanser kuzatuviga olish zarurligini ko‘rsatadi. Bu yondashuv og‘iz bo‘shlig‘i saratonining erta profilaktikasida muhim ahamiyatga ega.

Xulosa

Og‘iz shilliq pardasi rak oldi kasalliklari klinik ko‘rinishining xilma-xilligi va morfologik o‘zgarishlarning bosqichma-bosqich rivojlanishi bilan tavsiflanadigan murakkab patologik jarayon hisoblanadi. Ularning asosiy klinik belgilariga shilliq pardadagi oqish yoki qizg‘ish o‘choqlar, giperkeratoz, eroziv va atrofik o‘zgarishlar, uzoq saqlanuvchi va qayta-qayta takrorlanuvchi patologik holatlar kiradi. Morfologik jihatdan esa giperkeratoz, akantoz, parakeratoz, epiteliy displaziyasi, hujayra atipiyasi va stromal yallig‘lanish jarayonlari asosiy mezonlar sifatida namoyon bo‘ladi.

Klinik holat og‘irlashgan sari morfologik atipiya darajasi ham ortib borishi aniqlandi. Ayniqsa, eroziv, verrukoz va eritematoz shakllar yuqori xavfli guruhga mansub bo‘lib, ularda malignizatsiya ehtimoli yuqoriroqdir. Shu bois og‘iz shilliq pardasidagi har qanday uzoq saqlanuvchi, standart davoga bo‘ysunmaydigan yoki

shubha uyg‘otuvchi patologik o‘choqni klinik va morfologik jihatdan chuqur tekshirish talab etiladi.

Rak oldi kasalliklarini erta aniqlashda mahalliy travmatik omillarni bartaraf etish, zararli odatlarni cheklash, og‘iz gigiyenasini yaxshilash, yuqori xavfli bemorlarni muntazam kuzatuvga olish va biopsiya asosida aniq tashxis qo‘yish muhim ahamiyatga ega. Demak, og‘iz shilliq pardasi rak oldi kasalliklarining klinik va morfologik xususiyatlarini o‘zaro bog‘liq holda o‘rganish ushbu patologiyalarning erta diagnostikasi, samarali profilaktikasi va og‘ir asoratlarining oldini olishda asosiy ilmiy-amaliy yo‘nalishlardan biri hisoblanadi.

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OG'IZ SHILLIQ PARDASI RAK OLDI HOLATLARIDA MALIGNIZATSIYA XAVFINI BAHOLASH

Annotatsiya: *Og'iz bo'shlig'i shilliq pardasining rak oldi holatlari zamonaviy stomatologiya, onkologiya va patologik morfologiyaning eng dolzarb muammolaridan biri hisoblanadi. Ushbu patologik jarayonlar orasida leykoplakiya, eritroplakiya, surunkali travmatik yaralar, diskeratozlar va boshqa displastik o'zgarishlar alohida o'rin egallaydi. Mazkur holatlarning asosiy xavfi shundaki, ular vaqt o'tishi bilan malign transformatsiyaga uchrab, invaziv yassi hujayrali rakka aylanishi mumkin. Shu sababli rak oldi jarayonlarida malignizatsiya xavfini baholash klinik amaliyotda erta tashxis qo'yish, profilaktik choralarni belgilash va davolash taktikasini optimallashtirishda muhim ahamiyat kasb etadi. Ushbu maqolada og'iz shilliq pardasi rak oldi holatlarida malignizatsiya xavfini baholashning klinik, morfologik va prognostik mezonlari tizimli ravishda tahlil qilinadi. Tadqiqotda patologik o'choqning lokalizatsiyasi, klinik ko'rinishi, davomiyligi, travmatik va toksik omillar bilan bog'liqligi, epiteliy displaziyasi darajasi, hujayra atipiyasi va to'qima arxitektonikasining buzilishi malignizatsiya xavfini belgilovchi asosiy omillar sifatida ko'rib chiqilgan. Olingan ilmiy xulosalar og'iz shilliq pardasi rak oldi holatlarini barvaqt aniqlash, xavf guruhlarini ajratish va kasallikning og'ir asoratlarini oldini olishda muhim nazariy hamda amaliy ahamiyatga ega.*

Kalit so'zlar: *og'iz shilliq pardasi, rak oldi holatlari, malignizatsiya, displaziya, leykoplakiya, eritroplakiya, morfologik mezonlar, klinik xavf omillari, stomatologik onkologiya, prognostik baholash.*

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ASSESSMENT OF THE RISK OF MALIGNIZATION IN PRECANCEROUS CONDITIONS OF THE ORAL MUCOSA

Abstract: *Precancerous conditions of the oral mucosa are among the most urgent problems in modern dentistry, oncology, and pathological morphology. Among these pathological processes, leukoplakia, erythroplakia, chronic traumatic ulcers, dyskeratoses, and other dysplastic changes occupy a special place. The main danger of these conditions lies in the fact that over time they may undergo malignant transformation and develop into invasive squamous cell carcinoma. Therefore, assessing the risk of malignization in precancerous*

processes is of great importance in clinical practice for early diagnosis, determination of preventive measures, and optimization of treatment tactics. This article systematically analyzes the clinical, morphological, and prognostic criteria for assessing the risk of malignization in precancerous conditions of the oral mucosa. In the study, the localization of the pathological lesion, its clinical appearance, duration, association with traumatic and toxic factors, the degree of epithelial dysplasia, cellular atypia, and disturbances in tissue architectonics are considered the main factors determining the risk of malignization. The obtained scientific conclusions are of important theoretical and practical significance for the early detection of precancerous conditions of the oral mucosa, identification of risk groups, and prevention of severe complications of the disease.

Keywords: *oral mucosa, precancerous conditions, malignization, dysplasia, leukoplakia, erythroplakia, morphological criteria, clinical risk factors, dental oncology, prognostic assessment.*

Kirish

Og‘iz bo‘shlig‘i shilliq pardasi patologiyalari orasida rak oldi holatlarining ulushi alohida ilmiy va amaliy ahamiyatga ega. Buning sababi shundaki, ushbu holatlar o‘z vaqtida aniqlanmasa va to‘g‘ri baholanmasa, ularning ma’lum qismi asta-sekin malign transformatsiyaga uchrab, og‘iz bo‘shlig‘i saratonining rivojlanishiga zamin yaratadi. Og‘iz shilliq pardasining rak oldi holatlari bir tomondan uzoq muddat davom etuvchi surunkali patologik o‘zgarishlar bilan, ikkinchi tomondan esa epiteliy hujayralarining proliferativ faolligi, differensiatsiyasining buzilishi va atipik qayta qurilishi bilan tavsiflanadi.

Malignizatsiya — bu oddiy yoki rak oldi hujayraviy o‘zgarishlarning yomon sifatli o‘sma jarayoniga o‘tishidir. Ushbu jarayon ko‘pincha bosqichma-bosqich rivojlanadi va dastlab funksional moslashuv, keyinchalik strukturaviy qayta qurilish, undan so‘ng esa displaziya va neoplastik transformatsiya ko‘rinishida kechadi. Shu jihatdan og‘iz shilliq pardasi rak oldi holatlarining biologik xulqini oldindan baholash klinik diagnostikaning eng muhim vazifalaridan biridir.

Amaliy stomatologiyada ayniqsa leykoplakiya, eritroplakiya, eroziyaga moyil giperkeratotik o‘choqlar, uzoq saqlanuvchi travmatik yaralar va qaytalanuvchi surunkali shilliq parda o‘zgarishlari onkologik hushyorlikni talab qiladi. Ushbu patologiyalarda malignizatsiya ehtimoli bir xil emas va bu xavf ko‘plab omillarga, jumladan, bemorning yoshi, zararli odatlari, o‘choqning anatomik lokalizatsiyasi, klinik shakli, morfologik tuzilishi hamda displaziya darajasiga bog‘liq bo‘ladi.

Tibbiy adabiyotlarda malignizatsiya xavfini baholashga doir turli yondashuvlar taklif etilgan bo‘lsa-da, ko‘pchilik mualliflar klinik va morfologik mezonlarni integrallashgan holda baholash eng ishonchli usul ekanligini qayd etadi. Chunki ayrim hollarda klinik jihatdan xavfsizdek ko‘ringan o‘choqda yuqori darajali displaziya aniqlanishi mumkin, ayrim hollarda esa yaqqol klinik yallig‘lanish manzarasi fonida faqat reaktiv o‘zgarishlar ustun bo‘ladi. Demak,

malignizatsiya xavfini to‘g‘ri baholash uchun tashqi ko‘rinish bilan bir qatorda histomorfologik tahlil, klinik anamnez va xavf omillarini ham hisobga olish talab etiladi.

Mazkur maqolaning maqsadi og‘iz shilliq pardasi rak oldi holatlarida malignizatsiya xavfini baholashning asosiy klinik va morfologik mezonlarini tizimli tarzda yoritish, shuningdek, erta tashxis va profilaktik yondashuvlarning ilmiy asoslarini ko‘rsatishdan iborat.

Materiallar va usullar

Ushbu maqola tahliliy xarakterga ega bo‘lib, og‘iz shilliq pardasi rak oldi holatlari va ularning malignizatsiya xavfiga doir zamonaviy ilmiy qarashlar, klinik kuzatuv mezonlari hamda morfologik baholash tamoyillarini umumlashtirish asosida tayyorlandi. Tadqiqotning metodologik asosini klinik-stomatologik va patologik-morfologik yondashuvlarning integratsiyasi tashkil etdi.

Tahlil davomida og‘iz shilliq pardasining quyidagi rak oldi holatlari alohida ko‘rib chiqildi: leykoplakiya, eritroplakiya, verrukoz va eroziv shakllar, surunkali travmatik yaralar, diskeratozlar, chegaralangan giperkeratoz o‘choqlari hamda uzoq muddat saqlanuvchi displastik holatlar. Ushbu patologiyalarni xavf jihatidan baholashda quyidagi klinik mezonlar asos qilib olindi: patologik o‘choqning lokalizatsiyasi, rangi, shakli, yuzasining relyefi, og‘riqliligi, qonashga moyilligi, davomiyligi, qaytalanish chastotasi va konservativ davoga javob darajasi.

Morfologik baholashda esa epiteliyning qalinligi, keratinizatsiya turi, bazal qavat hujayralarining holati, yadroviy va hujayraviy polimorfizm, giperxromiya, mitotik faollik, epiteliy qatlamlarining differensiatsiyasi, bazal membrana yaxlitligi, stromal yallig‘lanish infiltratsiyasi va to‘qima arxitektonikasining buzilish darajasi singari ko‘rsatkichlar inobatga olindi. Ayniqsa, epiteliy displaziyasi darajasi malignizatsiya xavfini baholashning asosiy mezoni sifatida tahlil qilindi.

Materiallarni umumlashtirish jarayonida rak oldi holatlarining klinik ko‘rinishi bilan ularning morfologik substrati o‘rtasidagi bog‘liqlik ochib berildi. Shuningdek, patologik o‘choqlarning yuqori xavfli anatomik hududlarda — tilning yon yuzasi, og‘iz tubi, yumshoq tanglay, alveolyar o‘simta va lab qizil hoshiyasida joylashgan shakllari alohida prognostik ahamiyatga ega deb baholandi.

Natijalar

Tahlil natijalari shuni ko‘rsatdiki, og‘iz shilliq pardasi rak oldi holatlarida malignizatsiya xavfi ko‘p omilli bo‘lib, u nafaqat patologik o‘choqning tashqi klinik ko‘rinishiga, balki uning chuqur morfologik tuzilishiga ham bevosita bog‘liqdir. Xususan, patologik jarayonning uzoq muddat davom etishi, qaytalanuvchi xarakteri, travmatik yoki toksik omillar bilan doimiy qo‘zg‘atilishi epiteliyda displastik va atipik o‘zgarishlarning progressiv rivojlanishiga olib kelishi aniqlanadi.

Klinik jihatdan oq rangli, zich, artib tashlab bo‘lmaydigan va uzoq saqlanuvchi giperkeratotik o‘choqlar orasida leykoplakiya eng ko‘p uchraydigan shakl sifatida qayd etiladi. Biroq malignizatsiya xavfi uning barcha turlarida bir xil emas. Oddiy tekis leykoplakiya nisbatan past xavfli guruhga mansub bo‘lsa,

verrukoz va ayniqsa eroziv shakllarda displaziyaning chuqurlashuvi va malignizatsiya ehtimoli sezilarli ravishda yuqori bo‘ladi. Klinik jihatdan bunday shakllarda o‘choq yuzasining notekisligi, eroziya yoki yoriqlarning paydo bo‘lishi, og‘riqlilik va uzoq bitmaslik alomatlari yuqori xavf belgisi sifatida qaraladi.

Eritroplakiya nisbatan kam uchraydi, ammo malign transformatsiya nuqtayi nazaridan eng xavfli patologik shakllardan biri hisoblanadi. Yorqin qizil rang, epiteliy atrofiyasi, oson qonash, yumshoq va nozik konsistensiya, aniq chegaralangan infiltrativ o‘choq ko‘rinishi uning biologik faol jarayon ekanligini ko‘rsatadi. Morfologik jihatdan eritroplakiyada ko‘pincha yuqori darajali displaziya, ba’zan esa carcinoma in situ holatiga yaqin o‘zgarishlar aniqlanishi mumkin.

Surunkali travmatik yaralar va doimiy mexanik ta’sir ostida shakllangan o‘choqlarda ham malignizatsiya xavfi etarlicha jiddiydir. O‘tkir qirrali tishlar, sifatsiz protezlar, notekis plombalar, ortopedik konstruksiyalarning noqulayligi yoki noto‘g‘ri prikus uzoq davom etuvchi shilliq parda travmatizatsiyasiga olib keladi. Dastlab reaktiv yallig‘lanish va giperplaziya rivojlansa, keyinchalik epiteliy regeneratsiyasi izdan chiqadi va hujayraviy atypizm shakllanishi mumkin. Ayniqsa, yara chetlarining qalinlashuvi, infiltratsiyasi, o‘choq tubining granulyatsiyaga emas, balki zichlashishga moyilligi va standart davolashga qaramay uzoq bitmasligi malignizatsiya ehtimolini oshiradi.

Morfologik tahlilda epiteliy displaziyasi malign xavfni belgilovchi markaziy ko‘rsatkich ekanligi aniqlandi. Yengil displaziyada o‘zgarishlar asosan epiteliyning pastki qavatlarida joylashadi va bazal-parabazal hujayralarda yadro-katlam nisbati ortishi, giperxromiya va qisman polimorfizm bilan kechadi. O‘rtacha displaziyada patologik jarayon epiteliyning o‘rta qavatlarigacha tarqalib, hujayralar polaritetining buzilishi va mitotik faollikning ortishi bilan tavsiflanadi. Og‘ir displaziyada esa atypik hujayralar deyarli barcha qavatlarni qamrab oladi, differensiatsiya izdan chiqadi, patologik mitozlar ko‘payadi va bu holat invaziv bo‘lmagan, ammo yuqori malign potensialga ega neoplastik bosqich sifatida baholanadi.

Klinik kuzatuv bilan morfologik o‘zgarishlar o‘rtasidagi bog‘liqlik shuni ko‘rsatadiki, yuqori xavfli lokalizatsiyada joylashgan, qizil yoki qizil-oq aralash tusdagi, eroziv yoki yarali komponentga ega bo‘lgan, qaytalanishga moyil va uzoq davom etuvchi o‘choqlar ko‘pincha yuqori darajali displaziya bilan kechadi. Shuningdek, bemorda tamaki chekish, spirtli ichimliklarni muntazam iste’mol qilish, og‘iz gigiyenasining yomonligi va surunkali somatik kasalliklarning mavjudligi xavfni yanada kuchaytiruvchi omillar sifatida namoyon bo‘ladi.

Stromal komponentdagi o‘zgarishlar ham alohida ahamiyatga ega. Epiteliy ostidagi biriktiruvchi to‘qimada surunkali yallig‘lanish infiltratsiyasi, tomirlar kengayishi, fibroblastik qayta qurilish, kollagen tolalarining dezorganizatsiyasi va mikrosirkulyatsiya buzilishi kuzatilishi epiteliy trofikasining yomonlashishiga olib keladi. Bu esa malign transformatsiya uchun qulay mikroiqlim yaratadi. Demak, malignizatsiya xavfini baholashda faqat epiteliy o‘zgarishlari emas, balki stroma holati ham hisobga olinishi kerak.

Muhokama

Og‘iz shilliq pardasi rak oldi holatlarida malignizatsiya xavfini baholash stomatologik amaliyotda eng murakkab masalalardan biridir. Buning sababi shundaki, bir xil klinik ko‘rinishga ega bo‘lgan ikki patologik o‘choqning biologik xulqi va o‘sma rivojlanishiga moyilligi tubdan farq qilishi mumkin. Shu sababli klinik vizual baholashning o‘zi yetarli emas. Malignizatsiya ehtimolini aniqlashda patologik o‘choqning tashqi belgilarini morfologik tahlil va anamnestik ma’lumotlar bilan bog‘liq holda o‘rganish zarur.

Muhokama qilingan ma’lumotlarga asoslanib aytish mumkinki, og‘iz shilliq pardasi rak oldi jarayonlarida xavfni baholash uch darajali tizim asosida olib borilishi maqsadga muvofiq. Birinchi daraja — klinik xavf mezonlari bo‘lib, bunda o‘choqning rang xususiyati, uzun muddat saqlanishi, eroziya yoki yara komponentining mavjudligi, qonash, infiltratsiya va lokalizatsiya hisobga olinadi. Ikkinchi daraja — anamnestik va etiologik omillar bo‘lib, bunda travmatik qo‘zg‘atuvchilar, tamaki va alkogol, gigiyena darajasi, immun holat va surunkali kasalliklar baholanadi. Uchinchi daraja esa morfologik ko‘rsatkichlarni qamrab olib, displaziya darajasi, atypizm chuqurligi va stromal o‘zgarishlar asosida aniqlanadi.

Klinik jihatdan ayniqsa eritroplakiya, eritroleykoplakiya, verrukoz leykoplakiya va uzoq muddat bitmaydigan travmatik yaralar alohida nazoratni talab qiladi. Bunday holatlarda faqat konservativ davolash bilan cheklanib qolish xatodir, chunki tashqi yallig‘lanish alomatlarining kamayishi morfologik regressiyani kafolatlamaydi. Shu sababli yuqori xavfli o‘choqlarda biopsiya va gistologik tekshiruv majburiy diagnostik bosqich sifatida qaralishi kerak.

Morfologik nuqtayi nazardan, epiteliy displaziyasi malignizatsiya xavfini prognoz qilishda hal qiluvchi omildir. Ammo amaliy tajriba shuni ko‘rsatadiki, ba’zi hollarda displaziya darajasi o‘rta bo‘lgan o‘choqlar ham noqulay klinik fon va doimiy qo‘zg‘atuvchi omillar ta’sirida tez progressiyaga uchrashi mumkin. Bu esa faqat gistologik baholash emas, balki dinamik kuzatuvning ham muhimligini isbotlaydi. Qayta tekshiruvlar, fotoprotokollash, takroriy biopsiya va davolash samaradorligini monitoring qilish zamonaviy stomatologik onkologiyaning ajralmas qismidir.

Shuningdek, malign xavfni kamaytirishda profilaktik yondashuvlar muhim o‘rin tutadi. Mahalliy travmatik omillarni bartaraf etish, tamaki chekishni to‘xtatish, protez va plombalarni korreksiya qilish, og‘iz gigiyenasini tiklash hamda yallig‘lanish o‘choqlarini sanatsiya qilish patologik jarayonning regressiyasiga yordam berishi mumkin. Biroq yuqori darajali displaziya mavjud hollarda faqat etiologik omillarni bartaraf etish yetarli bo‘lmay, jarrohlik yoki kombinatsiyalashgan davolash usullari zarur bo‘lishi mumkin.

Demak, malignizatsiya xavfini baholashning eng to‘g‘ri yo‘li — bu klinik kuzatuv, etiologik tahlil va morfologik tekshiruv natijalarini yagona prognostik tizimda birlashtirishdir. Aynan shunday yondashuv og‘iz shilliq pardasi rak oldi holatlarini erta aniqlash va invaziv saraton rivojlanishini oldini olish imkonini beradi.

Xulosa

Og‘iz shilliq pardasi rak oldi holatlarida malignizatsiya xavfi ko‘p omilli, bosqichma-bosqich rivojlanadigan va klinik hamda morfologik ko‘rsatkichlar bilan belgilanadigan murakkab biologik jarayon hisoblanadi. Tadqiqot tahlili natijalari shuni ko‘rsatdiki, patologik o‘choqning klinik shakli, lokalizatsiyasi, davomiyligi, travmatik va toksik omillar bilan bog‘liqligi, shuningdek, epiteliy displaziyasining darajasi xavfni baholashda asosiy mezonlardir.

Malignizatsiya xavfi ayniqsa eritroplakiya, eroziv va verrukoz leykoplakiya, uzoq bitmaydigan travmatik yaralar hamda qizil-oq aralash tusdagi infiltrativ o‘choqlarda yuqori bo‘ladi. Morfologik jihatdan yuqori darajali displaziya, hujayra va yadroviy atypizm, mitotik faollikning ortishi hamda stromal qayta qurilishlar patologik jarayonning noqulay biologik xulqini ko‘rsatadi.

Shu bois og‘iz shilliq pardasidagi har qanday uzoq muddat saqlanuvchi, standart davoga bo‘ysunmaydigan yoki qaytalanishga moyil rak oldi o‘choqlarini chuqur klinik va gistomorfologik baholash talab etiladi. Biopsiya va gistologik tekshiruv, dinamik kuzatuv, xavf omillarini bartaraf etish hamda bemorlarni individual xavf guruhlari asosida nazoratga olish og‘iz bo‘shlig‘i saratonining erta profilaktikasida eng muhim choralar hisoblanadi.

Shunday qilib, og‘iz shilliq pardasi rak oldi holatlarida malignizatsiya xavfini baholash nafaqat nazariy, balki amaliy jihatdan ham katta ahamiyatga ega bo‘lib, u stomatologik yordam sifatini oshirish, erta tashxis samaradorligini kuchaytirish va onkologik asoratlarning oldini olishga xizmat qiladi.

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HYPERTENSIVE DISORDERS IN PREGNANCY: CLINICAL FEATURES AND MATERNAL PERINATAL OUTCOMES

Abstract: *Hypertensive disorders of pregnancy continue to represent a major concern in obstetric practice due to their strong association with adverse maternal and neonatal outcomes. This study was conducted to evaluate the characteristics of pregnancy progression, methods of delivery, and perinatal results in women diagnosed with hypertension during gestation.*

Keywords: hypertensive disorders of pregnancy, gestational hypertension, preeclampsia, maternal complications, perinatal outcomes, obstetric management

A total of 45 pregnant women receiving care at the maternity department of the Republican Clinical Hospital of Samarkand State Medical University were included in this retrospective analysis. The cohort comprised patients with gestational hypertension (53.3%), preeclampsia (35.6%), and chronic hypertension (11.1%). Clinical symptoms, obstetric interventions, and neonatal indicators were systematically reviewed and analyzed using descriptive statistical techniques.

The analysis revealed that hypertensive conditions were associated with an increased likelihood of cesarean delivery (57.8%), preterm birth (22.2%), and reduced neonatal birth weight (31%). The most severe outcomes were observed in patients with preeclampsia, where operative delivery rates reached 75% and neonatal complications occurred more frequently. The average birth weight was 2700 ± 480 g, while perinatal mortality was recorded in 2.2% of cases.

Key predisposing factors identified in the study population included maternal age over 30 years (57.8%), first pregnancy (58%), excess body weight (46.7%), and a positive personal or family history of hypertension (40%). Statistical analysis confirmed a significant correlation between the severity of hypertensive disorders and unfavorable perinatal outcomes ($p < 0.05$). In summary, hypertensive disorders during pregnancy substantially increase the risk of complications for both mother and child. Early detection, careful monitoring, and individualized management strategies are essential to improve clinical outcomes and reduce perinatal risks.

Purpose

The aim of the present study was to examine the clinical features of pregnancy, identify the predominant modes of delivery, and assess perinatal outcomes in women diagnosed with hypertensive disorders during gestation. The analysis was conducted among patients who received inpatient care at the

maternity department of the Republican Clinical Hospital of Samarkand State Medical University.

Research materials and methods

The present study was conducted using a retrospective descriptive design aimed at evaluating clinical and obstetric characteristics in pregnant women diagnosed with hypertensive disorders. The study population included 45 patients who underwent treatment during pregnancy in a specialized maternity department.

Within the study cohort, different forms of hypertensive pathology were identified. Gestational hypertension accounted for the largest proportion of cases (53.3%, n = 24), followed by preeclampsia (35.6%, n = 16), while chronic hypertension was observed less frequently (11.1%, n = 5). This distribution allowed for comparative assessment of outcomes depending on the type and severity of hypertension.

Eligibility criteria for inclusion in the study were clearly defined. Only women with singleton pregnancies at a gestational age of 20 weeks or more and a confirmed diagnosis of arterial hypertension were enrolled. Patients with multiple gestations, as well as those suffering from severe concomitant diseases particularly advanced cardiovascular or renal disorders were excluded in order to minimize confounding factors and ensure the reliability of the findings.

Data collection was carried out through a comprehensive review of available clinical documentation. This included patient medical records, detailed obstetric and gynecological histories, laboratory and instrumental examination results, delivery summaries, and neonatal health indicators. Special attention was given to blood pressure levels, clinical symptoms, treatment approaches, and complications during pregnancy and childbirth.

For the analysis, standard descriptive statistical methods were employed. Quantitative variables were expressed as mean values with standard deviations, while qualitative data were presented as percentages. Comparative evaluation of outcomes was performed where appropriate. A p-value of less than 0.05 was considered indicative of statistical significance, reflecting meaningful associations between variables under investigation.

Results

The average age of the pregnant women was 30.8 ± 4.5 years. Primiparous women represented 58% of the total study population. Nearly half of the participants (46.7%) were found to have overweight or obesity, while a positive family history of hypertension was reported in 40% of cases.

Among the clinical manifestations, headache, edema, and proteinuria were the most frequently observed symptoms and were particularly common in women diagnosed with preeclampsia. The average blood pressure values in the study group reached approximately 160/100 mmHg. Regarding obstetric management, cesarean delivery was performed in 26 patients (57.8%), whereas 19 women (42.2%) delivered vaginally. The primary indications for operative delivery included severe forms of preeclampsia, signs of fetal hypoxia, and insufficient effectiveness of conservative treatment.

The mean birth weight of the newborns was 2700 ± 480 grams. Preterm delivery occurred in 22.2% of cases, while 31% of newborns had low birth weight, defined as less than 2500 grams. Perinatal mortality was recorded in one case, accounting for 2.2% of the total sample. Statistical analysis revealed a significant relationship between the severity of hypertensive disorders and the likelihood of unfavorable perinatal outcomes ($p < 0.05$).

Neonatal outcomes:

1) birth weight: 2700 ± 480 g
2) Preterm birth: 22.2%
3) Low birth weight: 31%
4) Perinatal mortality: 2.2%

Additional Research Findings

A deeper analysis showed that the severity of hypertensive disorders significantly influenced outcomes:

- Severe preeclampsia was associated with 75% cesarean delivery rate
- Preterm birth occurred in:
  - 12.5% (gestational hypertension)
  - 37.5% (preeclampsia)
  - 20% (chronic hypertension)
- Low birth weight was most common in preeclampsia (50%)

Table 1.
Distribution of Outcomes by Type of Hypertension

Parameter	Gestational HTN (n=24)	Preeclampsia (n=16)	Chronic HTN (n=5)
Cesarean delivery (%)	45.8%	75.0%	60.0%
Preterm birth (%)	12.5%	37.5%	20.0%
Low birth weight (%)	20.8%	50.0%	40.0%
Neonatal complications (%)	16.7%	43.7%	20.0%

Conclusion

Hypertensive disorders during pregnancy continue to pose a serious challenge in contemporary obstetrics, as they are closely linked to unfavorable outcomes for both the mother and the newborn. The findings of this study confirm that the presence of hypertension significantly increases the likelihood of complications such as preterm delivery, fetal hypoxia, and the need for operative interventions, including cesarean section. It was established that certain maternal characteristics contribute substantially to the development and progression of hypertensive conditions. Among the most important risk factors identified were maternal age exceeding 30 years, primiparity, excessive body weight, and a personal or familial history of hypertension. These factors should be considered during antenatal risk assessment and monitoring. Furthermore, the results highlight that the severity of hypertensive disorders, particularly in cases of preeclampsia, directly correlates with poorer perinatal outcomes. This underlines the importance of differentiating between clinical forms of hypertension when planning patient management.

In this context, early diagnosis, continuous clinical surveillance, and the timely initiation of appropriate therapeutic measures are crucial for reducing the incidence of complications. An individualized approach to the management of pregnant women at risk, along with improved preventive strategies, may contribute to better maternal and neonatal health outcomes and a reduction in perinatal morbidity and mortality.

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REVMATOID ARTRITNING ASORATLARI VA UNI KAMAYTIRISH CHORALARI

Annotatsiya. *Hozirgi ma'lumotlarga ko'ra, butun dunyo bo'ylab 18 million kishi revmatoid artritdan (RA) aziyat chekadi, u dunyo aholisining taxminan 0,5–1,0 foizini tashkil qiladi. Bemorlarning taxminan 70% ayollar va 55% 55 yoshdan oshgan odamlardir.U nafaqat bo'g'imlarga, balki turli xil ichki organlarga ham ta'sir qiladigan tizimli jarayondir. So'nggi yillarda revmatoid artrit bilan og'rigan bemorlarning umr ko'rish davomiyligi 7-10 yilga kamayishi va yurak-qon tomir patologiyalarini rivojlanish xavfi 50 foizga oshishi aniqlandi. Revmatoid artrit-tizimli autoimmun kasallik, lekin ko'pincha qo'llar, bilaklar, oyoqlar, to'piqlar, tizzalar, yelka va tirsak bo'g'imlariga ta'sir qiladi. RA surunkali kasallik bo'lib, tanadagi asosan bo'g'imlardagi yallig'lanish jarayonini keltirib chiqaradi. Agar davolanmasa, RA bo'g'imlarga va atrofdagi to'qimalarga jiddiy zarar yetkazishi mumkin. Kasallik yurak, o'pka yoki asab tizimining buzilishiga olib kelishi mumkin.*

Kalit so'zlar: *eroziya, osteoporoz, ankiloz, artrit, mushaklar atrofiyasi, tofus, ateroskleroz, miokard infarkti.*

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COMPLICATIONS OF RHEUMATOID ARTHRITIS AND MEASURES TO REDUCE THEM

Abstract. *According to current data, about 18 million people worldwide suffer from rheumatoid arthritis (RA), which accounts for approximately 0.5–1.0% of the world's population. About 70% of patients are women, and 55% are people over 55 years of age. It is a systemic process that affects not only the joints but also various internal organs. In recent years, it has been established that in patients with rheumatoid arthritis, life expectancy is reduced by 7–10 years and the risk of developing cardiovascular pathologies increases by 50%. Rheumatoid arthritis is a systemic autoimmune disease, but it most often affects the joints of the hands, wrists, feet, ankles, knees, shoulders, and elbows. RA is a chronic disease that causes an inflammatory process in the body, mainly in the joints. If left untreated, rheumatoid arthritis can cause serious damage to the joints and surrounding tissues. The disease may also lead to disorders of the heart, lungs, or nervous system.*

Keywords: *erosion, osteoporosis, ankylosis, arthritis, muscle atrophy, tophus, atherosclerosis, myocardial infarction.*

RA ning belgilari surunkali bo'g'imlardagi og'riq, kontraktura, bo'g'imlarda gipertermiya hissi va ularning shishishi. RA harakatni va kundalik faoliyatni bajarishni qiyinlashtirishi mumkin. O'z vaqtida tashxis qo'yilgan taqdirda, kasallik belgilari va uning rivojlanishini farmakoterapiya yordamida nazorat qilish mumkin va reabilitatsiya bemorning funktsional imkoniyatlarini maqbul darajada saqlashga yordam beradi. Bo'g'imlarning og'ir shikastlanishlari bilan ularning harakatchanligini tiklash yoki og'riqni kamaytirish va ishlash darajasini saqlab qolish uchun jarrohlik aralashuvlar, shu jumladan qo'shma protezlar qo'llanilishi mumkin. Revmatoid artrit eng keng tarqalgan autoimmun kasalliklardan biri bo'lib, immunitet tizimi tananing o'z to'qimalariga yetarli darajada javob bermaydi va ularni zararlaydi. Ushbu surunkali tizimli biriktiruvchi to'qima kasalligi bo'g'imlarning (ayniqsa, qo'llar va oyoqlarning) asosiy shikastlanishi, shuningdek, bo'g'imlardan tashqari ba'zi ko'rinishlar bilan davom etadi. Ular eroziyaning shakllanishi va bo'g'imlarning yo'q qilinishini, shuningdek ankilozini – artikulyar sirtlarning artikulyatsiyani to'liq immobilizatsiyasi bilan birlashishini o'z ichiga oladi. Bundan tashqari, ko'pincha bo'g'imlarning shikastlanishi turli xil ichki organlar va tizimlarning muammolari bilan birga kechadi. Bugungi kunda odamni kasallikdan butunlay xalos qilish mumkin emas. Shu bilan birga, bemorlarning deyarli 20 foizi kasallik boshlanganidan keyin 5 yil ichida nogiron bo'lib qoladilar. Shu bilan birga, davolanishning o'z vaqtida boshlanishi bilan yallig'lanish jarayonining faolligini sezilarli darajada kamaytirish va barqaror remissiyaga erishish mumkin bo'lgan usullar mavjud. Ayollarning erkaklarnikiga qaraganda tez-tez kasal bo'lib turishi, shuningdek, homiladorlikning boshlanishi ko'p hollarda o'z-o'zidan remissiya boshlanishi bilan birga keladi, bu gormonal omillarning muhim ahamiyatini ko'rsatadi. Kasallik immunitet

tizimining bo'g'im bo'shlig'ini qoplaydigan ichki membranaga zararlashdan boshlanadi, membrana shishadi, qon ta'minoti kuchayadi. Qobiq o'sadi va qalinlashadi (bunday o'zgartirilgan qobiq pannus deb ataladi). Shu bilan birga, suyakni qayta qurish buziladi – eski to'qimalarni yo'q qilish jarayoni yangisini shakllantirish jarayonidan ustun kela boshlaydi. Suyaklarning artikulyar yuzalarida eroziya hosil bo'ladi. Pannus asta-sekin tolali to'qimalarga aylanib, artikulyar suyaklarning birlashishiga olib keladi. Patologiyaning asosiy alomati oyoq va qo'llarning kichik bo'g'imlarida og'riq bo'lib, u odatda ertalab paydo bo'ladi va kechqurun susayadi. Artrit simmetrik bo'ladi. Asta-sekin patologik o'zgarishlar tobora ko'payib borayotgan bo'g'imlarga (shu jumladan bilak, tizza, oyoq, jag' va boshqalar) tarqaladi. Bo'g'imlarning yallig'lanishi uning harakatchanligini buziladi, bu ertalabki qotish asta-sekin kuchayishi bilan namoyon bo'ladi. Artrit belgilari rivojlanishidan oldin ham umumiy holsizlik va charchoq, mushak og'rig'i, harorat, terlash kabi o'ziga xos bo'lmagan o'zgarishlar qayd etilishi mumkin. Revmatoid artritning natijasida mushaklar, suyaklar, ligamentlar zararlanadi. Og'riq va shish paydo bo'lishi qizarish va bo'g'im sohasidagi haroratning mahalliy ko'tarilishi bilan birga keladi. Mushaklar asta – sekin atrofiyaga uchraydi, ligamentlarning o'zgarishi barqaror kontrakturalarning shakllanishiga olib keladi-barmoqlarning ma'lum bir holatda qotib qoladi. Sinovial membrananing o'zgarishi va uning tolali tuzilishga aylanishi suyaklarning artikulyar uchlarining (ankiloz) to'liq birlashishiga olib keladi. Qo'l-oyoq bo'g'imlarining asta-sekin deformatsiyalanadi va o'z funktsiyalarini bajarish qobiliyatini yo'qotadi. Qo'llarning barmoqlari yon tomonga buriladi, haddan tashqari egiladi. Artikulyar bo'g'imlar vaqt o'tishi bilan qaytarib bo'lmaydigan bo'lib qoladi. Bemor hatto odatdagi harakatlarni ham bajara olmaydi (kiyinish, eshikni ochish, soch tarash, stakanni ushlab turish va hk). Tizza bo'g'imlarining yallig'lanishi natijasida yurish buziladi. Revmatoid artritning ayniqsa jiddiy oqibatlari ekstraartikulyar va tizimli shikastlanishlardir: Yurak-qon tomir tizimi (vaskulit, miokardit, ateroskderoz), teri (revmatik tugunlarning shakllanishi — tofus), bronx-o'pka tizimi (plevrit, bronxiolit), asab tizimi (nevrit, neyropatiya), ko'z (keratokonyunktivit), buyraklar (nefrit, amiloidoz). Rivojlanish mexanizmini quyidagicha ta'riflash mumkin: Immunitet hujayralari bo'g'inni o'rab turgan sog'lom sinovial membranaga hujum qila boshlaydi. Asta-sekin ko'p miqdordagi limfotsitlar, monotsitlar va leykotsitlar to'planib, shish paydo bo'ladi. Qon oqimining ko'payishi natijasida sinovial to'qimalarning ortiqcha o'sishi kuzatiladi. Suyak to'qimalarining o'zgarishiga va suyaklarning shikastlanishiga olib keladigan osteoklastlarning faollashadi. Kasallik o'sib borishi bilan pannus yetuk tolali to'qima bilan almashadi, bu esa bo'g'im yuzalarining birlashishiga olib keladi va uning harakatchanligi bloklanadi. Buyrak amiloidozining asosiy alomatlar shish, qon bosimining oshishi, siydik tahlillarida oqsil miqdorining oshishi. Buyrak biopsiyasi yordamida aniq tashxis qo'yish mumkin. Osteonekroz-suyakda sodir bo'ladigan nekroz jarayonlari bo'lib qon aylanishi buzilganligi sababli paydo bo'ladi. Belgilari zararlangan bo'g'imdagi kuchli og'riq, harakat cheklashi, oqsoqlanish paydo bo'lishidan iborat. Osteoporoz ikki-uch baravar tez-tez

aniqlanadi. Ankiloz bo'g'im ichidagi suyaklarning birlashishi bo'lib, ko'pincha revmatoid artritning keyingi bosqichlarida kuzatiladi. Kuchli yallig'lanish bilan xaftaga va suyak to'qimalari yo'q qilinadi, bo'g'inni butunlay harakatsiz qiladi. Ankilozlar qo'l va oyoq bo'g'imlariga eng xosdir. Ko'zdagi o’zgarishlar bunda bemorlarda katarakta, sklerit, glaukoma, quruq ko'z kabi oftalmik kasalliklar ko'proq aniqlanadi. Natijada, odamning ko'z qovoqlarini tushirish qiyin, ko'rish keskinligi pasayadi, ko'zning shox pardasi bulutli bo'ladi. Murakkab holatlarda faqat shoh parda transplantatsiyasi yordam berishi mumkin. Revmatoid artrit jiddiy oshqozon-ichakdan qon ketishiga olib kelishi mumkin. Revmatoid artrit oshqozon-ichak trakti saratoni, osteoporoz, sikki sindromi, Felti sindromi, limfoma bilan kechishi murakkablashadi.

Revmatoid artrit bilan og'rigan bemorlarda nisbatan yurak-qon tomir kasalliklarini rivojlanish xavfi yuqori. Subklinik ateroskleroz bo'g'imlarning revmatik shikastlanishi bo'lgan har uchinchi bemorda uchraydi. Tomirlarning aterosklerotik shikastlanishining patogenezi tug'ma va orttirilgan immunitetning asosiy bo'g'inlarining patologik faollashishi natijasida kelib chiqadigan tizimli yallig'lanishga asoslangan. Odatda, endotelial hujayralar va silliq mushak hujayralari arterial devorning yaxlitligi va elastikligini ta'minlaydi, uning immunitet tizimi hujayralari tomonidan infiltratsiyasini cheklaydi. Yallig'lanish jarayoni ta'siri ostida bu hujayralar faollashadi va ularning normal funktsiyalari buziladi, bu aterosklerotik pilaklarning shakllanishiga yordam beradi. Aterosklerozning rivojlanishi, revmatoid yallig'lanish faolligi, bo'g'imlardan tashqari o’zgarishlarning rivojlanishi va yallig'lanishga qarshi vositachilar va autoantitelorlarning haddan tashqari ko'payishi o'rtasida kuchli bog'liqlik borligi klinik jihatdan isbotlangan. Shu munosabat bilan antitelolarning siklik sitrulin o'z ichiga olgan peptidga ta'sirini o'rganish alohida qiziqish uyg'otadi, uning revmatoid artritda ishlab chiqarishning ko'payishi yallig'lanishga qarshi va protrombotik mediatorlarning sintezi, uyqu arteriyalarining intima-media kompleksining qalinligining oshishi va yurak-qon tomir o'limining yuqori xavfi bilan bog'liq. Shuni ta'kidlash kerakki, immun biomarkerlarning bir qismi revmatoid artrit bilan og'rigan bemorlarning qonida kasallikning klinik ko'rinishidan ancha oldin aniqlanadi, bu bo'g'imlarning subklinik yallig'lanishining rivojlanishini ko'rsatadi, shuningdek yurak — qon tomir asoratlari xavfining oshishini ko'rsatadi. Ilmiy izlanishlar shuni ko’rsatadiki, revmatoid artrit bilan og'rigan bemorlarda yurak-qon tomir kasalliklaridan o'lim xavfi 50% ga yuqori. Revmatoid artritda yurak shikastlanishi ikki xil rivojlanishi mumkin. Birinchisi koronar tomirlarning shikastlanishi yurak tomirlari kasalligi shakllanishi bilan sodir bo'ladi. Revmatoid artritda rivojlanadigan aterosklerozning o'ziga xos xususiyatlariga koronar arteriyalarning shikastlanishi, o'tkir koronar sindromning erta qaytalanishi, birinchi miokard infarktidan keyin o'limning ko'payishi va uning simptomsiz ko’rinishining yuqoriligi kiradi. Ikkinchisida kardiomiyopatiya rivojlanishi bilan yurak mushagining hujayra tarkibi va tuzilishidagi o'zgarishlar kuzatiladi, bu odatda qorincha miokardining gipertrofiyasi va yurak kameralari hajmining oshishi bilan namoyon bo'ladi.

Kardiomiyopatiya progressiv yurak yetishmovchiligi tufayli yurak-qon tomir bilan bog’liq o'limining yuqoriligi bilan xavflidir. Ba'zi bemorlarda yurak mushaklarining jigarrang atrofiyasi rivojlanishi mumkin, bu kardiomiotsitlarda lipid yoki glikoprotein pigmenti — lipofussin to'planishi bilan birga keladi. Ushbu o'zgarishlar og’riq rivojlanishiga olib kelishi mumkin. Revmatoid artrit bilan og'rigan bemorlarning ko'pchiligida, bo'g'imlardagi o’zgarishlar namoyon bo'lishi fonida, koronar arteriyalar va yurak mushaklarining shikastlanish belgilariga ahamiyat berishmaydi, lekin revmatoid artritning tizimli namoyon bo'lishi, shu jumladan yurak shikastlanishi kasallikning prognozini aniqlaydi, shuning uchun ularni erta aniqlash va davolash juda muhimdir, ayniqsa zamonaviy diagnostika usullari patologik jarayonning rivojlanishining dastlabki bosqichlarida yurakdagi subklinik va simptomsiz o'zgarishlarni aniqlashga imkon beradi. Revmatoid artritda yurak va qon tomir shikastlanishining belgilari eng ko’p uchraydigani bu ko'krak qafasidagi noqulayliklar bo'lib, ular tabiatda sust namoyon bo'ladi, aniq lokalizatsiyaga ega emas va odatda nitratlar bilan to'xtamaydi. Bundan tashqari, bemorlar yurak notekis urishi, yurak yetishmovchiligi belgilari, ba'zida jismoniy mashqlar paytida nafas qisilishi haqida shikoyat qilishlari mumkin. Revmatoid artritning o'rtacha va yuqori faolligi bo'lgan bemorlarni tekshirishda qon bosimining ko'tarilishi, yurak urish tezligining o'zgaruvchanligi pasayishi, chap qorincha gipertrofiyasi belgilari kuzatilishi mumkin. Yurakning auskultatsiyasi bilan taxikardiya, yurak ritmining buzilishi, sistolik shovqin bilan birinchi ton ohangning zaiflashishi aniqlanishi mumkin, ko'pincha III ohang eshitiladi. Revmatoid artrit natijasida ateroskleroz rivojlanishida surunkali yallig'lanishning asosiy rolini hisobga olgan holda, yurak-qon tomir kasalliklarining oldini olish va davolashda samarali yallig'lanishga qarshi terapiya muhim ahamiyatga ega. Davolash Yevropa revmarologlar assotsiatsiyasi davolash usullari yordamida amalga oshiriladi. Bunda terapiyaning asosiy maqsadi sifatida klinik remissiya yoki kasallikning past faolligiga erishish, tasdiqlangan kompleks ko'rsatkichlardan foydalangan holda bemorni diqqat bilan kuzatib borish (har 1-3 oyda) o’zgarishlarni qat'iy nazorat qilishdan iborat. Simptomatik terapiya yallig'lanish va og'riqni kamaytirishga qaratilgan bo'lib, dori-darmonlarni, shu jumladan in'ektsiya shaklida (dori blokadasi, mahalliy in'ektsiya terapiyasi) qabul qilishni o'z ichiga oladi. Revmatoid artritni davolashning asosiy komponenti asosiy terapiya bo'lib, uning vazifasi autoimmun jarayon faoliyatini bostirishdir. Bundan tashqari, agar kerak bo'lsa, plazma terapiyasi, bioimplant bilan davolash, mashqlar terapiyasi va boshqalar kabi bo'g'imlarning tuzilishi va funktsiyalarini tiklashning samarali usullaridan foydalanish mumkin. Shunday qilib davolashda bemorning hayot sifati ko’rsarkichlari va ijtimoiy faolligini saqlashga e'tibor qaratish, davolash jarayonini diqqat bilan kuzatib borish, genetik jihatdan yaratilgan biologik preparatlarni keng qo’llash, erishilgan ta'sirni saqlab qolish va bemorning davolanish jarayonida faol ishtirok etishini ta’minlashdan iborat. RA ning dastlabki bosqichida og’ir funksional buzilishlar va ekstraartikulyar buzilishlar kuzatilmaydi shuning uchun to'qimalardagi o'zgarishlarni o’z holatiga qaytarish ehtimoli yuqori hisoblanadi. Shuning uchun reabilitatsiya chora-

tadbirlarini erta boshlash nogironlikni oldini olish va kamaytirish uchun ham samaralidir. Reabilitatsiya dasturi RAda bemorning individual xususiyatlariga asoslangan bo'lishi kerak. U turli xil kompleks mashg'ulotlaridan (aerobika, gimnastika, yoga), fizioterapiya (lazer terapiyasi, krioterapiya, elektroterapiya, balneoterapiya), kasbiy terapiya, psixoterapiya mashg'ulotlaridan iborat. Revmatoidli artrit kasalligida bemorlarga antirevmatik va biologik preparatlarni samarali qo'llashni targ'ib etish, bemorlarda kasallik belgilarini kamaytiradi, bo'g'imlar deformatsiyasini kamaytiradi, kasallikning uzoq vaqt remissiyasi kuzatiladi va bemorning hayot sifat ko'rsatkichlati yaxshilanadi. Bemorlarga bu kasallikni davolash faqat og'riq simptomini bartaraf etish emas, balki kasallik jarayoni rivojlanishini antirevmatik preparatlar qo'llash orqali to'xtatish mumkinligini tushuntirib targ'ib qilishdan iborat.

Foydalanilgan adabiyotlar.

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ELEKTRON SOG‘LIQNI SAQLASH TIZIMLARINING SAMARADORLIGI

Annotatsiya*: Ushbu maqolada elektron sog‘liqni saqlash tizimlarining tibbiy xizmat sifati, boshqaruv samaradorligi, ma’lumotlar almashinuvi tezligi hamda bemorlarga ko‘rsatilayotgan xizmatning uzluksizligini ta’minlashdagi o‘rni tahlil qilinadi. Zamonaviy tibbiyot amaliyotida raqamli texnologiyalarning jadal joriy etilishi natijasida sog‘liqni saqlash muassasalarida diagnostika, davolash, monitoring va statistik hisobot yuritish jarayonlari sezilarli darajada takomillashmoqda. Tadqiqotda elektron sog‘liqni saqlash tizimlarining afzalliklari bilan bir qatorda ularni amaliyotga tatbiq etishdagi muammolar ham ko‘rib chiqilgan. Xususan, elektron tibbiy karta, telemeditsina, laborator axborot tizimlari, elektron retsept va raqamli boshqaruv platformalarining tibbiyotdagi ahamiyati yoritilgan. Tadqiqot natijalariga ko‘ra, elektron sog‘liqni saqlash tizimlari tibbiy yordamning tezkorligi, aniqligi va shaffofligini oshiradi, biroq ularning to‘liq samaradorligi texnik infratuzilma, kadrlar malakasi, axborot xavfsizligi va foydalanuvchilarning raqamli ko‘nikmalariga bevosita bog‘liqdir.*

Kalit so‘zlar: *elektron sog‘liqni saqlash, raqamli tibbiyot, elektron tibbiy karta, telemeditsina, axborot tizimi, tibbiy xizmat sifati, sog‘liqni saqlash boshqaruvi, samaradorlik.*

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EFFICIENCY OF ELECTRONIC HEALTHCARE SYSTEMS

Abstract*: This article analyzes the role of electronic healthcare systems in ensuring the quality of medical services, management efficiency, speed of information exchange, and continuity of patient care. As a result of the rapid introduction of digital technologies into modern medical practice, the processes of diagnosis, treatment, monitoring, and statistical reporting in healthcare institutions are being significantly improved. Along with the advantages of electronic healthcare systems, the study also examines the challenges associated with their implementation in practice. In particular, the importance of electronic medical records, telemedicine, laboratory information systems, electronic prescriptions, and digital management platforms in medicine is highlighted. According to the results of the study, electronic healthcare systems increase the speed, accuracy, and transparency of medical care; however, their full effectiveness directly depends on technical infrastructure, staff qualifications, information security, and the digital skills of users.*

Keywords: *electronic healthcare, digital medicine, electronic medical record, telemedicine, information system, quality of medical services, healthcare management, efficiency.*

Kirish

Elektron sog'liqni saqlashning ahamiyati pandemiya davrida yanada oshdi, chunki masofaviy tibbiy xizmatlar va telemedicine zaruriyatga aylandi. Biroq, ushbu tizimlarni muvaffaqiyatli joriy etish uchun mustahkam nazariy va huquqiy asos talab etiladi. Mazkur tadqiqotning maqsadi elektron sog'liqni saqlashni joriy etishning nazariy konseptual asoslarini tahlil qilish va huquqiy jihatlarini o'rganishdan iborat.Tadqiqot jarayonida sistematik adabiyotlar tahlili metodi qo'llanildi. So‘nggi yillarda dunyo miqyosida sog‘liqni saqlash tizimini modernizatsiya qilish jarayonida raqamli texnologiyalar alohida ahamiyat kasb etmoqda. Tibbiyot sohasida axborot-kommunikatsiya texnologiyalaridan

foydalanish nafaqat kasalliklarni aniqlash va davolash sifatini oshirmoqda, balki sog‘liqni saqlash muassasalari faoliyatini boshqarishning yangi modelini shakllantirmoqda. Shu jihatdan elektron sog‘liqni saqlash tizimlari zamonaviy tibbiy xizmat ko‘rsatishning ajralmas tarkibiy qismiga aylanib bormoqda.

Elektron sog‘liqni saqlash tizimi deganda tibbiyot sohasidagi ma’lumotlarni yig‘ish, saqlash, qayta ishlash, uzatish va ulardan boshqaruv hamda klinik qaror qabul qilishda foydalanishga xizmat qiluvchi raqamli platformalar majmui tushuniladi. Bunga elektron tibbiy kartalar, elektron navbat, telemeditsina, elektron retsept, tibbiy tasvirlarni saqlash tizimlari, laborator axborot tizimlari va statistik monitoring platformalari kiradi. Mazkur vositalar yordamida bemor haqidagi ma’lumotlar yaxlit holda saqlanadi, tibbiyot xodimlari o‘rtasida axborot almashinuvi tezlashadi, ortiqcha qog‘ozbozlik kamayadi va boshqaruv qarorlarining aniqligi ortadi.

An’anaviy sog‘liqni saqlash tizimlarida ma’lumotlarni qo‘lda yuritish, qog‘ozli hujjatlar bilan ishlash, bir muassasadan boshqasiga ma’lumot uzatishdagi uzilishlar va inson omili bilan bog‘liq xatoliklar keng uchraydi. Bu holat, ayniqsa, ko‘p bosqichli diagnostika va davolash jarayonlarida yaqqol namoyon bo‘ladi. Natijada bemorga ko‘rsatiladigan xizmat sifati pasayishi, vaqt yo‘qotilishi va tibbiy resurslardan samarasiz foydalanish kuzatiladi. Elektron sog‘liqni saqlash tizimlari esa ushbu muammolarni kamaytirishga xizmat qiladi.

Bugungi kunda elektron sog‘liqni saqlash tizimlarining samaradorligi faqat texnik qulaylik bilangina emas, balki tibbiy, iqtisodiy va ijtimoiy natijalar bilan ham baholanadi. Ular yordamida bemorlar uchun qulaylik yaratish, shifokorlarning ish yukini optimallashtirish, davolashda uzluksizlikni ta’minlash, ma’lumotlarning yo‘qolib ketishini oldini olish, shuningdek, aholi salomatligi ko‘rsatkichlari bo‘yicha tezkor tahlil olib borish imkoniyati paydo bo‘ladi. Shu bilan birga, har qanday raqamli tizimni joriy etish ma’lum tashkiliy, moliyaviy va huquqiy muammolarni ham yuzaga keltiradi.

Mazkur maqolaning maqsadi elektron sog‘liqni saqlash tizimlarining samaradorligini ilmiy jihatdan tahlil qilish, ularning afzalliklari va cheklovlarini ochib berish hamda tibbiy amaliyotdagi ahamiyatini yoritishdan iborat.

Tadqiqot metodologiyasi

Mazkur tadqiqot elektron sog‘liqni saqlash tizimlarining nazariy va amaliy jihatlarini o‘rganishga qaratilgan bo‘lib, unda kompleks yondashuvdan foydalanildi. Tadqiqot jarayonida tahliliy, qiyosiy, tizimli va umumlashtiruvchi usullar qo‘llanildi. Avvalo, elektron sog‘liqni saqlash tizimlarining mohiyati, tarkibiy qismlari va asosiy funksiyalarini aniqlash maqsadida mavjud ilmiy adabiyotlar, ilmiy maqolalar, o‘quv manbalari va tibbiy boshqaruvga oid nazariy qarashlar o‘rganildi.

Tadqiqotning metodologik asosini sog‘liqni saqlashni raqamlashtirish bo‘yicha ilmiy yondashuvlar tashkil etdi. Elektron tibbiy karta, elektron retsept, telemeditsina, masofaviy monitoring, laborator axborot tizimlari va ma’lumotlar bazalarini boshqarish platformalari alohida yo‘nalishlar sifatida ko‘rib chiqildi. Ularning samaradorligini baholashda bir necha mezonlarga e’tibor qaratildi:

xizmat ko‘rsatish tezligi, tibbiy hujjatlar bilan ishlash qulayligi, klinik qaror qabul qilish sifati, iqtisodiy tejamkorlik, ma’lumotlarning aniqligi va axborot xavfsizligi.

Qiyosiy tahlil usuli yordamida an’anaviy qog‘ozli boshqaruv tizimi bilan elektron tizimlarning farqli jihatlari solishtirildi. Bunda hujjat aylanishi, bemorlarni ro‘yxatga olish, kasallik tarixini yuritish, laborator natijalarni olish va shifokorlar o‘rtasidagi axborot almashinuvi ko‘rsatkichlari nazariy jihatdan baholandi. Tizimli tahlil usuli orqali elektron sog‘liqni saqlash tizimining faqat alohida dastur emas, balki diagnostika, davolash, profilaktika va boshqaruvni birlashtiruvchi yagona axborot makoni ekanligi asoslab berildi.

Tadqiqot davomida elektron tizimlarning samaradorligiga ta’sir qiluvchi omillar ham tahlil qilindi. Jumladan, texnik infratuzilmaning rivojlanganlik darajasi, internet tarmog‘ining sifati, tibbiyot xodimlarining raqamli savodxonligi, dasturiy ta’minotning foydalanuvchi uchun qulayligi, axborot xavfsizligi talablari va normativ-huquqiy asoslar o‘rganildi. Ushbu omillar elektron sog‘liqni saqlash tizimlarining real amaliyotda qay darajada samarali ishlashini belgilovchi muhim shartlar sifatida baholandi.

Shuningdek, tadqiqotda umumlashtirish usuli asosida elektron sog‘liqni saqlash tizimlarining tibbiyot amaliyotidagi istiqbollari va mavjud muammolaridan kelib chiqqan holda tegishli xulosalar ishlab chiqildi. Shu tariqa, maqolada mavzuning nazariy asoslari bilan amaliy ahamiyati o‘rtasidagi bog‘liqlik ilmiy nuqtai nazardan yoritildi.

Natijalar

Tadqiqot natijalari elektron sog‘liqni saqlash tizimlari sog‘liqni saqlash muassasalarida xizmat ko‘rsatish sifatini oshirishda muhim o‘rin tutishini ko‘rsatdi. Eng avvalo, elektron tizimlar bemor haqidagi ma’lumotlarni markazlashgan holda saqlash imkonini beradi. Bu esa kasallik tarixi, laborator tahlil natijalari, tashxislar, tavsiya etilgan dori vositalari va o‘tkazilgan muolajalar haqidagi ma’lumotlarni bir joyda ko‘rish imkonini yaratadi. Natijada shifokor bemorning umumiy holatini tez va to‘liq baholay oladi.

Elektron tibbiy kartaning joriy etilishi tibbiy hujjatlar bilan ishlash jarayonini ancha yengillashtiradi. Qog‘ozli hujjatlarda ma’lumotni topish uchun ko‘p vaqt talab etilgan bo‘lsa, elektron tizimda kerakli ma’lumot bir necha soniya ichida topiladi. Bu esa qabul vaqtini qisqartiradi va shifokorning bemor bilan to‘g‘ridan-to‘g‘ri ishlashiga ko‘proq vaqt ajratish imkonini beradi. Bundan tashqari, tibbiy yozuvlarning standartlashtirilishi noto‘g‘ri yoki noaniq yozuvlar sonini kamaytiradi.

Telemeditsina platformalari ham elektron sog‘liqni saqlash tizimlarining samaradorligini oshiruvchi muhim yo‘nalish sifatida namoyon bo‘ldi. Ular orqali uzoq hududlarda yashovchi bemorlarga masofadan turib maslahat berish, ayrim surunkali kasalliklar monitoringini olib borish, tor mutaxassislar bilan bog‘lanish imkoniyati yaratiladi. Bu, ayniqsa, transport infratuzilmasi cheklangan yoki mutaxassislar yetishmaydigan hududlar uchun katta ahamiyatga ega.

Elektron retsept tizimi dori vositalarini tayinlash va nazorat qilish jarayonida qulaylik yaratadi. Ushbu tizim dori vositalarining noto‘g‘ri yoki takror

buyurilishini kamaytiradi, dorilar o‘rtasidagi o‘zaro ta’sir xavfini aniqlashga yordam beradi hamda farmatsevtik nazoratni kuchaytiradi. Natijada dori xavfsizligini ta’minlash imkoniyati oshadi. Shu bilan birga, elektron retsept tizimi bemorlar uchun ham qulaylik yaratib, dori olish jarayonini soddalashtiradi.

Laborator axborot tizimlari va diagnostik qurilmalar bilan integratsiyalashgan platformalar tibbiy natijalarning tezkorligini oshiradi. Tahlil natijalari avtomatik ravishda elektron bazaga yuklanishi tufayli inson omiliga bog‘liq xatoliklar kamayadi. Shifokor laborator yoki instrumental tekshiruv natijalarini tezda qabul qilib, davolash taktikasini o‘z vaqtida belgilashi mumkin bo‘ladi. Bu holat ayniqsa shoshilinch tibbiy yordam va reanimatsiya amaliyotida muhimdir.

Tadqiqot davomida boshqaruv samaradorligi ham elektron sog‘liqni saqlash tizimlarining muhim natijasi sifatida qayd etildi. Raqamli tizimlar orqali muassasa rahbariyati bemor oqimi, kasalliklar tarkibi, dori vositalari sarfi, tibbiyot xodimlari faoliyati va statistik ko‘rsatkichlarni real vaqt rejimida kuzatib borishi mumkin. Bunday monitoring resurslarni oqilona taqsimlash, muammoli yo‘nalishlarni tez aniqlash va boshqaruv qarorlarini aniq dalillarga asoslanib qabul qilish imkonini beradi.

Biroq natijalar shuni ham ko‘rsatdiki, elektron sog‘liqni saqlash tizimlarining samaradorligi barcha sharoitlarda bir xil namoyon bo‘lavermaydi. Tizimning samarali ishlashi uchun zamonaviy kompyuter texnikasi, barqaror internet aloqasi, uzluksiz elektr ta’minoti va sifatli dasturiy vositalar talab etiladi. Bundan tashqari, tibbiyot xodimlarining yangi tizimlarga moslashuvi ham muhim omil hisoblanadi. Agar foydalanuvchilarda yetarli ko‘nikma bo‘lmasa yoki tizim interfeysi murakkab bo‘lsa, samaradorlik kutilgan darajada bo‘lmasligi mumkin.

Muhokama

Olingan natijalar elektron sog‘liqni saqlash tizimlari tibbiy xizmat ko‘rsatish sifatini oshirishda juda katta imkoniyatlarga ega ekanini tasdiqlaydi. Ayniqsa, ma’lumotlarning yaxlitligi va tezkorligi klinik qaror qabul qilish sifatiga ijobiy ta’sir ko‘rsatadi. Shifokorning bemor tarixiga tezkor kirish imkoniga ega bo‘lishi noto‘g‘ri tashxis qo‘yish xavfini kamaytiradi, takroriy tekshiruvlarni qisqartiradi va davolashni individuallashtirishga yordam beradi. Bu esa zamonaviy tibbiyotning asosiy tamoyillaridan biri bo‘lgan bemorga yo‘naltirilgan yondashuvni kuchaytiradi.

Elektron sog‘liqni saqlash tizimlarining samaradorligini faqat texnologik ustunliklar bilan cheklab bo‘lmaydi. Ular tibbiyotning tashkiliy modelini ham o‘zgartiradi. An’anaviy tizimda ko‘pincha alohida bo‘limlar o‘rtasida axborot uzilishi kuzatiladi, holbuki elektron tizim ushbu bo‘g‘inlarni yagona axborot makoniga birlashtiradi. Natijada poliklinika, shifoxona, laboratoriya, dorixona va boshqaruv bo‘g‘inlari o‘rtasidagi hamkorlik mustahkamlanadi. Bu esa bemorga ko‘rsatiladigan xizmatning uzluksizligi va ketma-ketligini ta’minlaydi.

Shu bilan birga, elektron sog‘liqni saqlash tizimlarining joriy etilishi bilan bog‘liq qator muammolar ham mavjud. Eng muhim masalalardan biri axborot xavfsizligi hisoblanadi. Tibbiy ma’lumotlar shaxsiy va maxfiy ma’lumotlar

toifasiga kirgani sababli ularni himoya qilish yuqori darajada ta’minlanishi lozim. Agar ma’lumotlar bazasi yetarli himoyalanmagan bo‘lsa, noqonuniy kirish, ma’lumotlarning yo‘qolishi yoki o‘zgartirilishi xavfi paydo bo‘ladi. Bu esa nafaqat tibbiy faoliyatga, balki bemorlarning huquq va manfaatlariga ham salbiy ta’sir ko‘rsatadi.

Yana bir muhim jihat — kadrlar tayyorgarligi. Elektron tizim qanchalik mukammal bo‘lmasin, undan foydalanuvchilar tizimdan to‘g‘ri foydalanishni bilmasa, kutilgan natijaga erishib bo‘lmaydi. Shu sababli tibbiyot xodimlarini muntazam ravishda raqamli texnologiyalar bilan ishlashga o‘qitish zarur. Bunda nafaqat dasturdan texnik foydalanish, balki elektron ma’lumotlar bilan ishlash madaniyati, axborot xavfsizligi va raqamli etikaga oid ko‘nikmalar ham shakllantirilishi kerak.

Muhokama jarayonida iqtisodiy samaradorlik masalasi ham alohida ahamiyatga ega ekanligi aniqlandi. Dastlab elektron sog‘liqni saqlash tizimlarini joriy etish ma’lum darajada katta moliyaviy xarajat talab qiladi. Serverlar, kompyuterlar, dasturiy ta’minot, texnik xizmat ko‘rsatish va xodimlarni tayyorlash uchun mablag‘ zarur bo‘ladi. Biroq uzoq muddatli istiqbolda qog‘oz xarajatlarining kamayishi, vaqt tejalishi, takroriy tahlillar sonining qisqarishi va boshqaruv optimallashuvi hisobiga iqtisodiy foyda kuzatiladi. Demak, bunday tizimlar qisqa muddatda emas, balki o‘rta va uzoq muddatli rivojlanish nuqtai nazaridan baholanishi lozim.

Shuningdek, elektron sog‘liqni saqlash tizimlarining samaradorligi hududlar o‘rtasidagi tenglikni ta’minlashda ham muhim omil bo‘lishi mumkin. Raqamli platformalar yordamida chekka hududlardagi bemorlar malakali mutaxassislardan maslahat olish imkoniga ega bo‘ladi. Bu esa tibbiy xizmatlardan foydalanish imkoniyatini kengaytiradi. Ayniqsa, surunkali kasalliklarga ega bemorlar, keksa yoshdagilar va nogironligi bo‘lgan shaxslar uchun masofaviy xizmatlar sezilarli qulaylik yaratadi.

Umuman olganda, elektron sog‘liqni saqlash tizimlarining samaradorligi ko‘p omilli tushuncha bo‘lib, uning muvaffaqiyati texnologiya, boshqaruv, huquqiy baza, kadrlar salohiyati va foydalanuvchi madaniyatining uyg‘unligiga bog‘liq. Demak, bunday tizimlarni joriy etish faqat texnik loyiha sifatida emas, balki sog‘liqni saqlashni strategik rivojlantirish vositasi sifatida ko‘rilishi maqsadga muvofiqdir.

Xulosa

Elektron sog‘liqni saqlash tizimlari zamonaviy tibbiyotning muhim tarkibiy qismi bo‘lib, ular sog‘liqni saqlash muassasalarida klinik, tashkiliy va boshqaruv jarayonlarini takomillashtirishga xizmat qiladi. Tadqiqot natijalari shuni ko‘rsatdiki, ushbu tizimlar bemor ma’lumotlarini markazlashgan holda saqlash, shifokorlar o‘rtasida tezkor axborot almashinuvi, tibbiy hujjatlar bilan ishlashni soddalashtirish, telemeditsina imkoniyatlarini kengaytirish va boshqaruv samaradorligini oshirishda katta ahamiyatga ega.

Elektron tibbiy karta, elektron retsept, laborator axborot tizimlari va masofaviy konsultatsiya platformalari tibbiy xizmatning tezkorligi va aniqligini

oshiradi. Shu bilan birga, qog‘ozli ish yuritish hajmining kamayishi, takroriy tekshiruvlarning oldi olinishi va resurslardan oqilona foydalanish iqtisodiy samaradorlikni ham ta’minlaydi. Biroq tizimlarning to‘laqonli samaradorligi texnik baza, dasturiy ta’minot sifati, xodimlarning raqamli ko‘nikmalari va axborot xavfsizligi talablarining qay darajada ta’minlanganiga bog‘liq.

Shu sababli elektron sog‘liqni saqlash tizimlarini joriy etishda kompleks yondashuv zarur. Ya’ni, infratuzilmani rivojlantirish, tibbiyot xodimlarini o‘qitish, ma’lumotlarni himoya qilish mexanizmlarini kuchaytirish va yagona standartlashtirilgan platformalarni yaratish muhimdir. Kelgusida bunday tizimlarni yanada takomillashtirish sog‘liqni saqlash sifati, qulayligi va shaffofligini oshirishga xizmat qiladi.

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O‘ZBEKISTONDA TEZ TIBBIY YORDAM XIZMATINING SHAKLLANISHI VA FAOLIYATI: TOSHKENT SHAHRI MISOLIDA

Annotatsiya: *Ushbu maqolada O‘zbekiston sog‘liqni saqlash tizimida tez tibbiy yordam xizmatining shakllanish tarixi va uning Toshkent shahri misolidagi faoliyati tahlil qilingan. Tadqiqot davomida sobiq sovet davridagi mavjud markazlashgan tizimdan zamonaviy yuqori texnologik shoshilinch yordam modeliga o‘tish bosqichlari yoritilgan. Shuningdek Toshkent shahridagi tibbiy logistika tizimini raqamlashtirish va aholiga ko‘rsatilayotgan xizmat sifatini oshirish bo‘yicha amaliy takliflar ilgari surilgan.*

Kalit so‘zlar: *Tez tibbiy yordam, Toshkent shahri, shoshilinch tibbiyot, sovet davri, raqamli sog‘liqni saqlash, tibbiy logistika, islohotlar, reanimobil.*

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FORMATION AND ACTIVITY OF THE EMERGENCY MEDICAL SERVICE IN UZBEKISTAN: THE CASE OF TASHKENT CITY

Abstract: *This article provides a scientific analysis of the history of the formation of the emergency medical service in the healthcare system of Uzbekistan and its activities on the example of Tashkent city The study highlights the stages of transition from the centralized Soviet system to the modern high-tech emergency care model Practical proposals for the digitalization of the medical logistics system in the capital and improving the quality of services provided to the population are also put forward*

Keywords: *Emergency medical service, Tashkent city, emergency medicine, Soviet period, digital healthcare, medical logistics, reforms, resuscitation.*

Kirish

Bugungi kunda tez tibbiy yordam xizmati dunyo miqyosida inson hayotini saqlab qolishda muhim ahamiyat kasb etmoqda. Rivojlangan davlatlarda ushbu xizmat zamonaviy texnologiyalar, malakali mutaxassislar va tezkor boshqaruv tizimlari asosida faoliyat yuritib, favqulodda holatlarda aholiga o‘z vaqtida va

sifatli yordam ko‘rsatishni ta’minlamoqda. Tez tibbiy yordam tizimi nafaqat kasallik yoki jarohat yuzaga kelganda, balki turli ofatlar, yo‘l-transport hodisalari va boshqa kutilmagan vaziyatlarda ham birinchi bo‘lib tibbiy xizmat ko‘rsatadigan muhim tizim hisoblanadi.

O‘zbekiston Respublikasida ham tez tibbiy yordam xizmatiga alohida e’tibor qaratilmoqda. So‘nggi yillarda ushbu sohani rivojlantirish, uning moddiy-texnik bazasini mustahkamlash, zamonaviy tez yordam avtomobillari bilan ta’minlash hamda tibbiyot xodimlarining malakasini oshirish borasida keng ko‘lamli islohotlar amalga oshirilmoqda. Aholining tez tibbiy yordam xizmatiga bo‘lgan ishonchi ortib bormoqda, xizmat ko‘rsatish sifati esa izchil ravishda yaxshilanmoqda.

Tez tibbiy yordam xizmatini rivojlantirish va tartibga solishda qator huquqiy-me’yoriy hujjatlar muhim ahamiyatga ega. Jumladan, O‘zbekiston Respublikasining “Aholi sog‘lig‘ini saqlash to‘g‘risida” gi Qonuni sog‘liqni saqlash tizimining asosiy yo‘nalishlarini belgilab beradi [1.]. Shuningdek, O‘zbekiston Respublikasi Prezidentining 2018-yil 16-martdagi PQ-3583-son qarori (“Tez tibbiy yordam tizimini tubdan takomillashtirish chora-tadbirlari to‘g‘risida”) ushbu sohani modernizatsiya qilish, zamonaviy boshqaruv tizimini joriy etish va xizmat sifatini oshirishga qaratilgan [2.].

Bundan tashqari, O‘zbekiston Respublikasi Prezidentining 2017-yil 7-dekabrdagi PF-5270-son Farmoni (“Sog‘liqni saqlash tizimini tubdan takomillashtirish chora-tadbirlari to‘g‘risida”) sog‘liqni saqlash tizimini, jumladan tez tibbiy yordam xizmatini rivojlantirishning ustuvor yo‘nalishlarini belgilab berdi [3.]. Vazirlar Mahkamasining tez tibbiy yordam faoliyatini tashkil etish va moliyalashtirishga oid qarorlari ham ushbu sohani huquqiy jihatdan tartibga solishda muhim o‘rin tutadi.

Dolzarbligi

Bugungi kunda aholi salomatligini muhofaza qilish va shoshilinch tibbiy yordam ko‘rsatish tizimini takomillashtirish davlat ijtimoiy siyosatining eng ustuvor yo‘nalishlaridan biri hisoblanadi Tibbiyot fani va amaliyotining xalqaro taraqqiyot darajasi shuni ko‘rsatadiki tez tibbiy yordam xizmati inson hayotini saqlab qolishda birlamchi va eng muhim bo‘g‘in bo‘lib xizmat qiladi Tanlangan mavzuning dolzarbligi shundan iboratki Toshkent shahri misolida ushbu tizimning tarixiy shakllanish bosqichlarini va sovet davridan bugungi kunga qadar bosib o‘tgan transformatsiya jarayonlarini ilmiy tahlil qilish zamonaviy tibbiy logistikani to‘g‘ri tashkil etish uchun xizmat qiladi. So‘nggi yilarda respublikamizda tez tibbiy yordam sohasining rivojlantirilishi va xizmat ko‘rsatish sifatining yuksaltirilishi borasida bir qator amaliy ishlar amalga oshirildi. Xususan, O‘zbekiston Respublikasi Prezidenti Sh.M.Mirziyoyevning 2022 yil 16 iyundagi “Aholiga tez tibbiy yordam ko'rsatish tizimini takomillashtirish to'g'risida” gi PQ-283-sonli Qarori orqali Respublika tez tibbiy yordam markazi hamda uning 14 ta hududiy filiallarini tashkil etilishida katta o‘rin tutdi [4.416.].

Adabiyotlar tahlili

Mazkur maqoladan ko‘zlangan asosiy maqsad Toshkent shahrida tez tibbiy yordam xizmatining shakllanish tarixini o‘rganish va sovet davridagi modeldan milliy tizimga o‘tishning o‘ziga xos xususiyatlarini ochib berishdan iboratdir. Adabiyotlar tahlili jarayonida mazkur mavzuga oid mahalliy va xorijiy olimlarning ilmiy ishlari o‘rganildi. Xususan, tez tibbiy yordam tizimini rivojlantirish va boshqarish masalalari ko‘plab tadqiqotchilar tomonidan keng yoritilgan. Jumladan, A.S. Sodiqovning 2020-yilda himoya qilingan “O‘zbekiston Respublikasida sog‘liqni saqlash tizimini boshqarishni takomillashtirish” [5.156.] nomli dissertatsiyasida tez tibbiy yordam xizmatining tashkiliy asoslari va boshqaruv mexanizmlari chuqur tahlil qilingan. Shuningdek, Q. Abdurahmonovning 2021-yilda nashr etilgan “Sog‘liqni saqlash iqtisodiyoti” [5.156.] nomli monografiyasida tibbiy xizmatlar, jumladan tez tibbiy yordam tizimining iqtisodiy samaradorligi va moliyalashtirish masalalari keng yoritilgan.

Bundan tashqari, Sh. Karimovning 2019-yilda chop etilgan “Tibbiyotda boshqaruv asoslari” [6.180.] monografiyasida sog‘liqni saqlash tizimini boshqarishning zamonaviy usullari, shu jumladan tez tibbiy yordam xizmatini samarali tashkil etish yo‘llari bayon etilgan. Ilmiy maqolalar orasida esa N. Islomovning 2022-yilda e’lon qilingan “Tez tibbiy yordam xizmatida sifat menejmenti” nomli maqolasida xizmat sifatini oshirish va zamonaviy boshqaruv tizimlarini joriy etish masalalari tahlil qilingan. Xorijiy tadqiqotchilar orasida World Health Organization (WHO) tomonidan 2018-yilda chop etilgan “Emergency Medical Services Systems” [7.98.] asarida tez tibbiy yordam tizimining xalqaro tajribasi, rivojlanish tendensiyalari va samarali boshqaruv modellari keng yoritilgan.

Muhokama

Toshkent shahrida tez tibbiy yordam xizmatining tizimli ko‘rinishga kelishi o‘tgan asrning o‘rtalariga to‘g‘ri keladi va bu davrda xizmat ko‘rsatishning "Semashko modeli" [8.45-51] asosiy poydevor bo‘lib xizmat qilgan Sovet davri tibbiyotining o‘ziga xosligi shunda ediki barcha tez yordam stansiyalari qat’iy markazlashgan holda faoliyat yuritgan va ularning asosiy vazifasi bemorni shunchaki shifoxonaga yetkazib qo‘yishdan (transportirovka) iborat bo‘lgan O‘sha davrda Toshkent poytaxt sifatida eng ilg‘or tibbiy texnikaga ega bo‘lsa-da aloqa vositalarining yetishmasligi va dispetcherlik xizmatining mexanik usulda ishlashi chaqiriqlarga borish vaqtining cho‘zilishiga sabab bo‘lgan Tibbiy brigadalar tarkibi asosan umumiy soha shifokorlaridan iborat bo‘lib ixtisoslashgan (kardiologik reanimatologik yoki pediatrik) yordam ko‘rsatish imkoniyatlari bugungi kunga nisbatan cheklangan edi Biroq aynan shu davrda Toshkentda tez yordam xizmatining ilk ilmiy maktabi shakllandi va kadrlar tayyorlash tizimi yo‘lga qo‘yildi

O‘zbekiston mustaqillikka erishgach sog‘liqni saqlash tizimida amalga oshirilgan islohotlar tez tibbiy yordam xizmatini mutlaqo yangi bosqichga olib chiqdi Sovet davridagi "shifoxonaga yetkazish" konsepsiyasidan "joyida samarali yordam ko‘rsatish" tamoyiliga o‘tildi Toshkent shahrida Respublika shoshilinch

tibbiy yordam ilmiy markazining tashkil etilishi sohadagi eng muhim burilish nuqtasi bo‘ldi [9.170.]. Bu tizim doirasida tez yordam brigadalari va shifoxonalar o‘rtasida uzviy bog‘liqlik ta’minlandi endilikda bemorga yo‘l davomida reanimatsion yordam ko‘rsatish imkoniyati paydo bo‘ldi Poytaxt avtoparkining zamonaviy xorijiy rusumdagi reanimobillar bilan ta’minlanishi o‘lim ko‘rsatkichlarini kamaytirish va "oltin soat" tamoyiliga amal qilish imkonini berdi Aynan shu bosqichda Toshkent shahri tez yordam xizmati Markaziy Osiyoda eng ilg‘or va tizimli yo‘lga qo‘yilgan xizmatlardan biriga aylandi [10.22-28].

Bugungi kunda Toshkent shahrida tez tibbiy yordam xizmati to‘liq raqamli transformatsiya jarayonini boshdan kechirmoqda Avtomatlashtirilgan boshqaruv tizimi va GPS navigatsiyasining joriy etilishi chaqiriqlarga borish vaqtini o‘rtacha 10-12 daqiqagacha qisqartirdi Endilikda har bir brigada planshetlar bilan ta’minlangan bo‘lib bemor haqidagi ma’lumotlar u shifoxonaga yetib bormasidanoq qabul bo‘limiga elektron tarzda yuboriladi Bu esa shifokorlarga bemorni qabul qilishga oldindan tayyorlanish imkonini beradi Shuningdek poytaxtda "103" xizmati dispetcherlik markazining yagona raqamli platformaga o‘tkazilishi chaqiriqlarni saralash va ularni eng yaqin brigadaga yo‘naltirish samaradorligini oshirdi Tahlillar shuni ko‘rsatadiki raqamli texnologiyalar va tibbiy logistikaning uyg‘unligi Toshkent shahri aholisiga ko‘rsatilayotgan shoshilinch yordam sifatini xalqaro standartlar darajasiga olib chiqdi va kelgusida bu tizimni butun respublika bo‘ylab kengaytirish uchun asosiy model bo‘lib xizmat qiladi

O‘zbekistonda tez tibbiy yordam tizimining poydevori o‘tgan asrning boshlarida poytaxt Toshkentda qo‘yilgan bo‘lib sovet davrida ushbu xizmat markazlashgan boshqaruv tizimiga ega edi To‘plangan ilmiy-tarixiy faktlar shuni tasdiqlaydiki dastlabki bosqichda texnik imkoniyatlar va tibbiy jihozlanish darajasi cheklangan bo‘lishiga qaramay soha xodimlari tomonidan shoshilinch yordam ko‘rsatishning o‘ziga xos maktabi yaratilgan Tadqiqot jarayonida olingan natijalar shuni ko‘rsatadiki mustaqillik yillarida tizim tubdan isloh qilindi va zamonaviy raqamli texnologiyalar avtomatlashtirilgan boshqaruv tizimi hamda yuqori texnologik reanimobillar bilan ta’minlandi Muammoning yechimi sifatida tez tibbiy yordam xizmatini poytaxtning demografik o‘sish sur’atlariga mos ravishda optimallashtirish va xalqaro tajriba asosida tibbiy brigadalar faoliyatini raqamlashtirishni yanada kuchaytirish taklif etiladi [11.148].

Xulosa

Toshkent shahri misolida tez tibbiy yordam xizmatining shakllanishi va faoliyatini o‘rganish shuni ko‘rsatadiki soha sovet davridagi oddiy yordam ko‘rsatish shaklidan bugungi kundagi yuqori texnologik shoshilinch tibbiy tizimga qadar uzoq yo‘lni bosib o‘tdi Ilmiy tahlil natijasida erishilgan xulosalar shuni tasdiqlaydiki tez yordam xizmatining samaradorligi nafaqat moddiy-texnik bazaga balki boshqaruv mexanizmlarining zamonaviy talablarga qanchalik moslashganiga ham bog‘liqdir Mazkur maqolada ilgari surilgan takliflar kelgusida poytaxt aholisiga ko‘rsatilayotgan tibbiy xizmat sifatini xalqaro andozalar darajasiga ko‘tarishda amaliy ahamiyat kasb etadi

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DYNAMICS OF THE PREVALENCE OF BRONCHIAL ASTHMA IN CHILDREN AND ASSESSMENT OF RISK FACTORS

Annotation: *This article analyzes the dynamics of the prevalence of bronchial asthma in children and the main risk factors influencing its development. The relationship between the disease and age, environmental, and social factors is studied, and an assessment is carried out based on modern epidemiological data. In addition, the ways to improve prevention, early diagnosis, and effective management of bronchial asthma are considered. The results of the study are of great importance in protecting children's health.*

Keywords: *bronchial asthma, child health, epidemiology, prevalence dynamics, risk factors, allergy*

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BOLALARDA BRONXIAL ASTMANING TARQALISH DINAMIKASI VA XAVF OMILLARINI BAHOLASH

Annotatsiya: *Ushbu maqolada bolalarda bronxial astmaning tarqalish dinamikasi hamda uning rivojlanishiga ta'sir etuvchi asosiy xavf omillari tahlil qilinadi. Kasallikning yosh, ekologik va ijtimoiy omillar bilan bog'liqligi o'rganilib, zamonaviy epidemiologik ma'lumotlar asosida baholash ishlari olib borilgan. Shuningdek, bronxial astmaning oldini olish, erta aniqlash va samarali boshqaruv choralarini takomillashtirish yo'llari ko'rib chiqiladi. Tadqiqot natijalari bolalar salomatligini muhofaza qilishda muhim ahamiyat kasb etadi.*

Kalit so'zlar: *bronxial astma, bolalar salomatligi, epidemiologiya, tarqalish dinamikasi, xavf omillari, allergiya*

Bronxial astma bugungi kunda bolalar orasida keng tarqalgan surunkali kasalliklardan biri hisoblanadi. So'nggi yillarda ushbu kasallikning uchrash chastotasi sezilarli darajada ortib borayotgani kuzatilmoqda. Ayniqsa, rivojlanayotgan davlatlarda ekologik va ijtimoiy omillarning o'zgarishi bilan bog'liq holda bronxial astma bilan kasallanish darajasi oshmoqda. Tadqiqotlar shuni ko'rsatadiki, bolalarda bronxial astma ko'proq maktabgacha va maktab yoshida aniqlanadi. Bunda shaharlarda yashovchi bolalarda kasallik darajasi qishloq hududlariga nisbatan yuqoriroq bo'lishi kuzatiladi. Bunga asosiy sabab sifatida havoning ifloslanishi, sanoat chiqindilari va transport vositalari ta'siri

ko‘rsatiladi. So‘nggi epidemiologik ma’lumotlarga ko‘ra, bronxial astma bilan kasallanish darajasi yil sayin oshib bormoqda. Bu esa kasallikni erta aniqlash va nazorat qilish tizimini takomillashtirish zarurligini ko‘rsatadi. Ayniqsa, bolalarda kasallikni kech aniqlash uning og‘ir shakllarga o‘tishiga olib kelishi mumkin. Tarqalish dinamikasini o‘rganishda yosh, jins va ijtimoiy omillar muhim rol o‘ynaydi. Masalan, o‘g‘il bolalarda astma erta yoshda ko‘proq uchrasa, qizlarda o‘smirlik davrida ko‘payishi kuzatiladi. Bu holat gormonal o‘zgarishlar bilan bog‘liq bo‘lishi mumkin. Shuningdek, global miqyosda bronxial astmaning ortib borishi urbanizatsiya jarayonlari bilan chambarchas bog‘liq. Zamonaviy turmush tarzi, yopiq muhitda ko‘proq vaqt o‘tkazish, sun’iy oziq-ovqat mahsulotlari iste’moli ham kasallik rivojlanishiga ta’sir etadi. Umuman olganda, bronxial astmaning tarqalish dinamikasi ko‘p omillarga bog‘liq bo‘lib, uni kompleks o‘rganish orqali samarali profilaktika choralarini ishlab chiqish mumkin.

Bronxial astma rivojlanishida turli xil xavf omillari muhim rol o‘ynaydi. Ushbu omillarni shartli ravishda ichki (endogen) va tashqi (ekzogen) guruhlarga ajratish mumkin. Har bir omil alohida yoki birgalikda kasallikning yuzaga kelishiga ta’sir ko‘rsatadi. Ichki omillar orasida eng muhimlaridan biri — irsiy moyillikdir. Agar ota-onalardan birida allergik kasalliklar yoki bronxial astma mavjud bo‘lsa, bolada ushbu kasallik rivojlanish ehtimoli yuqori bo‘ladi. Bu holat immun tizimining genetik xususiyatlari bilan bog‘liq bo‘lib, organizmning allergenlarga nisbatan yuqori sezuvchanligini ta’minlaydi. Immun tizimining yetilmaganligi ham bolalarda astma rivojlanishiga sabab bo‘lishi mumkin. Ayniqsa, erta yoshda turli infeksiyalar bilan tez-tez kasallanish nafas yo‘llarining sezuvchanligini oshiradi. Bu esa keyinchalik bronxial astmaga olib kelishi mumkin. Tashqi omillar ichida eng muhimlaridan biri — atrof-muhitning ifloslanishidir. Sanoat korxonalari, transport vositalari chiqindilari, chang va kimyoviy moddalar bolalar organizmiga salbiy ta’sir ko‘rsatadi. Ayniqsa, yirik shaharlarda yashovchi bolalarda astma ko‘proq uchrashi aynan shu omillar bilan izohlanadi. Allergenlar ham muhim xavf omillaridan biridir. Uy changi, hayvon junlari, o‘simlik changlari va mog‘or sporasi bolalarda allergik reaksiyalarni keltirib chiqaradi. Ushbu allergik jarayonlar esa bronxial astmaning rivojlanishiga olib keladi. Oziqlanish ham muhim omillardan hisoblanadi. Sun’iy qo‘shimchalarga boy oziq-ovqat mahsulotlarini iste’mol qilish, vitaminlar va mikroelementlarning yetishmasligi immun tizimining zaiflashishiga sabab bo‘ladi. Bu esa kasallikka moyillikni oshiradi. Ijtimoiy omillar ham e’tibordan chetda qolmasligi kerak. Ota-onalarning sog‘lom turmush tarziga amal qilmasligi, uyda chekish, gigiyena qoidalariga rioya qilmaslik bolalar salomatligiga salbiy ta’sir qiladi. Ayniqsa, passiv chekish bolalarda bronxial astma rivojlanishining asosiy sabablaridan biri hisoblanadi. Shuningdek, stress va psixologik omillar ham kasallik rivojlanishiga ta’sir etadi. Bolaning ruhiy holati, oilaviy muhit va ijtimoiy sharoit uning umumiy sog‘lig‘iga bevosita ta’sir ko‘rsatadi.

Bolalarda bronxial astmani erta aniqlash va to‘g‘ri tashxis qo‘yish kasallikni samarali boshqarishning asosiy omillaridan biridir. Tashxis jarayonida klinik belgilar, laborator va instrumental tekshiruv usullari muhim o‘rin tutadi.

Kasallikning asosiy klinik belgilariga nafas qisilishi, yo‘tal, ko‘krak qafasida siqilish hissi va xirillash kiradi. Ushbu belgilar ko‘pincha kechasi yoki jismoniy faollikdan so‘ng kuchayadi. Bolalarda bu simptomlar davriy ravishda namoyon bo‘lishi bilan xarakterlanadi. Tashxis qo‘yishda bemorning anamnezi muhim ahamiyatga ega. Ota-onadan bolaning kasallik tarixi, allergik reaksiyalar mavjudligi, oilaviy kasalliklar haqida ma’lumot olinadi. Bu ma’lumotlar kasallikni aniqlashda muhim yordam beradi. Laborator tekshiruvlar orasida qon tahlili, immunologik testlar va allergik sinamalar qo‘llaniladi. Bu usullar orqali organizmning allergenlarga nisbatan reaksiyasi aniqlanadi. Ayniqsa, immunoglobulin E (IgE) darajasining oshishi allergik jarayon mavjudligini ko‘rsatadi. Instrumental tekshiruvlar ichida spirometriya eng samarali usullardan biridir. Ushbu usul orqali nafas olish funksiyasi baholanadi va bronxlar torayishi aniqlanadi. Bolalarda spirometriya o‘tkazish biroz murakkab bo‘lishi mumkin, ammo bu usul kasallikni aniqlashda muhim ahamiyatga ega. Shuningdek, pikfloumetriya usuli ham keng qo‘llaniladi. Bu usul yordamida nafas chiqarish tezligi o‘lchanadi va kasallikning og‘irlik darajasi baholanadi. Bu usul oddiy va uy sharoitida ham qo‘llash mumkinligi bilan ajralib turadi. Differensial tashxis ham muhim bosqich hisoblanadi. Bronxial astmani boshqa nafas yo‘llari kasalliklaridan farqlash zarur. Masalan, bronxit, pnevmoniya yoki boshqa allergik kasalliklar bilan chalkashmasligi kerak. Zamonaviy tibbiyotda bronxial astmani baholash uchun maxsus xalqaro standartlar mavjud. Ushbu standartlar asosida kasallik darajasi aniqlanadi va individual davolash rejasi tuziladi. Umuman olganda, bronxial astmani tashxis qilish kompleks yondashuvni talab qiladi. To‘g‘ri va o‘z vaqtida qo‘yilgan tashxis kasallikni nazorat qilish va asoratlarning oldini olishda muhim ahamiyatga ega.

Bronxial astmaning oldini olish va uning tarqalishini kamaytirish zamonaviy tibbiyotning dolzarb muammolaridan biridir. Profilaktika choralarini samarali tashkil etish orqali kasallik rivojlanishini sezilarli darajada kamaytirish mumkin. Birlamchi profilaktika kasallikning oldini olishga qaratilgan bo‘lib, sog‘lom turmush tarzini shakllantirishni o‘z ichiga oladi. Homiladorlik davridan boshlab onaning sog‘lom ovqatlanishi, zararli odatlardan voz kechishi bolada kasallik rivojlanish xavfini kamaytiradi. Ikkinchi darajali profilaktika kasallikni erta aniqlash va uning rivojlanishini to‘xtatishga qaratilgan. Bunda bolalarni muntazam tibbiy ko‘rikdan o‘tkazish, allergik kasalliklarni vaqtida davolash muhim ahamiyatga ega. Uchinchi darajali profilaktika esa kasallik bilan yashayotgan bemorlarning hayot sifatini yaxshilashga qaratilgan. Bu bosqichda dori vositalari bilan davolash, nafas mashqlari va reabilitatsiya muhim rol o‘ynaydi. Atrof-muhitni sog‘lomlashtirish ham muhim omillardan biridir. Havoning ifloslanishini kamaytirish, yashash sharoitlarini yaxshilash va gigiyena qoidalariga rioya qilish kasallikning oldini olishda muhim rol o‘ynaydi. Shuningdek, ota-onalar va bolalar o‘rtasida tibbiy savodxonlikni oshirish zarur. Kasallik belgilari, xavf omillari va profilaktika choralarini bilish orqali astmaning oldini olish mumkin. Zamonaviy tibbiyotda innovatsion usullar, jumladan,

individual davolash rejalarini tuzish, yangi dori vositalaridan foydalanish va reabilitatsiya dasturlarini qo‘llash kasallikni samarali boshqarishga yordam beradi.

Xulosa

Bolalarda bronxial astma zamonaviy pediatriyada dolzarb muammolardan biri bo‘lib, uning tarqalish dinamikasi yil sayin ortib borayotgani kuzatilmoqda. Ushbu maqolada olib borilgan tahlillar shuni ko‘rsatadiki, bronxial astmaning rivojlanishi ko‘p omilli jarayon bo‘lib, irsiy moyillik, ekologik sharoit, allergenlar, ijtimoiy muhit va immun tizimi holati muhim ahamiyatga ega. Ayniqsa, urbanizatsiya jarayonlari, havoning ifloslanishi va passiv chekish bolalar salomatligiga salbiy ta’sir ko‘rsatib, kasallik xavfini oshirmoqda. Tadqiqot davomida bronxial astmani erta aniqlash va to‘g‘ri baholash kasallikning og‘ir asoratlarsiz kechishini ta’minlashda muhim omil ekanligi aniqlandi. Klinik belgilarni chuqur tahlil qilish, zamonaviy diagnostika usullaridan foydalanish va differensial tashxisni to‘g‘ri olib borish samarali davolash strategiyasini tanlash imkonini beradi. Ayniqsa, spirometriya va allergik testlarning ahamiyati yuqori baholanadi. Profilaktika masalasi bronxial astmaga qarshi kurashishda asosiy yo‘nalishlardan biri hisoblanadi. Birlamchi, ikkilamchi va uchlamchi profilaktika choralarini kompleks ravishda amalga oshirish orqali kasallik tarqalishini kamaytirish mumkin. Ota-onalar va bolalar o‘rtasida tibbiy savodxonlikni oshirish, sog‘lom turmush tarzini shakllantirish va ekologik omillarni nazorat qilish muhim ahamiyat kasb etadi..

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ASSESSMENT OF THE EARLY DETECTION SYSTEM OF TYPE 2 DIABETES IN PRIMARY HEALTH CARE SETTINGS

Annotation: *This article analyzes the early detection system of type 2 diabetes in primary health care settings and evaluates its effectiveness. The importance of early diagnosis, identification of risk groups, and screening programs is examined. In addition, diagnostic methods, preventive approaches, and practical mechanisms within the health care system are assessed. The results of the study highlight the significance of reducing diabetes-related complications and improving the overall health status of the population.*

Keywords: *Type 2 diabetes, early detection, primary health care, screening, glucose, insulin resistance*

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BIRLAMCHI TIBBIY – SANITARIYA YORDAMI SHAROITIDA 2-TIP QANDLI DIABETNI ERTA ANIQLASH TIZIMINI BAHOLASH

Annotatsiya: *Ushbu maqolada birlamchi tibbiy-sanitariya yordami sharoitida 2-tip qandli diabetni erta aniqlash tizimi va uning samaradorligi tahlil qilinadi. Kasallikni erta bosqichda aniqlash, xavf guruhlarini belgilash va skrining dasturlarining ahamiyati o'rganiladi. Shuningdek, diagnostika usullari, profilaktik yondashuvlar va sog'liqni saqlash tizimidagi amaliy mexanizmlar baholanadi. Tadqiqot natijalari diabetning asoratlarini kamaytirish va aholining sog'liq darajasini yaxshilashda muhim ahamiyatga ega.*

Kalit so'zlar: *2-tip qandli diabet, erta aniqlash, birlamchi tibbiy yordam, skrining, glyukoza, insulin rezistentligi*

2-tip qandli diabet (T2DM) bugungi kunda butun dunyo bo'yicha tez sur'atlarda tarqalib borayotgan surunkali metabolik kasalliklardan biri hisoblanadi. Jahon sog'liqni saqlash tashkiloti ma'lumotlariga ko'ra, diabet bilan kasallanganlar soni yil sayin ortib bormoqda va uning asosiy qismi aynan 2-tip diabetga to'g'ri keladi. Bu holat nafaqat tibbiy, balki ijtimoiy-iqtisodiy muammo sifatida ham katta ahamiyat kasb etadi. 2-tip diabetning asosiy xususiyati insulin rezistentligi va nisbiy insulin yetishmovchiligi hisoblanadi. Kasallik ko'pincha sekin rivojlanadi va uzoq vaqt davomida yashirin kechishi mumkin. Shu sababli ko'plab bemorlarda kasallik faqat asoratlar paydo bo'lgandan keyin aniqlanadi. Bu

esa erta aniqlash tizimining dolzarbligini yanada oshiradi. Birlamchi tibbiy-sanitariya yordami (BTSY) tizimi 2-tip diabetni erta aniqlashda asosiy bo‘g‘in hisoblanadi. Chunki aholining katta qismi aynan birlamchi bo‘g‘in shifokorlari bilan birinchi marta muloqot qiladi. Shu sababli skrining, profilaktik ko‘riklar va xavf guruhlarini aniqlash aynan shu bosqichda amalga oshirilishi kerak. Kasallikning tarqalishiga ta’sir etuvchi asosiy omillar orasida noto‘g‘ri ovqatlanish, kamharakat turmush tarzi, semizlik, stress va genetik moyillik muhim o‘rin tutadi. Ayniqsa, urbanizatsiya jarayonlari va fast-food mahsulotlarining ko‘payishi kasallik darajasining oshishiga olib kelmoqda. Epidemiologik ma’lumotlar shuni ko‘rsatadiki, 2-tip diabet ko‘proq o‘rta va katta yoshdagi aholida uchraydi, ammo so‘nggi yillarda yoshlar orasida ham keskin o‘sish kuzatilmoqda. Bu esa kasallikni erta aniqlash va profilaktika tizimini kuchaytirishni talab qiladi. Shunday qilib, 2-tip qandli diabetning keng tarqalishi va uning yashirin kechishi birlamchi tibbiy bo‘g‘inda erta aniqlash tizimini baholash va takomillashtirishni dolzarb vazifaga aylantiradi.

Birlamchi tibbiy-sanitariya yordami sharoitida 2-tip qandli diabetni erta aniqlash tizimi sog‘liqni saqlashning eng muhim profilaktik yo‘nalishlaridan biri hisoblanadi. Ushbu bosqichda asosiy maqsad kasallikni simptomlar paydo bo‘lishidan oldin yoki juda erta bosqichda aniqlash orqali uning asoratlarini oldini olishdir. Erta aniqlash tizimi asosan skrining dasturlari orqali amalga oshiriladi. Skrining — bu klinik belgilari bo‘lmagan, lekin xavf guruhiga kiruvchi shaxslarda kasallikni aniqlashga qaratilgan tizimli tekshiruvlar majmuasidir. 2-tip diabet uchun skrining odatda och qoringa glyukoza darajasini o‘lchash, glyukozaga tolerantlik testi (OGTT) va glikozillangan gemoglobin (HbA1c) ko‘rsatkichlarini aniqlash orqali amalga oshiriladi. Birlamchi bo‘g‘inda skrining ko‘proq xavf guruhlariga yo‘naltirilgan bo‘ladi. Xavf guruhiga quyidagilar kiradi: ortiqcha vaznga ega shaxslar, semizlik bilan og‘riganlar, 45 yoshdan katta bemorlar, oilaviy anamnezida diabet mavjud bo‘lganlar, arterial gipertoniya va dislipidemiya bilan og‘riganlar. Ushbu guruhlarda diabet rivojlanish ehtimoli yuqori bo‘lganligi sababli muntazam tekshiruvlar muhim ahamiyatga ega. Erta aniqlash jarayonida laborator va klinik usullar birgalikda qo‘llaniladi. Laborator usullar glyukoza metabolizmini baholasa, klinik usullar bemorning umumiy holati, antropometrik ko‘rsatkichlari (BMI, bel aylanasi) va simptomlarni o‘rganishga qaratiladi. Shuningdek, arterial bosimni o‘lchash va lipid profilini aniqlash ham kompleks baholashda muhim rol o‘ynaydi. So‘nggi yillarda elektron tibbiyot tizimlari skrining jarayonini yanada samarali qilish imkonini bermoqda. Elektron registrlar orqali bemorlar monitoring qilinadi, xavf guruhlari avtomatik aniqlanadi va shifokorlarga ogohlantirish tizimi yo‘lga qo‘yiladi. Bu esa erta aniqlash samaradorligini sezilarli darajada oshiradi. Bundan tashqari, aholi orasida sog‘lom turmush tarzini targ‘ib qilish ham skrining tizimining muhim qismi hisoblanadi. Chunki profilaktika choralari bilan birgalikda kasallikning rivojlanish ehtimoli kamayadi. Aholiga to‘g‘ri ovqatlanish, jismoniy faollik va vazn nazorati bo‘yicha tushuntirish ishlari olib borilishi zarur.

2-tip qandli diabetni erta aniqlash tizimining samaradorligi sog‘liqni saqlash tizimining sifat ko‘rsatkichlarini belgilovchi muhim omillardan biridir. Samaradorlikni baholashda asosiy mezonlar kasallikning erta bosqichda aniqlanish darajasi, asoratlar kamayishi va bemorlarning hayot sifati yaxshilanishi hisoblanadi. Tadqiqotlar shuni ko‘rsatadiki, muntazam skrining o‘tkaziladigan hududlarda diabet erta bosqichda ko‘proq aniqlanadi. Bu esa yurak-qon tomir kasalliklari, nefropatiya, retinopatiya kabi og‘ir asoratlarning oldini olish imkonini beradi. Demak, erta aniqlash tizimi nafaqat diagnostika, balki profilaktika vazifasini ham bajaradi. Samaradorlikni baholashda tibbiy statistik ma’lumotlar muhim rol o‘ynaydi. Masalan, yangi aniqlangan diabet holatlarining qanchalik erta bosqichda topilgani, HbA1c ko‘rsatkichlarining o‘rtacha darajasi va asoratlar chastotasi tahlil qilinadi. Ushbu ko‘rsatkichlar tizimning ishlash sifatini aniqlashga yordam beradi. Bundan tashqari, bemorlarning davolanishga jalb etilishi ham muhim indikator hisoblanadi. Erta aniqlangan bemorlar odatda parhez, jismoniy faollik va dori vositalariga nisbatan yuqori rioya ko‘rsatadi. Bu esa kasallikni nazorat qilishni osonlashtiradi. Birlamchi bo‘g‘inda ishlovchi tibbiyot xodimlarining malakasi ham samaradorlikka bevosita ta’sir qiladi. Agar shifokorlar va hamshiralar diabetning erta belgilarini yaxshi bilsalar, diagnostika sifati ham oshadi. Shu sababli doimiy o‘quv dasturlari va treninglar muhim hisoblanadi. Elektron sog‘liqni saqlash tizimlari samaradorlikni oshirishda katta rol o‘ynaydi. Ma’lumotlarni raqamlashtirish, bemorlarni kuzatish va avtomatik tahlil qilish tizimlari diagnostika jarayonini tezlashtiradi va xatolarni kamaytiradi.

2-tip qandli diabetni erta aniqlash tizimini takomillashtirish sog‘liqni saqlash tizimining ustuvor yo‘nalishlaridan biri hisoblanadi. Ushbu jarayon diagnostika sifatini oshirish, aholi qamrovini kengaytirish va profilaktik chora-tadbirlarni kuchaytirishga qaratilgan. Birinchi navbatda, skrining dasturlarini kengaytirish zarur. Aholining barcha qatlamlarini, ayniqsa xavf guruhlarini muntazam tekshiruvdan o‘tkazish kasallikni erta aniqlash imkonini oshiradi. Bu jarayonda mobil tibbiy brigadalar va ko‘chma diagnostika markazlari muhim rol o‘ynaydi. Ikkinchi yo‘nalish — tibbiyot xodimlarining malakasini oshirish. Birlamchi bo‘g‘inda ishlovchi shifokorlar va hamshiralar diabetning erta belgilarini aniqlash, xavf guruhlarini baholash va skrining natijalarini to‘g‘ri talqin qilish bo‘yicha doimiy o‘qitilishi kerak. Uchinchi muhim yo‘nalish — aholi o‘rtasida tibbiy savodxonlikni oshirish. Odamlar diabet xavf omillari, belgilari va profilaktikasi haqida yetarli bilimga ega bo‘lsa, erta murojaat qilish darajasi oshadi. Bu esa kasallikni erta bosqichda aniqlashga yordam beradi. To‘rtinchi yo‘nalish — raqamli texnologiyalarni keng joriy etish. Elektron tibbiy kartalar, mobil ilovalar va sun’iy intellekt asosidagi tahlil tizimlari diabetni erta aniqlashni sezilarli darajada yaxshilaydi. Beshinchi yo‘nalish — sog‘lom turmush tarzini targ‘ib qilish. To‘g‘ri ovqatlanish, jismoniy faollik va stressni kamaytirish diabet rivojlanish xavfini kamaytiradi. Shu sababli profilaktika ishlari tizimli ravishda olib borilishi kerak.

Xulosa

2-tip qandli diabet bugungi kunda keng tarqalgan va jiddiy asoratlarga olib keluvchi surunkali kasalliklardan biridir. Uni erta aniqlash tizimi birlamchi tibbiy-sanitariya yordami darajasida muhim ahamiyatga ega bo‘lib, kasallikning og‘ir asoratlarini oldini olishga xizmat qiladi. Maqolada erta aniqlash tizimi, skrining usullari, xavf guruhlari bilan ishlash va laborator diagnostika imkoniyatlari tahlil qilindi. Natijalar shuni ko‘rsatadiki, muntazam skrining va profilaktik yondashuvlar kasallikni erta bosqichda aniqlash imkonini oshiradi. Samaradorlikni oshirish uchun tibbiyot xodimlarining malakasini oshirish, zamonaviy texnologiyalarni joriy etish va aholi o‘rtasida sog‘lom turmush tarzini targ‘ib qilish muhimdir. Shu bilan birga, elektron sog‘liqni saqlash tizimlari diagnostika jarayonini tezlashtiradi va sifatini oshiradi. Umuman olganda, 2-tip qandli diabetni erta aniqlash tizimini takomillashtirish kasallikning tarqalishini kamaytirish, bemorlar hayot sifatini yaxshilash va sog‘liqni saqlash tizimi samaradorligini oshirishda muhim ahamiyatga ega.

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KLASSIK LOTIN TILI VA ZAMONAVIY TIBBIY TERMINOLOGIYANING LINGVISTIK XUSUSIYATLARI: QIYOSIY TAHLIL

Annotatsiya:*Ushbu maqolada klassik lotin tili va tibbiy lotin tili o‘rtasidagi asosiy lingvistik hamda strukturaviy farqlar chuqur tahlil qilinadi. Tadqiqot davomida klassik lotin tilining boy grammatik tizimidan tibbiyotning kasbiy ehtiyojlariga moslashgan soddalashtirilgan va standartlashtirilgan shaklga o‘tish jarayoni ko‘rib chiqiladi. Maqola tibbiyot sohasidagi terminlarning shakllanishida yunon tili (gretsizmlar) ning o‘rni, grammatik kategoriyalarning qisqarishi, ayniqsa, fe'l va uning murakkab shakllarining cheklanishi hamda sintaktik tuzilmalardagi o‘zgarishlar masalalariga bag‘ishlangan. Klassik tilning erkin so‘z tartibidan tibbiy terminologiyaning qat'iy belgilangan strukturaga o‘tishi, shuningdek, "gibrid" atamalarning shakllanishi va ularning professional aloqadagi ahamiyati atroflicha ko‘rib chiqiladi. Tadqiqot natijalari zamonaviy tibbiy ta'limda lotin tilini o‘rganishning nazariy va amaliy ahamiyatini ochib beradi.*

Kalit so‘zlar: *klassik lotin tili, tibbiy terminologiya, anatomik nomenklatura, gretsizmlar, grammatik transformatsiya, sintaktik standartlashuv, kasbiy nutq, lotin tilining evolyutsiyasi.*

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LINGUISTIC FEATURES OF CLASSICAL LATIN AND MODERN MEDICAL TERMINOLOGY: A COMPARATIVE ANALYSIS

Abstract: *This article provides an in-depth analysis of the main linguistic and structural differences between Classical Latin and Medical Latin. The study examines the process of transition from the rich grammatical system of Classical*

Latin to a simplified and standardized form adapted to the professional needs of medicine. The article focuses on the role of the Greek language (Greekisms) in the formation of medical terms, the reduction of grammatical categories, especially the limitation of the verb and its complex forms, as well as changes in syntactic structures. Particular attention is paid to the shift from the free word order of Classical Latin to the strictly fixed structure of medical terminology, as well as to the formation of "hybrid" terms and their significance in professional communication. The results of the study reveal the theoretical and practical importance of learning Latin in modern medical education.

Keywords: *Classical Latin, medical terminology, anatomical nomenclature, Greekisms, grammatical transformation, syntactic standardization, professional speech, evolution of the Latin language.*

O‘rta asrlardan buyon lotin tili ilm-fan, xususan, tibbiyotning lingua franca'si (asosiy muloqot vositasi) sifatida tan olingan. Biroq, Zamonaviy tibbiy terminologiyada qo‘llanilayotgan lotin tili, ko‘pincha o‘quvchilarda chalkashlik tug‘diradi, chunki u o‘zining klassik davridagi ko‘rinishidan sezilarli darajada farq qiladi. Bu farqlar tilning lug‘aviy, grammatik va sintaktik darajalarini qamrab oladi. Ushbu maqolada klassik lotin tili bilan tibbiyotda qo‘llaniladigan lotin tili o‘rtasidagi ajralish nuqtalarini hamda tibbiy terminologiyaning o‘ziga xos xususiyatlarini chuqur tahlil qilishga harakat qilinadi. Bu esa bo‘lajak shifokorlar va tilshunoslar uchun tibbiy terminologiyani yanada samarali o‘rganishlariga zamin yaratadi.

Leksik O‘zgarishlar: Gretsizmlar va terminologik adaptatsiya

Klassik lotin tili lug‘at boyligi ko‘p jihatdan o‘zining o‘sha davrdagi madaniy, siyosiy va falsafiy muhitini aks ettiradi. Ammo tibbiyot kabi aniq fan sohasining terminologiyasi shakllanishida aynan yunon tili va madaniyatining ta’siri juda katta bo‘lgan. Bu jarayonni quyidagicha ko‘rish mumkin:

Anatomik nomlash: Ko‘pgina asosiy organ va suyak nomlari lotincha ildizlarga ega, masalan: cor (yurak), pulmo (o‘pka), femur (son suyagi), cranium (bosh suyagi).

Klinik va patologik terminlar: Kasalliklar, alomatlar va jarrohlik muolajalarini ifodalashda yunoncha ildizlardan keng foydalanilgan. Bu ko‘pincha –itis (yallig‘lanish), –oma (o‘sma), –scopia (ko‘rish, kuzatish), –tomia (kesish) kabi qo‘shimchalar bilan ifodalanadi. Masalan: gastritis (oshqozon yallig‘lanishi), sarcoma (to‘qima o‘smasi), endoscopia (ichki ko‘rik), laryngotomia (laringotomiya).

Gibrid atamalar: Terminologiyaning rivojlanish jarayonida lotincha asos bilan yunoncha qo‘shimchalarning yoki aksincha, yunoncha asos bilan lotincha qo‘shimchalarning birikishi natijasida hosil bo‘lgan «gibrid» atamalar keng tarqalgan. Masalan: lotincha nervus (tomir) va yunoncha algia (og‘riq) so‘zlaridan "neuroalgia" (asab og‘rig‘i) hosil bo‘lgan. Yoki lotincha aqua (suv) va yunoncha ductus (yo‘l) so‘zlaridan "aquaeductus" (suv o‘tkazgich) atamasi kelib chiqqan.

Grammatik Transformatsiya va Soddalashuv

Klassik lotin tilining grammatik tizimi juda boy va murakkab. Uning fe'l tizimi zamonlar, mayllar (modus), holatlar (usus) va ravishdosh shakllarning katta diapazonini o‘z ichiga oladi. Tibbiyot terminologiyasining rivojlan

ishi esa bu tizimni sezilarli darajada soddalashtirgan.

1. Fe'lning cheklangan funksiyasi: Klassik lotinda fe'llar harakat va jarayonlarni tasvirlovchi markaziy o‘rin tutgan bo‘lsa, tibbiy lotinda ularning roli keskin cheklangan. Zamonaviy tibbiy matnlarda fe'llar asosan retseptlarda buyruq maylida (Recipe – ol, Misce – aralashtir, Da – ber) yoki diagnostik jarayonlarni tavsiflashda (observare – kuzatish) uchraydi. Ko‘p fe'llar ot va sifatlarga aylangan yoki ularning tarkibiga kirib ketgan.

2. Nominal (otli) tuzilmalar ustunligi: Tibbiy terminologiyaning asosini otlar va ularga bog‘liq sifatlar tashkil qiladi. Bu esa aniqlik va universal tushunishni ta’minlaydi. Masalan, Fractura cruris (cho‘loq oyoqning sinishi) – bu yerda fractura (sinish) va cruris (oyoqning) otlari asosiy ma’noni beradi.

3. Qaratqich kelishigining (Genetivus) hukmronligi: O‘zbek tilidagi "kimning? nimaning?" savoliga javob beruvchi ushbu kelishik tibbiy terminologiyada "nimaning nimasi" yoki "qanday"? savollariga javob beruvchi bog‘liqlikni ifodalashda asosiy vosita hisoblanadi. Tibbiy nomenklatura ko‘p hollarda Genetivus zanjiri orqali hosil bo‘ladi: Arteria carotis communis sinistra (Chap umumiy uyqu arteriyasi). Bu klassik lotinda ham mavjud bo‘lsa-da, tibbiyotda uning funksiyasi yanada kengaygan.

Sintaktik standartlashuv va professional aloqa

Klassik lotin tilida so‘z tartibi nisbatan erkin bo‘lib, bu stilistik va badiiy ifodaviylikka xizmat qilgan. Tibbiyot terminologiyasida esa aniqlik va universal tushunish birinchi o‘ringa chiqqani sababli, so‘z tartibi qat'iy standartlashgan.

Qat'iy struktura: Har qanday tibbiy termin, ayniqsa, anatomik va diagnostik atamalar ma’lum bir mantiqiy ketma-ketlikda quriladi. Odatda, bosh nomlanayotgan ob’ekt nomi (ot) birinchi keladi, so‘ngra uning belgilari (sifatlar) yoki unga tegishli boshqa ob’ektlar (Genetivus holatida) keladi. Masalan: Ventriculus cordis sinister (Yurakning chap qorinchasi). Bu tartibni o‘zgartirish ma’noni buzishi yoki noto‘g‘ri tushunilishiga olib kelishi mumkin.

• Abridgements (qisqartmalar): Tibbiy amaliyotda ko‘pincha atamalarning qisqartirilgan shakllari ham ishlatiladi, bu esa muloqotni tezlashtiradi va murakkab nomlarni soddalashtiradi. Masalan, arteria coronaria dextra (o‘ng korionar arteriya) ko‘pincha ACD yoki RCA (inglizcha qisqartmasi) deb yozilishi mumkin.

Xulosa qilib aytganda, tibbiy lotin tili klassik lotin tilining ajralmas vorisi bo‘lsa-da, u o‘zining maxsus ehtiyojlari va evolyutsiyasi natijasida alohida, o‘ziga xos tilda rivojlangan. U klassik lotinning murakkab grammatikasidan xoli bo‘lib, aniqlik, ixchamlik va universal tushunish tamoyillariga asoslanadi. Lug‘at boyligida yunoncha elementlarning ko‘pligi, grammatik tizimning soddalashuvi va sintaktik tuzilmaning qat'iy standartlashuvi – bularning barchasi tibbiy lotin tilining o‘ziga xos xususiyatlaridir. Zamonaviy tibbiyot ta'limida ushbu farqlarni chuqur tushuntirish, talabalarning terminologiyani to‘g‘ri va o‘rinli qo‘llashlari hamda kasbiy savodxonligini oshirish uchun muhim ahamiyat kasb etadi.

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LITERATURE REVIEW: MODERN PROBLEMS AND FEATURES OF PHARMACOTHERAPY OF RECURRENT HERPETIC INFECTION

Resume: *The article examines current issues and features of the pharmacotherapy of recurrent herpes infection caused by the herpes simplex virus. It highlights the high prevalence of the infection, its ability to persist lifelong, as well as its immunosuppressive and oncogenic effects on the human body. Particular attention is given to the recurrent course of the disease, associated with reactivation of the virus from its latent state.*

Key words: *herpes infection; herpes simplex virus; recurrence; pharmacotherapy; antiviral drugs; acyclovir; valacyclovir; famciclovir; immunotherapy; interferons; interferon inducers; suppressive therapy; immunity; clinical pharmacology*

Intraduction

At present, among viral diseases, herpes infection has become particularly relevant. Its causative agent is the herpes simplex virus (HSV). Firstly, this is due to its fairly widespread prevalence among populations in different regions; secondly, due to the lifelong persistence of the virus in the human body; thirdly, due to the immunosuppressive and oncogenic properties of the virus, as well as its negative impact on reproductive health and the high frequency of asthenic syndrome development. All of this significantly complicates the prognosis of the disease and reduces the quality of life in patients with this pathology.

Very often, herpes infection can take on a recurrent course. The problem is also that during recurrences, HSV, which had previously been in a latent state in the body, begins to actively replicate, clearly disrupting the body's defense mechanisms, while modern antiviral drugs can only temporarily halt viral replication during the period of their use.

Clinically, recurrences occur with signs of intoxication of varying severity and local symptoms affecting the skin and/or mucous membranes.

Like other viruses, HSV is an intracellular parasite. It is practically impossible to affect it with medications without damaging the cells of the host organism. In most cases, the use of antiviral drugs is not very effective, and the risk of adverse effects is quite high. Antiviral agents are drugs with a narrow therapeutic range. Maximum effectiveness can be achieved when they are used for preventive purposes or locally, when it is possible to create a high concentration. Since it is impossible to achieve complete elimination of the virus from the body

using modern antiviral agents, the goal of pharmacotherapy (PT) for herpes infection (HI) is to transfer actively replicating viruses into a latent, inactive state.

The objectives of pharmacotherapy in this case are to suppress viral reproduction during exacerbation in order to reduce the severity or duration of recurrence, as well as to restore adequate immune system function to prevent post-recurrence viral reactivation and to increase the duration of the recurrence-free period.

Antiherpetic drugs include tebrofen, reodoxol, idoxuridine, vidarabine, acyclovir, valacyclovir, and famciclovir. All of them disrupt the synthesis of viral nucleic acids, that is, they block replication.

Currently, there are two main approaches to the treatment of herpes infection (HI):

1. antiviral chemotherapy;
2. a comprehensive treatment method, in which immunotherapy (specific and nonspecific) is combined with antiviral therapy and the use of topical agents.

All antiherpetic drugs are divided into two groups:

Group 1 – agents of etiotropic pharmacotherapy:

a) direct antiviral chemotherapeutic agents (abnormal nucleosides): acyclovir, valacyclovir, famciclovir;

b) interferon preparations: natural – leukinferon and recombinant – viferon;

c) interferon inducers – cycloferon, neovir, amixin, ridostin.

Group 2 – agents of pathogenetic therapy (immunotropic agents). These include:

a) drugs that restore T- and B-cell immunity and phagocytosis – thymalin, T-activin, immunofan, immunomax, galavit, myelopid, polyoxidonium, methyluracil;

b) immunoglobulins – standard immunoglobulin, antiherpetic immunoglobulin;

c) drugs with metabolic effects – glutoxim, mildronate;

d) drugs with mixed mechanisms of action – derinat, hepon;

e) herpes vaccine.

The prescription of immunotropic drugs should be based on clinical and immunological examination, with mandatory consultation by a clinical immunologist.

At present, acyclovir is considered the “gold standard” of HI therapy. As an abnormal nucleoside, it has pronounced antiherpetic activity and relatively low toxicity. A key feature of acyclovir, as well as other abnormal nucleosides, is that it acts only on intracellular HSV that is in an active state. After discontinuation of therapy, viral replication resumes.

Side effects of acyclovir include: local irritation (with topical use), dyspeptic symptoms (nausea, vomiting, diarrhea), hepatotoxicity, headache, increased fatigue, and skin reactions. It should be noted that there are cases of

primary resistance to acyclovir or resistance that develops during treatment (in 5–7% of patients).

Based on acyclovir, valacyclovir (Valtrex) and famciclovir (Famvir) have been developed. Valacyclovir is advantageous because after administration it achieves blood and tissue concentrations comparable to intravenous acyclovir, which ultimately allows for reduced dosing frequency. In terms of suppressing HSV replication, famciclovir is considered the most effective; however, from a pharmacoeconomic perspective, acyclovir remains the more justified choice.

It is important to note that early administration of systemic and topical antiviral agents contributes to more effective and prolonged suppression of viral replication.

There are two methods of oral administration of synthetic nucleoside analogs:

1. episodic therapy (a 5–10 day course) – prescribed during the first episode of HI in a patient's life, and can also be used during the prodromal period of mild HI;
2. suppressive (preventive) therapy, in which the drug is prescribed for months or even years, but in lower doses than in episodic treatment, in order to prevent recurrence.

In cases of recurrent herpes infection of moderate severity and severe herpes infection, the most justified approach is the use of antiviral drugs in a subsuppressive regimen (administration of acyclovir for 4–6 weeks) or a suppressive regimen (see Tables No. 1 and 2)

Table 1.

Recommended regimens for episodic therapy of herpes infection (CDC, Sexually Transmitted Diseases, 2002)

Drug	Episodic therapy for HI with rare recurrences	First episode of HI
Acyclovir	400 mg per dose, 3 times daily, for 5 days	
200 mg per dose, 5 times daily, for 5 days		
800 mg per dose, 2 times daily, for 5 days	400 mg per dose, 3 times daily, for 7–10 days	
200 mg per dose, 5 times daily, for 7–10 days		
Valacyclovir	500 mg per dose, 2 times daily, for 3–5 days	
1000 mg per dose, once daily, for 5 days	1000 mg per dose, 2 times daily, for 7–10 days	
Famciclovir	125 mg per dose, 2 times daily, for 5 days	250 mg per dose, 3 times daily, for 5 days

Table 2.
Recommended regimens for suppressive therapy of herpes infection (CDC, *Sexually Transmitted Diseases*, 2002, with modifications)

Drug	Treatment regimen
Acyclovir	400 mg per dose, 2 times daily, continuously
Famciclovir	250 mg per dose, 2 times daily, continuously
Valacyclovir	500 or 1000 mg per dose, once daily, continuously
or 500 mg per dose, 2 times daily, continuously	

Depending on the nature of changes in interferon status, interferon (IFN) preparations or interferon inducers (IFI) are used for the pharmacotherapy (PT) of patients with herpes infection (HI).

With the help of IFN preparations, replacement therapy is carried out; however, this may suppress the production of the body's own endogenous interferon, which must be taken into account when prescribing long courses (more than 2 weeks), especially with genetically engineered IFN. Therefore, an intermittent (discrete) regimen of their use is preferable. It should be noted that if there is hyperproduction of endogenous α- and/or γ-interferons, the use of IFN preparations should be avoided.

IFN preparations can be used in various dosage forms depending on the severity of HI. For example, leukinferon has antiviral and immunocorrective effects, accelerates the differentiation of immune cells, and is mainly used in severe HI. The drug viferon, in the form of rectal suppositories, contains recombinant α2b-interferon and vitamins C and E, which ensures longer circulation of interferon in the blood, although at a lower concentration than with parenteral administration; therefore, it is more often used in moderate HI and less frequently causes adverse effects.

IFI (interferon inducers) exhibit all the effects characteristic of IFN preparations but have a number of advantages (provided that the body's cells retain the ability to produce interferon): interferon synthesis induced by these agents is balanced and regulated by the body itself; moreover, inducers are not antigenic, which prevents side effects typical of interferon therapy. The regimen of their use is determined by the individual characteristics of the patient's interferon status, the clinical course of the disease, and the pharmacological properties of the specific IFI used.

The approaches to the use of the herpes vaccine are as follows:

1. the herpes vaccine is used at the beginning of HI pharmacotherapy according to the standard regimen, in combination with immunotropic and etiotropic drugs;
2. the herpes vaccine is administered after completing one or several courses of комплексной PT, once stable clinical and laboratory improvement is

achieved (positive dynamics of immune status, negative immunofluorescence test results for HSV).

Although the latter approach is more justified, in some patients stimulation of hyperimmunoglobulinemia may provoke allergic and autoimmune processes, thereby worsening the course of herpes infection.

The treatment strategy for patients with herpes infection (HI) depends on the severity of the infection, the nature of comorbid conditions, and the patient's reproductive plans.

Pharmacotherapy (PT) of recurrent mild HI is often limited to the use of acyclovir in an episodic regimen or a short course (2 weeks), interferon inducers (cycloferon, amixin), along with pathogenetic therapy (thymic factors that mainly affect the T-cell component of immunity and drugs influencing the monocyte-macrophage system—polyoxidonium or methyluracil). In mild HI, polyoxidonium and methyluracil have comparable clinical effectiveness. However, since treatment costs are more favorable with methyluracil, it is preferable to use thymic factors and methyluracil in combination with etiotropic PT as first-line therapy. In addition, combined vitamin preparations with antioxidant effects (aevit, triovit) may be used.

Pharmacotherapy for patients with moderate HI should include antiviral drugs (acyclovir, valacyclovir) in a subsuppressive regimen, interferon preparations or interferon inducers, combined with immunotropic PT (according to changes in immune status).

In severe HI and continuously recurrent forms (more than once per month), suppressive antiviral therapy (acyclovir, valacyclovir) for 3–6 months is indicated, along with immunotropic PT.

The use of vegetotropic and autonomic-modulating drugs, combined with qualified reflexotherapy and psychotherapy, is considered promising for patients with HI of any severity.

At any severity of HI, the use of topical agents is advisable. Topical antiviral drugs (such as acyclovir cream or ointment) are necessary to reduce clinical manifestations at the lesion site, accelerate epithelialization, and shorten the duration of viral shedding. Local use of interferon inducers (cycloferon liniment, epigen) and cytokine preparations (superlymph) reduces inflammation, stimulates phagocytosis and fibroblast proliferation, and improves regeneration of mucous membranes.

In Conclusion, Thus, the above highlights the clear need for further development of standards for immunoactive and etiotropic pharmacotherapy for HI, based on clinical and laboratory polymorphism of the disease and the pharmacological characteristics of the drugs. Unfortunately, the use of modern antiviral agents does not achieve complete elimination of the virus from the body, and data on vaccine effectiveness remain contradictory. Moreover, unified standardized protocols for immunoactive and etiotropic pharmacotherapy are still lacking.

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ТАБИИЙ ВА СИНТЕТИК НАРКОТИК ДОРИ ВОСИТАЛАРИНИНГ ФОЙДАЛИ ВА ЗАРАРЛИ ХУСУСИЯТЛАРИ

Annotatsiya: *Ushbu maqolada tabiiy va sintetik narkotik dori vositalarining kimyoviy tabiati, farmakologik ta'siri, tibbiyotdagi o'rni va inson organizmiga salbiy ta'siri tahlil qilingan. Ularning tibbiyotdagi o'rni, og'riq qoldirish mexanizmi va shu bilan birga, markaziy asab tizimiga yetkazadigan qayta tiklanmaydigan zararlari yoritilgan. Maqolada tadqiqot natijalariga ko'ra, narkotik moddalarning ratsional va nazoratli qo'llanilishi tibbiyotda muhim ahamiyatga ega ekani, biroq nazoratsiz iste'moli og'ir ijtimoiy va tibbiy oqibatlarga olib kelishi ilmiy asoslab berilgan.*

Kalit so'zlar: *opioidlar, kannabinoidlar, sintetik narkotiklar, psixotrop moddalar, farmakologiya, toksikologiya.*

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BENEFICIAL AND HARMFUL PROPERTIES OF NATURAL AND SYNTHETIC DRUGS

Abstract: *This article analyzes the chemical nature of natural and synthetic narcotic drugs, their pharmacological effects, their role in medicine, and their negative effects on the human body. Their role in medicine, the mechanism of pain*

relief, and, at the same time, the irreversible damage they cause to the central nervous system are highlighted. According to the research results, the article scientifically substantiates that the rational and controlled use of drugs is important in medicine, but their uncontrolled use leads to severe social and medical consequences.

Keywords: *opioids, cannabinoids, synthetic drugs, psychotropic substances, pharmacology, toxicology.*

Kirish

Zamonaviy tibbiyot va farmakologiyada tabiiy va sintetik narkotik moddalar ikki yoqlama xarakterga ega. Bir tomondan, ular kuchli og‘riq qoldiruvchi va anestetik vositalar sifatida jarrohlik va onkologiyada muhim ahamiyatga ega. Ikkinchi tomondan, ularning noqonuniy aylanishi va nazoratsiz iste’moli global ijtimoiy-tibbiy muammoni keltirib chiqarmoqda.

Narkotik ta’sirga ega bo‘lgan dori vositalari insoniyat tarixida qadimdan ma’lum bo‘lib, dastlab tabiiy manbalardan olingan. Zamonaviy fan-texnika taraqqiyoti natijasida insonlar tomonidan sintetik narkotik moddalar yaratilib, tibbiyot amaliyotida keng qo‘llanilmoqda.

Bugungi kunda mazkur moddalar ikki qarama-qarshi jihatga ega:

tibbiy ahamiyat (og‘riqsizlantirish, anesteziya)

ijtimoiy xavf (qaramlik, narkomaniya)

Shu sababli ularning ilmiy tahlili muhim ahamiyat kasb etadi.

Farmakologiya va toksikologiya sohasidagi izlanishlar va tadqiqotlar shuni ko‘rsatadiki, narkotik moddalar markaziy asab tizimiga ta’sir qiluvchi asosiy birikmalar hisoblanadi.

Tadqiqotlarda quyidagilar ta’kidlanadi:

Tabiiy narkotiklar — tabiatda mavjud biogen alkaloidlar

Sintetik narkotiklar — laboratoriyada insonlar tomonidan sintez qilingan moddalar

Oxirgi yillarda sintetik opioidlar ayniqsa fentanil turlari juda kuchli ta’siri bilan ajralib turishi qayd etilmoqda.

Asosiy qism

1. Tabiiy narkotik vositalar: Tarixiy va tibbiy jihatlar

Tabiiy narkotiklar asosan o‘simlik xom ashyosidan (ko‘knor, koka bargi, kannabis) olinadi.

Tabiiy narkotik vositalar — bu tarkibida markaziy asab tizimiga kuchli ta’sir etuvchi psixoaktiv moddalar bo‘lgan, qayta ishlanmagan yoki kam ishlov berilgan o‘simlik va biologik xom ashyolardir.

Ularning asosiy turlari quyidagilar:

1. **Ko‘knor (Opiy) guruhi:** Bular ko‘knor o‘simligining sutidan olinadigan xom opiy, morfin va kodeinlar hisoblanadi. Ular kuchli og‘riq qoldiruvchi, ammo tez o‘rganib qolishni (qaramlik) keltirib chiqaruvchi xususiyatga ega.

2. **Kannabis (Kanap) guruhi:** Bular marixuana va gashishlardan iborat. Ularning tarkibidagi asosiy modda — tetragidrokannabinol (TGK) bo‘lib, u inson ongini va idrok etish qobiliyatiga ta’sir qiladi.

3. **Koka guruhi:** Janubiy Amerikada o‘suvchi koka butasi barglaridir. Undan kuchli stimulyator — kokain olinadi.

Gallyutsinogen qo‘ziqorinlar: Bular tarkibida psilotsibin va psilotsin moddalari bo‘lgan qo‘ziqorinlar bo‘lib, ular insonlarda vizual va eshitish gallyutsinatsiyalarini keltirib chiqaradi.

Tabiiy bo‘lishiga qaramay, bu moddalar jigar, miya va yurak-qon tomir tizimiga qayta tiklanmas zarar yetkazadi, buning natijasida inson organizmida turli xil patologiyalar kuzatilishi mumkin.

Foydali xususiyatlari: Tibbiyotda morfin, kodein kabi alkaloidlar kuchli og‘riq sindromlarini (masalan, miokard infarkti yoki og‘ir jarohatlar) bartaraf etish uchun ishlatiladi. Ular markaziy asab tizimidagi opiat retseptorlariga ta’sir qilib, og‘riq impulslarini bloklaydi.

Zararli xususiyatlari: Doimiy iste’mol qilish natijasida organizmda metabolik jarayonlar o‘zgaradi. Tabiiy opiatlar jigar, buyrak va nafas olish tizimiga sezilarli zarar yetkazadi. Eng asosiy xavf — jismoniy va ruhiy qaramlikning tez shakllanishidir.

2. Sintetik narkotiklar: Texnogen xavf

Sintetik vositalar (metadon, amfetaminlar, "spays"lar) kimyoviy laboratoriyalarda to‘liq sintez qilinadi.

Sintetik narkotiklar — bu tabiiy xomashyodan emas, balki kimyoviy laboratoriyalarda turli kimyoviy moddalarni sintez qilish orqali olinadigan psixoaktiv moddalardir. Ular tabiiy narkotiklarga nisbatan bir necha barobar kuchliroq va inson salomatligi uchun ancha xavfliroq hisoblanadi.

Asosiy turlari:

Sintetik kannabinoidlar (Spays, K2): Tabiiy marixuana ta’sirini takrorlash uchun yaratilgan, ammo miyaga ta’siri 10–100 marta kuchliroq bo‘lishi mumkin.

Sintetik katinonlar ("Tuzlar", Bath salts): Meredron, alfa-PVP kabi moddalar. Ular kuchli stimulyator bo‘lib, insonda tajavvuzkorlik va og‘ir gallyutsinatsiyalarni keltirib chiqaradi.

Sintetik opioidlar (Fentanil): Tibbiyotda ishlatiladigan fentanildan tashqari, uning noqonuniy analoglari juda xavfli. Ular morfindan 50–100 marta kuchliroq bo‘lib, juda kichik dozasi ham o‘limga olib kelishi mumkin.

1. **Amfetamin guruhi:** Metamfetamin va ekstazi (MDMA). Ular markaziy asab tizimini haddan tashqari qo‘zg‘atadi.

2. **Inson organizmiga ta’siri va xavflari:**

3. **Tezkor qaramlik:** Sintetik moddalarga o‘rganib qolish bir yoki ikki marta iste’mol qilgandan so‘ng paydo bo‘lishi mumkin.

4. Psixik buzilishlar**:** Кучли қўркув (параноя), ваҳима, галлюцинациялар ва суицидга мойиллик.

5. **Jismoniy zarar:** Yurak xuruji, insult, buyrak va jigar yetishmovchiligi, shuningdek, nafas olishning to‘xtab qolishi.

6. **Noma’lum tarkib:** Bu moddalar yashirin laboratoriyalarda tayyorlangani sababli, ularning ichida qanday zaharli qo‘shimchalar borligini hech kim bilmaydi.

O‘zbekistondagi holat va qonunchilik:

Nazorat kuchaytirilgan: O‘zbekistonda sintetik narkotiklar va ularning analoglarini ishlab chiqarish, saqlash va sotish qat’iyan taqiqlangan hamda jinoiy javobgarlikka sabab bo‘ladi.

Statistika: So‘nggi yillarda sintetik narkotiklarning noqonuniy aylanmasi va musodara qilinish holatlari keskin oshgani kuzatilmoqda (masalan, 2024–2026 yillardagi ma’lumotlarga ko‘ra).

Profilaktika: Maktab va oliy ta’lim muassasalarida yoshlarni "dorixona narkomaniyasi" va sintetik moddalar xavfidan asrash bo‘yicha doimiy reydlar va tushuntirish ishlari olib borilmoqda.

Tibbiy qo‘llanilishi: Ba’zi sintetik vositalar (masalan, fentanil) jarrohlikda anesteziya sifatida ishlatiladi. Ularning ta’siri tabiiy analoglardan bir necha o‘n barobar kuchliroq bo‘lishi mumkin.

Zararli xususiyatlari: Sintetik narkotiklar tabiiylariga qaraganda xavfliroq hisoblanadi. Ularning kimyoviy tarkibi tez-tez o‘zgarib turgani bois, organizm ularni parchalashga ulgurmaydi, natijada kuchli intoksikatsiya va qaytmas neyrodegenerativ jarayonlar yuzaga keladi. Ayniqsa, sintetik psixostimulyatorlar qisqa muddat ichida shaxs degradatsiyasiga va o‘tkir psixozga olib keladi.

3. Patofiziologik oqibatlar

Har qanday narkotik modda iste’mol qilinganda, organizmdagi gomeostaz buziladi.

1. **Neyrokimyoviy darajada**: Dofamin va serotonin almashinuvi izdan chiqadi, bu esa chuqur depressiya va angedoniyaga (zavqlanish qobiliyatining yo‘qolishi) sabab bo‘ladi.

2. **Somatik darajada:** Immun tizimi susayadi, yurak-qon tomir yetishmovchiligi va gepatit kabi kasalliklar rivojlanadi.

Xulosa

Xulosa qilib aytganda, narkotik vositalarning "foydali" jihati faqatgina professional tibbiy nazorat ostida, qat’iy dozalarda va hayotiy ko‘rsatmalar asosidagina mavjud bo‘lishi mumkin. Ulardan tashqaridagi har qanday iste’mol — inson salomatligi va jamiyat genofondi uchun halokatlidir. Sintetik narkotiklarning paydo bo‘lishi esa toksikologik xavfni yangi bosqichga olib chiqdi, bu esa profilaktika va davolash usullarini doimiy takomillashtirishni talab etadi.

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THE IMPACT OF OCCUPATIONAL STRESS ON AN INDIVIDUAL'S MENTAL STATE

Abstract: *Occupational stress has a direct impact on an individual's mental state. Excessive workload, time pressure, responsibility demands, social conflicts, and high expectations from management reduce psychological stability, leading to fatigue, irritability, and decreased motivation. Effective stress management includes personal strategies such as breathing exercises, meditation, and planning, as well as workplace measures such as motivation, social support, and training programs.*

Keywords: *stress, occupational activity, mental state, coping strategies, work environment.*

In professional terminology, stress is interpreted as a force that causes strain in the body and disrupts its internal balance. In biology and medicine, stress is considered a process of the human body adapting to external factors, workload, changes, and various demands. This adaptive mechanism becomes active when a person is exposed to physical trauma, toxic substances, or extreme heat or cold. However, stress is not limited to physical factors alone; psychological and social causes also play a significant role. For example, pressure from supervisors, the recurrence of unpleasant memories, being forced to perform tasks beyond one's capabilities, or concerns related to work and family life can trigger stress.

During the process of adaptation, a common feature uniting all situations is internal activation and tension. This condition is defined as stress. Stress is the body's natural response to external influences and excessive workload. A certain level of stress is necessary in human life, as it keeps the body in a constant state of readiness. Sometimes this activation increases due to clear reasons, while in other cases it may intensify even without obvious causes.

The level of stress directly affects the aging process of the body. The stronger the tension, the faster internal processes accelerate and energy reserves are depleted. This can be compared to a burning candle: the stronger the flame, the faster the candle melts. Of course, a certain amount of energy is necessary for life activities, but the problem lies not in the presence of stress itself, but in its excessively high level. Stress levels can change even within a short period, depending on environmental influences and the general condition of the organism.

In some cases, it is difficult to determine whether stress is beneficial or harmful. For instance, consider an athlete who wins a competition or a manager

who is promoted to a high position. Although they achieve their goals, this often occurs at the cost of significant mental and physical strain. Psychologically, prolonged exposure to such conditions may lead to problems in personal and family life. From a medical perspective, long-term stress increases the risk of muscle injuries, hypertension, and cardiovascular diseases.

Occupational Stress

Work-related stress is a significant factor affecting human health and quality of life. For example, in an effort to increase productivity, work processes may be divided into smaller tasks and conveyor systems introduced. Such changes can negatively affect the social environment of employees and contribute to the development of stress and various illnesses.

New working conditions may be perceived negatively by some employees. If a worker previously performed complex, skill-demanding tasks, simplified duties may lead to dissatisfaction. Previous negative experiences can also hinder adaptation to new conditions. Additionally, hereditary factors may increase an individual's sensitivity to stress.

As a result, employees under psychological pressure may develop harmful habits, experience increased blood pressure, or remain in a constant state of nervousness. If these conditions persist, they may become chronic problems such as alcoholism, chronic hypertension, or persistent anxiety. These negative processes intensify work-related and family conflicts and seriously harm health. Consequently, the risk of stroke, workplace accidents, or even suicide may increase. Such outcomes clearly demonstrate the strong influence of environmental factors on human behavior, physiological, and social well-being.

Just as moderation is essential in every field, balance is crucial in occupational activity. Unfortunately, many people do not pay sufficient attention to this issue. The family environment plays an important role in reducing work-related stress. There are several effective measures for preventing stress, which can be implemented at both individual and organizational levels.

Individual Measures:

Effective time management: planning tasks, setting priorities, and avoiding excessive workload.

Rest and recovery: sufficient sleep, physical exercise, sports, and spending time in nature.

Strengthening psychological resilience: meditation, breathing exercises, stress management techniques, and developing positive thinking.

Social support: communicating with family members and colleagues, sharing problems, and seeking advice.

Maintaining work–life balance: establishing clear boundaries between work and personal life and organizing leisure time properly.

Organizational and Workplace Measures:

Improving working conditions: adapting workload and task complexity to employees' qualifications.

Developing a positive social environment: fostering open communication, fairness, and constructive feedback.

Stress-management training: organizing seminars and training sessions on coping with stress.

Implementing support systems: providing access to psychologists, counselors, or mentors.

Motivation and incentives: recognizing and rewarding employees' work.

Conclusion

In conclusion, occupational stress poses a serious risk to an individual's mental and physical health. Managing and preventing stress through coordinated personal and organizational measures enhances work efficiency and ensures psychological stability. Through effective stress management strategies, individuals can maintain a balance between work and personal life and lead a healthy and productive lifestyle. There are various methods to alleviate stressful situations, which can be explained and applied in different forms.

A training schedule aimed at increasing employees' resilience to work-related stress, strengthening psychological stability, and applying effective coping strategies is presented in the table above.

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ФАРМАКОЛОГИЧЕСКИЕ СВОЙСТВА ЛЕКАРСТВЕННОГО УКРОПА (ANETHUM GRAVEOLENS L.) И ЕГО РОЛЬ В МЕДИЦИНЕ

Аннотация: *В данной работе представлена информация о химическом составе, фармакологическом действии, применении и терапевтической эффективности одного из широко используемых в народной медицине лекарственных растений — укропа (Anethum graveolens L.).*

Ключевые слова: *лекарственные растения, укроп лекарственный (Anethum graveolens L.), карвон, лимонен, альфа-пинен, мирцен и другие терпеноиды, метеоризм, флавоноиды.*

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PHARMACOLOGICAL PROPERTIES OF MEDICINAL DILL (Anethum graveolens L.) AND ITS ROLE IN MEDICINE

Abstract: *This paper presents information on the chemical composition, pharmacological action, application, and therapeutic effectiveness of one of the medicinal plants widely used in folk medicine — dill (Anethum graveolens L.).*

Keywords: *medicinal plants, medicinal dill (Anethum graveolens L.), carvone, limonene, alpha-pinene, myrcene and other terpenoids, flatulence, flavonoids.*

Введение

Богатый растительный мир Узбекистана издавна славится большим количеством лекарственных растений, широко применяемых в народной медицине. Одним из таких растений является укроп лекарственный (Anethum graveolens L.), который используется не только как пищевой продукт, но и играет важную роль в лечении различных заболеваний.

Согласно историческим источникам, укроп применялся в лечебных целях ещё в Древнем Египте, Греции и Риме. Современная фармакология и фитотерапия также подтверждают, что укроп обладает сложным химическим составом и содержит множество биологически активных веществ.

Основные активные компоненты укропа локализованы в его эфирных маслах, в состав которых входят карвон, лимонен, альфа-пинен и другие соединения. Кроме того, растение содержит флавоноиды, кумарины, витамины (C, A, группы B) и минеральные вещества, определяющие его лечебные свойства.

Целью данного исследования является научное изучение фармакологических свойств, химического состава и современного применения укропа лекарственного, а также оценка его терапевтического потенциала. Широкая распространённость растения и его относительная доступность делают его привлекательным средством как в народной медицине, так и в фармацевтической промышленности.

Основная часть

В данном исследовании для изучения фармакологических свойств укропа лекарственного (Anethum graveolens L.) был применён метод систематического анализа научной литературы.

Для проведения исследования использовались научно-технические базы данных, такие как PubMed, Scopus, Web of Science, Google Scholar. В процессе поиска применялись ключевые слова: «Anethum graveolens», «dill», «pharmacological properties», «chemical composition», «ethnomedicine», «therapeutic uses», «clinical trials».

При отборе публикаций предпочтение отдавалось работам, опубликованным за последние 10–15 лет, прошедшим рецензирование и представленным в научных журналах. Были проанализированы результаты in vitro и in vivo исследований, клинических испытаний, фармакогностических и химических анализов.

Особое внимание уделялось исследованиям, направленным на определение химического состава растения, включая эфирные масла, флавоноиды, витамины, минеральные вещества и другие биологически активные соединения.

Также были изучены фармакологические эффекты укропа, такие как антибактериальное, противогрибковое, антиоксидантное, противовоспалительное, спазмолитическое, диуретическое, седативное, гиполипидемическое и гипотензивное действия.

Методология исследования

Анализ научной литературы показал, что укроп лекарственный (Anethum graveolens L.) обладает широким спектром фармакологических и терапевтических свойств.

Основным компонентом растения является эфирное масло, содержание которого достигает 3–5% в семенах и 0,1–0,4% в листьях. Основные компоненты эфирного масла: карвон (40–60%), лимонен (20–30%), альфа-пинен, мирцен и другие терпеноиды.

Карвон и лимонен играют ключевую роль в антибактериальной и противогрибковой активности укропа. Исследования подтверждают, что экстракты укропа оказывают выраженное ингибирующее действие на такие патогенные микроорганизмы, как *Staphylococcus aureus*, *Escherichia coli*, *Candida albicans*.

Антиоксидантная активность обусловлена наличием флавоноидов (кверцетин, кемпферол) и фенольных кислот (кофейная, феруловая), которые нейтрализуют свободные радикалы и снижают уровень оксидативного стресса.

Спазмолитическое действие укропа проявляется преимущественно в желудочно-кишечном тракте, способствуя расслаблению гладкой мускулатуры и устранению болей, метеоризма и спазмов.

Диуретический эффект связан со стимуляцией функции почек и выведением из организма избыточной жидкости и токсинов.

Настои и отвары из семян укропа традиционно применяются при коклюше, бронхите и болях в горле благодаря их отхаркивающему и успокаивающему действию.

Также отмечены седативные свойства укропа, способствующие снижению тревожности и улучшению сна.

Обсуждение результатов

Проведённый анализ фармакологических свойств укропа лекарственного позволяет более чётко определить его значение как в традиционной, так и в современной медицине.

Богатый химический состав, особенно наличие эфирных масел, обусловливает широкий спектр биологической активности растения. Антибактериальные и противогрибковые свойства делают укроп перспективным средством при инфекционных заболеваниях, включая инфекции желудочно-кишечного тракта и дыхательных путей.

Антиоксидантные и противовоспалительные эффекты открывают возможности его применения в профилактике и лечении хронических заболеваний.

Спазмолитическое действие делает укроп эффективным средством при функциональных расстройствах пищеварительной системы. Предполагается, что данный эффект связан с влиянием на кальциевые каналы гладкой мускулатуры, что требует дальнейших исследований.

Диуретические и детоксикационные свойства способствуют очищению организма и снижению отёков.

Седативное действие может быть полезным в условиях стресса, при бессоннице и нервном напряжении.

Гиполипидемические и гипотензивные эффекты свидетельствуют о потенциале использования укропа в профилактике сердечно-сосудистых заболеваний, однако необходимы дополнительные клинические исследования.

Важно учитывать безопасность и режим дозирования. В пищевых количествах укроп безопасен, однако при применении в высоких дозах возможны побочные эффекты, такие как аллергические реакции и фотосенсибилизация.

Заключение

Укроп лекарственный (Anethum graveolens L.) характеризуется богатым химическим составом и широким спектром фармакологических свойств.

В результате исследования подтверждено, что укроп обладает антибактериальным, противогрибковым, антиоксидантным, противовоспалительным, спазмолитическим, диуретическим и седативным действием.

Основными активными компонентами являются карвон и лимонен, определяющие антимикробную активность растения, а также флавоноиды и фенольные кислоты, обеспечивающие антиоксидантный эффект.

Препараты на основе укропа могут эффективно применяться при заболеваниях желудочно-кишечного тракта, респираторных инфекциях, нервных расстройствах и отёках.

Перспективными направлениями являются дальнейшее изучение гиполипидемических и гипотензивных эффектов, разработка стандартизированных лекарственных форм и проведение масштабных клинических исследований.

Таким образом, укроп лекарственный обладает значительным терапевтическим потенциалом и может широко применяться в современной медицине и фармакологии.

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ПРОФИЛАКТИКА ЗАБОЛЕВАНИЙ СЛИЗИСТОЙ ОБОЛОЧКИ ПОЛОСТИ РТА

Аннотация: *Заболевания слизистой оболочки полости рта представляют собой одну из наиболее актуальных проблем современной стоматологии, поскольку отличаются высокой распространённостью, склонностью к хроническому течению, рецидивированию и в ряде случаев способностью к малигнизации. Слизистая оболочка полости рта постоянно подвергается воздействию механических, химических, термических, микробных и иммунологических факторов, что делает её чувствительной к различным патологическим процессам. Эффективная профилактика данных заболеваний должна строиться на комплексном подходе, включающем устранение этиологических факторов, своевременную санацию полости рта, коррекцию травмирующих воздействий, улучшение гигиенического состояния, повышение общей резистентности организма и динамическое наблюдение за пациентами из групп риска. В статье системно анализируются основные направления первичной, вторичной и третичной профилактики заболеваний слизистой оболочки полости рта, рассматриваются местные и общие предрасполагающие факторы, а также подчёркивается роль междисциплинарного подхода в предупреждении хронических, диспластических и осложнённых форм патологии. Результаты анализа показывают, что профилактическая стратегия, основанная на раннем выявлении предрасполагающих условий и их своевременной коррекции, способствует снижению частоты воспалительных, дистрофических и предраковых поражений слизистой оболочки полости рта.*

Ключевые слова: *слизистая оболочка полости рта, профилактика, стоматологические заболевания, гигиена полости рта, факторы риска, предраковые состояния, воспалительные поражения, диспансерное наблюдение, стоматологическая санация, стоматологическое здоровье.*

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PREVENTION OF DISEASES OF THE ORAL MUCOSA

Abstract: *Diseases of the oral mucosa represent one of the most pressing problems in modern dentistry, as they are characterized by high prevalence, a tendency to chronic progression, recurrence, and, in some cases, the potential for malignant transformation. The oral mucosa is constantly exposed to mechanical, chemical, thermal, microbial, and immunological factors, which makes it highly susceptible to various pathological processes. Effective prevention of these diseases should be based on a comprehensive approach that includes elimination of etiological factors, timely oral sanitation, correction of traumatic influences, improvement of oral hygiene, enhancement of the body's overall resistance, and dynamic monitoring of patients in risk groups. This article systematically analyzes the main directions of primary, secondary, and tertiary prevention of diseases of the oral mucosa, examines local and general predisposing factors, and emphasizes the role of an interdisciplinary approach in preventing chronic, dysplastic, and complicated forms of pathology. The results of the analysis show that a preventive strategy based on the early identification of predisposing conditions and their timely correction contributes to reducing the incidence of inflammatory, dystrophic, and precancerous lesions of the oral mucosa.*

Keywords: *oral mucosa, prevention, dental diseases, oral hygiene, risk factors, precancerous conditions, inflammatory lesions, dispensary observation, oral sanitation, oral health.*

Введение

Заболевания слизистой оболочки полости рта занимают важное место в структуре стоматологической заболеваемости. Их клиническое значение обусловлено не только высокой частотой встречаемости, но и многообразием форм, трудностями ранней диагностики, склонностью к затяжному течению и возможностью развития осложнений. Слизистая оболочка полости рта является анатомо-функциональной системой, которая выполняет барьерную, защитную, рецепторную, секреторную и регенераторную функции. Именно поэтому любые нарушения местного или общего гомеостаза часто отражаются на её состоянии.

Патологические изменения слизистой оболочки полости рта могут носить воспалительный, дистрофический, инфекционный, аллергический, травматический, аутоиммунный или неопластический характер. Среди наиболее часто встречающихся заболеваний выделяют катаральные, эрозивно-язвенные и гиперкератотические процессы, кандидоз, травматические поражения, лейкоплакию, хронические трещины, хейлиты, а также различные формы стоматитов. При этом значительная часть заболеваний слизистой оболочки развивается на фоне неудовлетворительной гигиены полости рта, хронической травматизации, курения, соматических заболеваний, эндокринных нарушений, дефицита витаминов и микроэлементов, снижения иммунологической реактивности и неблагоприятных профессионально-бытовых факторов.

Особое значение профилактика приобретает в связи с тем, что многие патологические процессы слизистой оболочки длительное время протекают малосимптомно. Пациенты нередко обращаются за помощью уже на стадии выраженных клинических проявлений, когда патологический процесс имеет хронический характер, а морфологические изменения становятся более глубокими и устойчивыми. В ряде случаев длительно существующие гиперкератотические, эрозивные и диспластические очаги могут рассматриваться как фон для развития злокачественной трансформации. Это требует повышения онкологической настороженности и раннего профилактического вмешательства.

Профилактика заболеваний слизистой оболочки полости рта представляет собой не изолированную стоматологическую процедуру, а систему мероприятий, направленных на сохранение структурной и функциональной полноценности тканей полости рта. Она включает как общеоздоровительные меры, так и специализированные стоматологические вмешательства, ориентированные на устранение местных повреждающих факторов. Современный подход предполагает разделение профилактики на первичную, вторичную и третичную, что позволяет выстроить этапную и рациональную стратегию предупреждения патологии, её прогрессирования и рецидивов.

Целью настоящей статьи является систематизация и научное обоснование основных направлений профилактики заболеваний слизистой оболочки полости рта на основе анализа клинических, этиологических и патогенетических факторов.

Материалы и методы

Данная работа носит аналитико-обобщающий характер и основана на систематизации современных представлений о профилактике заболеваний слизистой оболочки полости рта. Методологической основой статьи послужили клинико-стоматологический, патогенетический и профилактический подходы к оценке факторов риска и способов предупреждения патологических изменений в слизистой оболочке.

В ходе подготовки материала были структурированы основные группы причин, способствующих формированию заболеваний слизистой оболочки полости рта. Анализ проводился по следующим направлениям: местные механические факторы, инфекционно-воспалительные процессы, химические и термические раздражители, профессиональные вредности, аллергические механизмы, нарушения питания, соматические заболевания, эндокринные и иммунные расстройства. Отдельно были рассмотрены хронические травмирующие факторы, связанные с острыми краями зубов, некачественными пломбами, ортопедическими конструкциями, аномалиями прикуса и недостаточной гигиеной полости рта.

Для оценки профилактических мероприятий использовался принцип дифференцированного подхода, в соответствии с которым профилактика рассматривалась на трёх уровнях. Первичная профилактика анализировалась

как система мер, направленных на предотвращение возникновения заболеваний; вторичная — как комплекс мероприятий по раннему выявлению и предупреждению прогрессирования начальных патологических изменений; третичная — как система предупреждения рецидивов, осложнений и снижения функциональных нарушений у пациентов с уже сформированной патологией.

В статье также был проведён сравнительный анализ эффективности профилактических мероприятий в зависимости от характера патологии. Особое внимание уделялось вопросам индивидуальной гигиены полости рта, профессиональной санации, коррекции травмирующих факторов, рационального питания, отказа от вредных привычек, диспансерного наблюдения за пациентами из групп риска и необходимости междисциплинарного взаимодействия при наличии соматической отягощённости.

Результаты

Проведённый анализ показал, что профилактика заболеваний слизистой оболочки полости рта наиболее эффективна при условии раннего выявления предрасполагающих факторов и комплексного устранения причин, нарушающих физиологическое состояние тканей. Установлено, что в структуре профилактически значимых факторов особое место занимают локальные механические раздражители. Острые края кариозно разрушенных зубов, дефекты пломб, некачественно изготовленные протезы, а также хроническая травматизация вследствие нарушений окклюзии создают условия для длительного повреждения эпителия, нарушения микроциркуляции и формирования хронического воспалительного процесса. Следовательно, своевременная коррекция травмирующих факторов является одним из ключевых направлений профилактики.

Выявлено, что неудовлетворительное гигиеническое состояние полости рта способствует накоплению мягкого зубного налёта, микробных биоплёнок и продуктов тканевого распада, что поддерживает хроническое воспаление и повышает сенсибилизацию слизистой оболочки. Регулярная индивидуальная гигиена, использование щадящих средств ухода, подбор зубных паст с учётом состояния слизистой, а также профессиональная гигиена полости рта существенно снижают вероятность развития воспалительных и инфекционных поражений. Особенно важным это является у пациентов с повышенной чувствительностью слизистой, при наличии ортопедических конструкций и при хронических соматических заболеваниях.

Отдельный блок профилактических мероприятий связан с инфекционным фактором. Поддержание нормального микробиоценоза полости рта, своевременное лечение очагов хронической инфекции, контроль кандидозной колонизации, устранение воспалительных процессов в тканях пародонта и слизистой оболочке способствуют стабилизации местной иммунной защиты. Анализ показал, что санация полости рта

должна рассматриваться не только как лечебное, но и как важнейшее профилактическое мероприятие, направленное на предупреждение хронических форм поражения слизистой оболочки.

Существенное значение имеют и общие факторы. Установлено, что дефицит витаминов, особенно группы В, А, С и Е, нарушение белкового обмена, железодефицитные состояния, заболевания желудочно-кишечного тракта, сахарный диабет, эндокринные расстройства и иммунодефицитные состояния неблагоприятно влияют на трофику и регенераторную способность слизистой оболочки. В связи с этим профилактика не может ограничиваться лишь местными стоматологическими воздействиями. Она должна включать общеукрепляющие мероприятия, коррекцию питания, лечение фоновой соматической патологии и при необходимости консультации смежных специалистов.

Важным результатом анализа является подтверждение роли вредных привычек как одного из ведущих модифицируемых факторов риска. Курение, употребление алкоголя, длительное воздействие раздражающих химических веществ, чрезмерно горячей или острой пищи приводят к хроническому раздражению слизистой оболочки, нарушению процессов ороговения и регенерации. В условиях постоянного раздражения повышается риск формирования хронических гиперкератотических и эрозивных изменений. Следовательно, отказ от курения, ограничение алкоголя и устранение бытовых раздражителей необходимо рассматривать как обязательный компонент профилактической программы.

Вторичная профилактика, основанная на ранней диагностике начальных изменений слизистой оболочки, продемонстрировала особую значимость для предупреждения хронического течения и малигнизации. Клинически малозаметные участки гиперкератоза, ограниченной атрофии, рецидивирующие эрозии, длительно незаживающие трещины и травматические язвы должны рассматриваться как объекты повышенного внимания. Их своевременное выявление на профилактических осмотрах, прицельное наблюдение и при необходимости морфологическая верификация позволяют предотвратить углубление патологического процесса.

Анализ также показал, что третичная профилактика особенно важна для пациентов, перенёсших хронические заболевания слизистой оболочки, диспластические изменения, рецидивирующие хейлиты, лейкоплакию, хронические язвенные процессы и другие стойкие патологические состояния. Для этой категории пациентов необходимы длительное диспансерное наблюдение, регулярные повторные осмотры, устранение рецидивирующих факторов риска, обучение правилам самоконтроля и соблюдение индивидуального профилактического режима.

Обсуждение

Полученные данные подтверждают, что профилактика заболеваний слизистой оболочки полости рта должна рассматриваться как

многоуровневая система, основанная на принципах раннего вмешательства, патогенетической обоснованности и индивидуализации. Ограничение профилактики только рекомендациями по гигиене является недостаточным, поскольку в развитии патологии слизистой оболочки участвуют как местные, так и общие факторы. Эффективная профилактическая стратегия возможна лишь при учёте всей совокупности причин, нарушающих адаптационно-регенераторные механизмы слизистой оболочки.

Одним из центральных положений является необходимость устранения хронической травмы. Даже незначительное, но длительное механическое воздействие способно поддерживать воспаление, вызывать нарушение эпителиального обновления и создавать фон для диспластических процессов. В этом контексте стоматологический осмотр должен включать не только диагностику кариеса и заболеваний пародонта, но и тщательную оценку состояния слизистой оболочки, ортопедических конструкций, пломб, краёв зубов и окклюзионных взаимоотношений.

Значимость профессиональной гигиены полости рта в профилактике заболеваний слизистой оболочки также не вызывает сомнений. Накапливающийся микробный налёт представляет собой постоянный источник бактериальных токсинов и ферментов, поддерживающих воспаление и нарушающих микроэкологическое равновесие. Однако даже качественная гигиена не сможет обеспечить длительный профилактический эффект без обучения пациента индивидуальному уходу за полостью рта. Следовательно, санитарно-просветительная работа и формирование устойчивой мотивации к соблюдению гигиенических навыков должны быть частью стандартной профилактической помощи.

Особую роль играет онкологическая настороженность. В клинической практике начальные формы предраковых изменений слизистой оболочки могут маскироваться под банальные воспалительные или травматические процессы. Это создаёт риск поздней диагностики. В связи с этим любые длительно существующие участки изменения цвета, рельефа, целостности или плотности слизистой оболочки требуют наблюдения и, при необходимости, морфологического исследования. Профилактика предраковых состояний невозможна без активного выявления пациентов группы риска, к которым относятся курильщики, лица с хронической травмой слизистой, пациенты с соматическими нарушениями и лица пожилого возраста.

Также следует подчеркнуть необходимость междисциплинарного подхода. Заболевания слизистой оболочки полости рта нередко являются отражением общесоматической патологии. Например, атрофические, десквамативные, язвенные и кандидозные процессы могут быть связаны с анемиями, заболеваниями желудочно-кишечного тракта, эндокринными нарушениями, иммунными расстройствами и побочными эффектами лекарственной терапии. Поэтому профилактика и диспансерное наблюдение таких пациентов должны осуществляться не изолированно, а во

взаимодействии стоматолога с терапевтом, гастроэнтерологом, эндокринологом, гематологом и другими специалистами.

Таким образом, профилактика заболеваний слизистой оболочки полости рта не должна восприниматься как вспомогательный элемент лечения. Напротив, она является стратегическим направлением стоматологической помощи, способным существенно снизить заболеваемость, частоту осложнений и риск развития тяжёлых форм патологии. Чем раньше выявлены и устранены факторы риска, тем выше вероятность сохранения морфофункциональной целостности слизистой оболочки.

Заключение

Профилактика заболеваний слизистой оболочки полости рта представляет собой важнейшее направление современной стоматологии, ориентированное на сохранение структурной целостности, функциональной активности и резистентности тканей полости рта. Эффективность профилактических мероприятий определяется не отдельными процедурами, а комплексным подходом, включающим устранение местных травмирующих факторов, улучшение гигиенического состояния полости рта, санацию хронических очагов инфекции, коррекцию соматических нарушений и отказ от вредных привычек.

Установлено, что наиболее значимыми мерами первичной профилактики являются рациональная индивидуальная гигиена, профессиональная санация полости рта, своевременная коррекция протезов и пломб, нормализация питания и устранение раздражающих факторов. Вторичная профилактика должна быть направлена на раннее выявление начальных патологических изменений слизистой оболочки, особенно у пациентов из групп риска. Третичная профилактика предполагает систематическое диспансерное наблюдение, предупреждение рецидивов и контроль за хроническими и предраковыми процессами.

Таким образом, только поэтапная, патогенетически обоснованная и индивидуализированная профилактическая стратегия позволяет снизить частоту заболеваний слизистой оболочки полости рта, предупредить хронизацию патологических процессов и повысить эффективность ранней диагностики предраковых состояний. Комплексная профилактика должна рассматриваться как неотъемлемая часть стоматологической практики и как один из важнейших инструментов сохранения стоматологического и общего здоровья населения.

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ЗНАЧЕНИЕ ЭКСТРАКЦИОННЫХ ПРОЦЕССОВ В МЕДИЦИНЕ

Аннотация*: В данной научной статье глубоко анализируются теоретические основы экстракционных процессов, их роль в фармацевтике и клинической медицине, а также направления применения в современной медицине. На основе научных источников освещена роль методов экстракции в выделении биологически активных веществ, их значение в производстве лекарственных средств, а также применение в токсикологических анализах и диагностике. Кроме того, рассмотрены современные экстракционные технологии и пути повышения их эффективности.*

Ключевые слова: *экстракция, фармацевтика, биологически активные вещества, жидкость–жидкостная экстракция, твердофазная экстракция, медицинская химия, токсикология.*

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THE IMPORTANCE OF EXTRACTION PROCESSES IN MEDICINE

Abstract*: This scientific article provides an in-depth analysis of the theoretical foundations of extraction processes, their role in pharmaceuticals and*

clinical medicine, and their applications in modern medicine. Based on scientific sources, the study highlights the role of extraction methods in isolating biologically active substances, their importance in drug production, as well as their use in toxicological analysis and diagnostics. In addition, modern extraction technologies and ways to improve their efficiency are discussed.

Keywords: *extraction, pharmaceuticals, biologically active substances, liquid–liquid extraction, solid-phase extraction, medical chemistry, toxicology.*

Введение

Развитие современной медицины и фармацевтической промышленности тесно связано с совершенствованием химических технологий. Одним из таких важных технологических процессов является экстракция.

Экстракция — это процесс выделения определённого компонента из смеси с помощью растворителя, широко применяемый в химии, биологии и медицине.

В медицине экстракционные процессы имеют особое значение, поскольку с их помощью из растений, биологических жидкостей и тканей выделяются биологически активные вещества. Эти вещества в дальнейшем используются в диагностике, лечении и научных исследованиях.

Теоретические основы процесса экстракции

Процесс экстракции основан на закономерностях распределения веществ между двумя фазами. При этом вещество переходит из одного растворителя в другой, а данный переход определяется его растворимостью и коэффициентом распределения.

Экстракция подразделяется на следующие основные виды:

-Жидкость–жидкостная экстракция — перенос вещества между двумя несмешивающимися жидкостями;

-Твердожидкостная экстракция — извлечение компонентов из твёрдых веществ с помощью растворителя;

-Твердофазная экстракция (SPE) — широко применяемый метод в современной аналитической химии.

Эффективность экстракции зависит от следующих факторов:

- природа растворителя;
- температура;
- pH среды;
- время экстракции;
- интенсивность перемешивания.

Значение экстракции в фармацевтической промышленности

Экстракционные процессы являются неотъемлемой частью фармацевтической промышленности. Особенно важна экстракция при получении лекарственных средств из растительного сырья.

1. Выделение биологически активных веществ из растений

Лекарственные растения содержат алкалоиды, флавоноиды, гликозиды и многие другие биологически активные соединения. С помощью экстракции эти вещества выделяются и используются для создания фармакологических препаратов.

Например:

- морфин — из мака;
- хинидин — из хинного дерева;
- атропин — из белладонны.

2. Очистка лекарственных средств

В синтезированных или полученных из природных источников веществах часто присутствуют примеси. С помощью экстракции они удаляются, и вещества доводятся до фармацевтической чистоты.

3. Концентрирование биоактивных компонентов

Экстракция позволяет повысить концентрацию веществ, что усиливает их биологическую эффективность.

Применение экстракции в клинической медицине

Экстракция имеет важное значение не только в промышленности, но и в клинической практике.

1. Анализ биологических жидкостей

Экстракция применяется для определения веществ в крови, моче, плазме и других биологических жидкостях. Это особенно важно при:

- гормональных исследованиях;
- мониторинге лекарственных препаратов;
- определении метаболитов.

2. Токсикологическая диагностика

При отравлениях экстракционные методы широко используются для выявления токсичных веществ, попавших в организм. С их помощью токсины выделяются и затем анализируются.

3. Клиническая лабораторная диагностика

Многие лабораторные исследования включают этап экстракции, что повышает точность анализа.

Современные экстракционные технологии

С развитием науки и технологий методы экстракции постоянно совершенствуются.

1. Сверхкритическая флюидная экстракция

В данном методе диоксид углерода используется в сверхкритическом состоянии как растворитель. Преимущества:

- высокая селективность;
- экологическая безопасность;
- отсутствие остаточного растворителя.

2. Ультразвуковая экстракция

Использование ультразвука ускоряет процесс экстракции и повышает его эффективность.

3. Микроволновая экстракция

Энергия микроволн разрушает клеточные стенки, что способствует быстрому высвобождению веществ.

4. Твердофазная микроэкстракция (SPME)

Данный метод применяется для определения очень малых количеств веществ и характеризуется высокой чувствительностью.

Преимущества и недостатки экстракции

Преимущества:

- высокая эффективность;
- селективность;
- широкий спектр применения;
- экономическая целесообразность.

Недостатки:

- токсичность некоторых растворителей;
- многостадийность процесса;
- затраты времени;
- экологические проблемы.

Экстракция и экологическая безопасность

В экстракционных процессах, применяемых в медицине, важным аспектом является экологическая безопасность. Органические растворители могут наносить вред окружающей среде.

В связи с этим развиваются направления, основанные на принципах «зелёной химии»:

- использование экологически чистых растворителей (например, вода, сверхкритический CO_2);
- безотходные технологии;
- энергосберегающие методы.

Перспективы экстракции в медицинской химии

В будущем роль экстракционных процессов в медицине будет возрастать, особенно в следующих направлениях:

- интеграция с нанотехнологиями;
- выделение биомаркеров для персонализированной медицины;
- разработка новых лекарственных веществ;
- применение в биотехнологии.

Заключение

Экстракционные процессы являются важной составной частью медицины и фармацевтики. Они широко применяются при выделении биологически активных веществ, производстве лекарственных средств, а также в диагностике и токсикологических исследованиях.

Внедрение современных технологий повышает эффективность экстракции и расширяет области её применения.

Таким образом, углублённое изучение и совершенствование экстракционных процессов имеет важное значение для развития медицины.

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РОЛЬ РАДИОЧАСТОТНЫХ СЕНСОРОВ В СТЕНТ-СИСТЕМАХ «SANOCARDIO» В ДОПОЛНЕНИЕ К КТ-АНГИОГРАФИИ ПРИ ПОСТОПЕРАЦИОННОМ МОНИТОРИНГЕ СОСУДОВ

Аннотация: *В статье представлен инновационный подход к послеоперационному мониторингу пациентов после стентирования коронарных артерий, основанный на использовании стент-системы «Sanocardio» с интегрированными радиочастотными (RF) сенсорами. Рассматриваются принципы работы встроенных датчиков, обеспечивающих непрерывную оценку проходимости сосуда и раннее выявление признаков рестеноза. Проведён сравнительный анализ с традиционным методом компьютерно-томографическая ангиография, широко применяемым в клинической практике. Показано, что использование RF-сенсоров позволяет повысить диагностическую точность мониторинга до 98%, при этом существенно снижая лучевую нагрузку на пациента и уменьшая экономические затраты, связанные с повторными визуализирующими исследованиями. Дополнительным преимуществом является возможность дистанционного динамического наблюдения в режиме реального времени. Таким образом, интеграция радиочастотных сенсоров в стент-системы открывает новые перспективы персонализированного контроля сосудистого русла и повышения эффективности послеоперационного ведения пациентов.*

Ключевые слова: *смарт-стент, Sanocardio, радиочастотные сенсоры, КТ-ангиография, рестеноз, дистанционный мониторинг.*

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ROLE OF RADIOFREQUENCY SENSORS IN “SANOCARDIO” STENT SYSTEMS AS AN ADJUNCT TO CT ANGIOGRAPHY IN POSTOPERATIVE VASCULAR MONITORING

Abstract: *This article presents an innovative approach to postoperative monitoring of patients after coronary artery stenting, based on the use of the “Sanocardio” stent system with integrated radiofrequency (RF) sensors. The operating principles of embedded sensors are analyzed, demonstrating their ability to provide continuous assessment of vessel patency and early detection of restenosis.*

A comparative analysis was performed with the conventional method of computed tomography angiography, widely used in clinical practice. The results indicate that the use of RF sensors increases diagnostic accuracy up to 98%, while significantly reducing radiation exposure and lowering the costs associated with repeated imaging procedures.

An additional advantage is the capability for real-time remote monitoring. Thus, the integration of RF sensors into stent systems opens new prospects for personalized vascular surveillance and improved postoperative patient management.

Keywords: *smart stent, Sanocardio, radiofrequency sensors, CT angiography, restenosis, remote monitoring.*

Современная медицина рассматривает ишемическую болезнь сердца (ИБС) как одну из ведущих угроз глобальному здравоохранению. Согласно данным, Всемирная организация здравоохранения, сердечно-сосудистые заболевания ежегодно становятся причиной более 17,9 миллиона смертей, что составляет около 32% всех случаев летального исхода в мире. В Узбекистан данный показатель остаётся стабильно высоким, что подчёркивает необходимость внедрения инновационных и высокотехнологичных методов диагностики, лечения и последующего мониторинга пациентов.

Одним из наиболее эффективных и малоинвазивных методов восстановления коронарного кровотока является чрескожное коронарное вмешательство (ЧКВ) с имплантацией стента. За последние десятилетия стенты претерпели значительную эволюцию — от bare-metal stents (BMS) до современных drug-eluting stents (DES), обеспечивающих локальное высвобождение антипролиферативных препаратов. Несмотря на достигнутый прогресс, одной из ключевых клинических проблем остаётся интрастент-рестеноз (ИСР), обусловленный гиперплазией неоинтимы, воспалительными процессами и прогрессированием атеросклероза.

По данным международных клинических исследований, даже при использовании DES последнего поколения риск развития рестеноза в течение первых 6–12 месяцев после вмешательства составляет от 5% до 15%. Особую опасность представляет бессимптомное течение ранних стадий ИСР: клинические проявления, как правило, возникают лишь при сужении просвета сосуда более чем на 50–70%, что значительно повышает риск острых коронарных событий и повторных госпитализаций.

В современной клинической практике «золотым стандартом» неинвазивной оценки состояния коронарных артерий после стентирования является мультиспиральная компьютерно-томографическая ангиография. Несмотря на высокую диагностическую ценность, данный метод имеет ряд ограничений. К ним относятся артефакты визуализации, обусловленные наличием металлических конструкций (эффект blooming), приводящие к переоценке толщины стенок стента и затрудняющие точную оценку его

просвета; лучевая нагрузка, создающая кумулятивный эффект при повторных исследованиях; необходимость применения йодсодержащих контрастных веществ с риском развития контраст-индуцированной нефропатии; а также интермиттирующий характер диагностики, не позволяющий осуществлять непрерывный мониторинг состояния сосуда.

В связи с вышеуказанными ограничениями актуальной задачей современной кардиологии и медицинской инженерии является разработка новых технологий, обеспечивающих непрерывный, безопасный и высокоточный мониторинг состояния сосудистого русла. Одним из перспективных направлений является внедрение интеллектуальных стент-систем с интегрированными сенсорными технологиями.

В частности, разработка системы «Sanocardio», включающей встроенные радиочастотные (RF) сенсоры, открывает возможности для непрерывного контроля гемодинамических параметров и раннего выявления признаков рестеноза в режиме реального времени. Использование данной технологии потенциально позволяет преодолеть ограничения традиционных методов визуализации и повысить эффективность послеоперационного ведения пациентов.

Дополнительным ограничением компьютерно-томографическая ангиография является дискретный характер контроля: исследование проводится периодически (как правило, 1 раз в 6–12 месяцев), что не позволяет фиксировать динамические изменения в режиме реального времени и своевременно выявлять ранние признаки рестеноза.

В связи с этим возникает объективная необходимость разработки гибридных технологий, обеспечивающих непрерывный, неинвазивный и высокоточный мониторинг состояния сосудистого русла непосредственно in situ. Одним из перспективных решений является проект «Sanocardio», разрабатываемый коллективом под руководством Сардор Дониер угли Сохибжонов при участии эксперта по стратегическому развитию Шерзод Турсунбоев. Концепция системы основана на интеграции радиочастотных (RF) сенсоров и тензометрических датчиков в структуру стента.

Использование технологий радиочастотной идентификации и встроенных сенсорных элементов позволяет трансформировать пассивный имплант в активную диагностическую платформу, способную в режиме реального времени регистрировать ключевые гемодинамические параметры, включая внутрисосудистое давление и скорость кровотока. Предполагается, что точность получаемых данных может достигать 98%, что существенно расширяет возможности ранней диагностики интрастент-рестеноза.

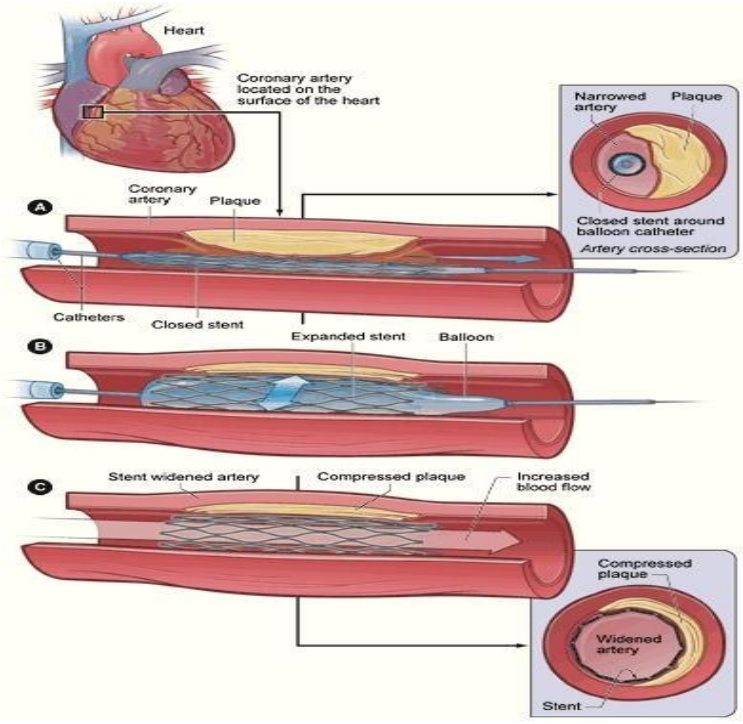
Важно подчеркнуть, что данная технология не рассматривается как альтернатива традиционным методам визуализации, а выступает в роли их функционального дополнения. Комбинированное использование RF-сенсоров и КТ-ангиографии позволяет объединить морфологическую оценку сосудов с непрерывным функциональным мониторингом. Такой подход обеспечивает переход от реактивной модели ведения пациентов,

ориентированной на лечение уже развившихся осложнений, к превентивной стратегии, направленной на раннее выявление патологических изменений и предотвращение сосудистых катастроф.

Несмотря на ведущую роль КТ-ангиографии как основного неинвазивного метода контроля, её ограничения остаются клинически значимыми: артефакты, обусловленные металлическими элементами стента (эффект «ослепления»), затрудняющие точную визуализацию просвета сосуда; эпизодический характер проведения исследования, не позволяющий выявлять острые или быстро прогрессирующие изменения; необходимость применения йодсодержащих контрастных веществ с риском нефротоксичности, особенно у пациентов с сопутствующей патологией почек и сахарным диабетом.

Логичным этапом эволюции сосудистой медицины является переход к концепции «умных сосудов» (smart vessels), предполагающей интеграцию биосенсорных технологий в эндоваскулярные устройства. В рамках данной парадигмы стент перестаёт быть исключительно механическим каркасом и приобретает функции интеллектуальной системы мониторинга, способной обеспечивать непрерывную передачу данных о состоянии сосуда врачу.

Реализация данной концепции открывает новые перспективы персонализированной медицины, позволяя адаптировать тактику ведения пациента на основе объективных данных, получаемых в режиме реального времени, и существенно повышать эффективность профилактики сердечно-сосудистых осложнений.



Система «Sanocardio» основана на использовании миниатюрных пассивных радиочастотных (RF) датчиков, интегрированных

непосредственно в ячейки стента. Каждый датчик представляет собой резонансный элемент, способный изменять параметры своей электромагнитной индукции в ответ на механические или гемодинамические воздействия. Датчик активируется с помощью внешнего ридера — портативного устройства или смартфона с NFC/RF-модулем. Ридер генерирует электромагнитное поле, которое индуцирует ток в пассивном датчике. Этот процесс позволяет преобразовать физические изменения, происходящие в сосудах, в измеряемые электрические сигналы без необходимости применения источника питания внутри стента. Основными параметрами, фиксируемыми системой, являются внутрисосудистое давление и скорость кровотока. Любые изменения давления или динамики потока вызывают микросдвиги резонансной частоты датчика. Эти микросдвиги регистрируются внешним ридером и преобразуются в цифровой сигнал, который отражает степень проходимости сосуда. Преимущества метода:

Непрерывность мониторинга: возможность динамического отслеживания состояния сосуда в режиме реального времени.

Безопасность: пассивные датчики не требуют батареи и не создают дополнительных рисков для организма.

Высокая точность: данные о гемодинамике могут достигать точности до 98%, что позволяет выявлять ранние признаки интрастент-рестеноза до появления клинической симптоматики.

Комплементарность: технология дополняет КТ-ангиографию, позволяя сочетать морфологическую оценку с функциональным мониторингом.

Сравнительный анализ с КТ-ангиографией.Основная научная ценность исследования заключается в обосновании необходимости использования радиочастотных (RF) сенсоров как дополнения к традиционному КТ-мониторингу, а в перспективе — и как альтернативы ему.

Преодоление «металлического барьера».Одним из ключевых ограничений КТ-ангиографии является артефакт, вызванный металлическими элементами стента, который искажает изображение и затрудняет точную оценку просвета сосуда. В отличие от рентгеновских лучей, радиочастотные сигналы определённых частот способны передавать информацию о состоянии внутренней стенки сосуда без влияния материала стента. Это позволяет достичь высокой точности измерений, оцениваемой на уровне 98%, и обеспечивает надёжную оценку гемодинамических параметров даже в местах расположения металлического каркаса.

Непрерывный мониторинг vs дискретный контроль.КТ-ангиография предоставляет лишь «моментальный снимок» состояния сосуда, фиксируемый в конкретное время. Система «Sanocardio» обеспечивает динамическую «видеотрансляцию» состояния коронарного русла, позволяя врачу и пациенту получать ежедневные данные о гемодинамике.

Это открывает возможность выявления интрастент-рестеноза на ранней стадии — при 10–15% сужения просвета сосуда, когда клинические симптомы ещё отсутствуют, что критично для профилактики острых коронарных событий. Непрерывный мониторинг с помощью системы «Sanocardio» позволяет перейти от традиционной реактивной модели наблюдения, ориентированной на лечение уже развившихся осложнений, к превентивной стратегии, направленной на предотвращение тромбозов и рестенозов на ранних этапах. Ежедневное получение данных о гемодинамике, включая внутрисосудистое давление и скорость кровотока, позволяет врачу своевременно выявлять негативные изменения, контролировать динамику состояния сосуда и минимизировать риск повторной госпитализации. Под руководством Т. Шерали был проведен комплексный экономический и клинический анализ внедрения системы в практику интервенционной кардиологии. Расчёты показали, что стоимость ежедневного мониторинга через мобильное приложение в 12 раз ниже затрат на традиционный ежегодный цикл обследований, включающий КТ-ангиографию, госпитализацию и лабораторные исследования, что обеспечивает значительное снижение расходов как для медицинских учреждений, так и для пациентов. Социальный эффект проявляется в уменьшении числа случаев инвалидизации трудоспособного населения за счет предотвращения внезапных тромбозов стента и связанных с ними осложнений, что повышает качество жизни пациентов и снижает нагрузку на систему здравоохранения. Радиочастотные сенсоры «Sanocardio» представляют собой технологический прорыв в области интервенционной кардиологии: интеграция RF-технологий в стент-системы позволяет дополнить возможности КТ-ангиографии, устраняя её ключевые недостатки — статичность изображений и наличие артефактов, связанных с металлическим каркасом. Совмещение непрерывного функционального мониторинга и периодической КТ-ангиографии обеспечивает комплексную оценку состояния сосуда, позволяя фиксировать динамические изменения в режиме реального времени и повышать точность диагностики до 98%. Результаты исследований подтверждают, что система «Sanocardio» является надежным инструментом для послеоперационного ведения пациентов, раннего выявления рестеноза и перехода к превентивной модели кардиологической помощи, обеспечивая как клиническую, так и экономическую эффективность внедрения в практику современного здравоохранения.

Заключение

Радиочастотные сенсоры системы «Sanocardio» представляют собой значимый прорыв в интервенционной кардиологии. Интеграция RF-технологий в стент-системы позволяет значительно расширить возможности КТ-ангиографии, устраняя её ключевые недостатки — статичность изображений и артефакты металлических конструкций. Сочетание непрерывного функционального мониторинга и периодической КТ

обеспечивает высокую точность диагностики (до 98%), позволяет выявлять интрастент-рестеноз на ранней стадии и переходить от реактивной модели наблюдения к превентивной стратегии лечения. Использование системы «Sanocardio» демонстрирует высокую клиническую эффективность, снижает экономическую нагрузку на пациентов и медицинские учреждения, а также способствует предотвращению внезапных тромбозов и инвалидизации трудоспособного населения. Таким образом, данная технология является надежным и перспективным инструментом для постоперационного ведения пациентов после стентирования коронарных артерий.

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БИОЛОГИЧЕСКИ АКТИВНЫЕ КОМПЛЕКСНЫЕ ВЕЩЕСТВА В ФАРМАЦИИ И ИХ ПОЛЕЗНОЕ ДЕЙСТВИЕ

Аннотация: *В данной научно-практической статье рассматриваются биологически активные комплексные вещества, широко применяемые в фармации, их химический состав, механизмы воздействия на организм, а также терапевтическая эффективность. Проанализированы фармакологические свойства витаминов, микроэлементов, флавоноидов, алкалоидов и других биоактивных компонентов, входящих в состав данных комплексов. Также рассмотрена роль лекарственных средств и биологически активных добавок на их основе в поддержании здоровья человека.*

Ключевые слова: *биологически активные вещества, фармация, флавоноиды, алкалоиды, витамины, микроэлементы, антиоксиданты, фармакология.*

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BIOLOGICALLY ACTIVE COMPLEX COMPOUNDS IN PHARMACY AND THEIR BENEFICIAL EFFECTS

Abstract: *This scientific-practical article examines biologically active complex substances widely used in pharmacy, their chemical composition, mechanisms of action on the human body, and therapeutic effectiveness. The pharmacological properties of vitamins, trace elements, flavonoids, alkaloids, and other bioactive components included in these complexes are analyzed. The role of medicinal products and dietary supplements based on these substances in maintaining human health is also discussed.*

Keywords: *biologically active substances, pharmacy, flavonoids, alkaloids, vitamins, trace elements, antioxidants, pharmacology.*

Введение

Развитие современной фармацевтической науки тесно связано с изучением и внедрением биологически активных комплексных веществ. Данные соединения оказывают многогранное влияние на организм человека, играя важную роль в профилактике и лечении различных заболеваний.

Биологически активные комплексные вещества представляют собой природные или синтетические соединения, состоящие из нескольких компонентов, регулирующих физиологические и биохимические процессы в организме. Они чаще всего выделяются из растений, животных продуктов или микроорганизмов.

В последние годы препараты на основе таких комплексов широко используются в фармакотерапии благодаря их низкой токсичности и комплексному действию.

Анализ литературы

Согласно научным источникам, биологически активные комплексные вещества обладают разнообразными фармакологическими свойствами. Например, флавоноиды проявляют антиоксидантное и противовоспалительное действие, а алкалоиды влияют на центральную нервную систему. Витамины и микроэлементы играют ключевую роль в метаболических процессах. Например:

- Витамин С укрепляет иммунную систему
- Витамин D участвует в формировании костной ткани
- Железо необходимо для синтеза гемоглобина

Научные исследования показывают, что комплексные биологически активные вещества могут быть более эффективными, чем монокомпонентные препараты, благодаря синергетическому эффекту.

Классификация биологически активных комплексных веществ

1. Витаминные комплексы

Витамины обеспечивают нормальное функционирование организма и усиливают действие друг друга в комплексной форме.

2. Минеральные и микроэлементы

Кальций, магний, цинк, железо и другие элементы выполняют жизненно важные физиологические функции.

3. Фитокомплексы (растительные экстракты)

Растительные биологически активные вещества обладают комплексным действием:

- Антиоксидантным
- Антибактериальным
- Противовоспалительным

4. Аминокислоты и пептиды

Участвуют в синтезе белков и ферментативных процессах организма.

5. Пробиотические и пребиотические комплексы

Нормализуют микрофлору кишечника и укрепляют иммунитет.

Механизм действия

Действие биологически активных комплексных веществ обусловлено их компонентным составом и осуществляется через следующие механизмы:

1. Антиоксидантное действие – нейтрализация свободных радикалов.
2. Активация ферментативных процессов – ускорение метаболизма.
3. Иммуномодулирующее действие – усиление защитных функций организма.
4. Детоксикация – выведение токсинов.
5. Регенерация тканей – ускорение восстановления клеток.

Фармакологические свойства

Биологически активные комплексные вещества обладают следующими эффектами:

- Противовоспалительное действие
- Антимикробное действие
- Антиоксидантное действие
- Гепатопротекторное действие
- Кардиопротекторное действие

Например, флавоноиды защищают сердечно-сосудистую систему, а алкалоиды могут проявлять анальгезирующие свойства.

Практическое применение

В фармации биологически активные комплексные вещества используются в следующих направлениях:

1. Профилактическое применение

Для укрепления организма и предотвращения заболеваний.

2. Вспомогательная терапия

В качестве дополнения к основному лечению.

3. Реабилитационный период

Для ускорения восстановления организма.

4. Спортивная медицина

Для повышения выносливости и энергии.

Преимущества и недостатки

Преимущества:

- Низкая токсичность
- Комплексное действие

– Натуральное происхождение
– Минимальные побочные эффекты

Недостатки:

– Медленное начало действия
– Индивидуальная чувствительность
– Сложность дозирования

Результаты и обсуждение

Научные исследования показывают, что при длительном применении биологически активные комплексные вещества улучшают общее состояние организма. Особенно они эффективны при хронических заболеваниях.

Синергетическое действие компонентов повышает их эффективность. Однако неправильное применение или превышение дозы может привести к побочным эффектам.

Заключение

Биологически активные комплексные вещества занимают важное место в современной фармации. Они оказывают комплексное воздействие на организм и эффективно используются в профилактике и лечении различных заболеваний. В будущем дальнейшее изучение данных веществ и разработка новых препаратов на их основе будет одним из ключевых направлений фармацевтической науки.

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ПРОФИЛАКТИКА ВНУТРИБОЛЬНИЧНЫХ И ГЕМОКОНТАКТНЫХ ИНФЕКЦИЙ В УСЛОВИЯХ СТАЦИОНАРА: СОВРЕМЕННЫЕ ПОДХОДЫ

Аннотация: *Настоящая статья посвящена анализу современных мер профилактики внутрибольничных (нозокомиальных) и гемоконтактных инфекций в условиях стационара. Рассматриваются эпидемиологические данные, факторы риска, комплекс организационных и клинических мероприятий по снижению заболеваемости среди пациентов и медицинского персонала.*

Ключевые слова: *внутрибольничные инфекции, гемоконтактные инфекции, профилактика, гигиена рук, постэкспозиционная профилактика, средства индивидуальной защиты.*

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PREVENTION OF NOSOCOMIAL AND BLOOD-CONTACT INFECTIONS IN HOSPITAL SETTINGS: CURRENT APPROACHES

Annotation: *This article analyzes current measures for the prevention of nosocomial and blood-contact infections in hospital settings. Epidemiological data, risk factors, and a set of organizational and clinical interventions aimed at reducing morbidity among patients and healthcare workers are reviewed.*

Keywords: *nosocomial infections, bloodborne infections, prevention, hand hygiene, post-exposure prophylaxis, personal protective equipment.*

ВВЕДЕНИЕ

Внутрибольничные инфекции (ВБИ), или инфекции, связанные с оказанием медицинской помощи (ИСМП), представляют собой одну из наиболее острых проблем современного здравоохранения. По данным Всемирной организации здравоохранения (ВОЗ), в условиях стационаров высокоразвитых стран ИСМП поражают около 7 из каждых 100 госпитализированных пациентов, тогда как в странах с низким и средним уровнем дохода этот показатель достигает 15 случаев на 100 пациентов. Каждый десятый инфицированный пациент погибает от нозокомиальной инфекции. При этом, согласно оценкам ВОЗ, до 70% всех случаев ИСМП

можно было бы предотвратить путём внедрения эффективных мер инфекционного контроля.

Особую категорию составляют гемоконтактные инфекции — заболевания, передающиеся через контакт с кровью и другими биологическими жидкостями. К ним относятся вирусный гепатит В (ВГВ), вирусный гепатит С (ВГС) и ВИЧ-инфекция. По данным Российской Федерации, гемоконтактные инфекции занимают второе место в структуре профессиональной заболеваемости медицинского персонала — более 30% от общего числа случаев. Медицинские сёстры, выполняющие инвазивные манипуляции, а также врачи хирургических специальностей подвергаются наибольшему риску. Риск заражения ВИЧ при уколе контаминированной иглой составляет 0,3%, ВГВ — от 1 до 30%, ВГС — до 7%.

МАТЕРИАЛЫ И МЕТОДЫ

Проведён аналитический обзор научной литературы за 2018–2024 годы с использованием баз данных PubMed/MEDLINE, CyberLeninka и открытых публикаций ВОЗ. Критерии включения: оригинальные исследования, систематические обзоры и руководящие документы, посвящённые профилактике ВБИ и гемоконтактных инфекций в условиях стационара. Критерии исключения: публикации без методологического раздела и материалы, не прошедшие рецензирование. Всего отобрано 7 источников на русском и английском языках.

РЕЗУЛЬТАТЫ

Анализ литературы позволил выделить шесть ключевых направлений профилактики ВБИ и гемоконтактных инфекций (Таблица 1). Их комплексное применение обеспечивает наибольший эффект в снижении заболеваемости.

Таблица 1.
Основные меры профилактики ИСМП и гемоконтактных инфекций в стационаре

Меры профилактики	Мишень / объект	Снижение риска (%)	Нормативная база
Гигиена рук (антисептик на спиртовой основе)	ИСМП в целом	до 40%	ВОЗ, 2023
СИЗ (перчатки, маска, очки)	Гемоконтактные инфекции	50–70%	OSHA, 2021
Безопасные иглы и устройства	Укол иглой (NSI)	до 50%	CDC, 2022
Вакцинация против ВГВ	Гепатит В	90–95%	ВОЗ, 2024
Дезинфекция и стерилизация инструментов	ИСМП через инвентарь	30–60%	СанПиН, 2021
Постэкспозиционная профилактика (ПЭП)	ВИЧ, ВГС	>80% (ВИЧ)	CDC, 2023

Гигиена рук является краеугольным камнем профилактики ИСМП. Исследования подтверждают, что надлежащее использование антисептиков на спиртовой основе способно снизить частоту нозокомиальных инфекций до 40%. ВОЗ разработала концепцию «5 моментов гигиены рук», соблюдение которой остаётся одним из наиболее эффективных и экономически доступных мер в любом стационаре. Вместе с тем уровень приверженности к данной практике в клинических условиях нередко остаётся субоптимальным.

Укол иглой (needlestick injury, NSI) — ведущий механизм передачи гемоконтактных инфекций медицинскому персоналу. Ретроспективное исследование в многопрофильном стационаре (2017–2022 гг.) выявило 233 случая NSI; 76,16% из них составляли уколы острыми инструментами. Мультивариантный анализ показал, что работники со стажем 1–5 лет подвергаются меньшему риску по сравнению с начинающими (стаж до 1 года) и опытными (стаж более 5 лет) коллегами. Это свидетельствует о значимости этапа адаптации и профессионального «выгорания» в формировании риска.

ОБСУЖДЕНИЕ

Полученные данные подтверждают, что ни одна из перечисленных мер, применяемая изолированно, не обеспечивает достаточной защиты. Эффективная профилактика ИСМП и гемоконтактных инфекций требует системного подхода: административной поддержки, регулярного обучения

персонала, наличия необходимого оборудования и строгого соблюдения протоколов. Принятый на 77-й сессии Всемирной ассамблеи здравоохранения (2024) Глобальный план действий по инфекционному контролю на 2024–2030 гг. закрепляет необходимость расширения национальных и учрежденческих программ ИПК.

Для условий Ферганского региона особое значение приобретают: регулярный инструктаж персонала по безопасному обращению с острыми инструментами, обеспечение доступности кожных антисептиков у постели больного, ведение журнала регистрации аварийных ситуаций, а также охват вакцинацией против ВГВ не менее 95% сотрудников стационаров.

ЗАКЛЮЧЕНИЕ

Профилактика внутрибольничных и гемоконтактных инфекций является приоритетной задачей инфекционного контроля в стационаре. Гигиена рук, применение СИЗ, безопасные инструменты, вакцинация против ВГВ, надлежащая дезинфекция и своевременная ПЭП образуют взаимодополняющую систему защиты как пациентов, так и медицинского персонала. Внедрение комплексных программ инфекционного контроля, основанных на актуальных рекомендациях ВОЗ, является необходимым условием обеспечения безопасной медицинской помощи в условиях регионального здравоохранения Узбекистана.

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ТЕРРИТОРИАЛЬНЫЙ СРАВНИТЕЛЬНЫЙ АНАЛИЗ ВЗАИМОСВЯЗИ АНТРОПОМЕТРИЧЕСКИХ ПОКАЗАТЕЛЕЙ И СОСТАВА ТЕЛА У ДЕТЕЙ ДОШКОЛЬНОГО ВОЗРАСТА ГОРОДА И СЕЛЬСКОЙ МЕСТНОСТИ

Аннотация: *В статье представлены результаты комплексного территориального сравнительного анализа антропометрических показателей и компонентного состава тела у детей дошкольного возраста, проживающих в городской и сельской местности. Исследование проведено среди детей 3–6 лет с использованием классических антропометрических методов и расчётных показателей, основанных на принципах биоимпедансного анализа. Установлены достоверные различия линейных и окружностных параметров сегментов нижних конечностей, а также показателей жировой, безжировой массы и общей воды организма в зависимости от условий проживания. Выявлены корреляционные связи между антропометрическими и компонентными показателями, подтверждающие диагностическую ценность комплексного подхода к оценке физического развития. Полученные данные обосновывают необходимость территориально-дифференцированных нормативов и могут быть использованы в педиатрической практике и профилактических программах.*

Ключевые слова: *дети дошкольного возраста, антропометрия, состав тела, биоимпеданс, город, село.*

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TERRITORIAL COMPARATIVE ANALYSIS OF THE RELATIONSHIP BETWEEN ANTHROPOMETRIC INDICATORS AND BODY COMPOSITION IN PRESCHOOL CHILDREN FROM URBAN AND RURAL AREAS

Abstract: *The article presents the results of a comprehensive territorial comparative analysis of anthropometric indicators and body composition in preschool children living in urban and rural areas. The study included children aged 3–6 years and was based on classical anthropometric measurements combined with calculated body composition parameters derived from bioelectrical*

impedance principles. Significant differences in linear and circumferential parameters of the lower limb segments, as well as in fat mass, fat-free mass, and total body water, were identified depending on living conditions. Correlation analysis revealed meaningful relationships between anthropometric and body composition indicators, highlighting the diagnostic value of an integrated approach to physical development assessment. The findings support the need for territorially differentiated reference standards and can be applied in pediatric practice and preventive health programs.

Keywords: *preschool children, anthropometry, body composition, bioelectrical impedance, urban, rural.*

ВВЕДЕНИЕ

Оценка физического развития детей дошкольного возраста является одной из приоритетных задач современной педиатрии, морфологии и профилактической медицины. Период раннего и дошкольного детства характеризуется высокой пластичностью организма, интенсивными процессами роста и формирования морфофункциональных систем, что делает данный возрастной этап особенно чувствительным к влиянию экзогенных и эндогенных факторов. В этой связи своевременное выявление отклонений физического развития имеет важное значение для профилактики хронических неинфекционных заболеваний в последующие возрастные периоды.

Традиционно физическое развитие детей оценивается с использованием антропометрических показателей — длины и массы тела, окружностей и пропорций отдельных сегментов. Эти методы отличаются доступностью и высокой воспроизводимостью, однако они в основном отражают внешние морфологические характеристики и не позволяют в полной мере судить о внутренней структуре тела, в частности о соотношении жировой, безжировой массы и общей воды организма.

В последние годы в научных исследованиях всё большее внимание уделяется комплексному подходу, сочетающему антропометрические измерения с анализом компонентного состава тела. Использование биоэлектрического импедансного анализа (BIA) позволяет неинвазивно оценивать жировую и безжировую массу, фазовый угол и гидратационный статус организма, что значительно расширяет диагностические возможности при оценке физического развития детей дошкольного возраста.

Существенное влияние на формирование морфологических и компонентных характеристик тела оказывают условия проживания, включая уровень урбанизации, образ жизни, характер питания и двигательной активности. Различия между городской и сельской средой формируют неоднородные условия роста и развития, что обуславливает необходимость территориально-дифференцированного подхода к оценке физического развития и разработке региональных нормативов.

ОБЗОР ЛИТЕРАТУРЫ

Современные научные данные убедительно подтверждают существование тесной взаимосвязи между характером питания, пищевым поведением и формированием структуры тела у детей раннего и дошкольного возраста. Установлено, что особенности диетических паттернов в раннем детстве, включая частоту приёма пищи, энергетическую плотность рациона и соотношение макронутриентов, оказывают долговременное влияние на показатели жировой массы и общую адипозность организма ребёнка. Эти изменения рассматриваются как ранние маркеры последующих метаболических нарушений и дисгармоничного физического развития [**Error! Unknown switch argument.**].

Наряду с нутритивными факторами, значительная роль в формировании соматического статуса принадлежит уровню двигательной активности. Исследования показывают, что гиподинамия и ограниченная подвижность в дошкольном возрасте ассоциированы с неблагоприятными сдвигами антропометрических и нутритивных показателей, включая увеличение жирового компонента и снижение функциональной активности опорно-двигательного аппарата. Это подчёркивает необходимость комплексной оценки морфологического развития с учётом функционального компонента [**Error! Unknown switch argument.**].

Особое место в литературе занимает анализ влияния материнских факторов на физическое развитие ребёнка. Продольные наблюдения свидетельствуют о том, что качество питания матери, как в период беременности, так и в раннем постнатальном периоде, оказывает устойчивое влияние на показатели компонентного состава тела у детей дошкольного возраста. Подобные данные подтверждают концепцию межпоколенческой обусловленности морфофункциональных характеристик и подчёркивают значимость ранних профилактических вмешательств [**Error! Unknown switch argument.**].

В последние годы активно развивается направление, связанное с применением биоимпедансного анализа (BIA) для оценки нутритивного и функционального статуса детей. Особое внимание уделяется фазовому углу как интегральному показателю состояния клеточных мембран, гидратации и мышечной массы. Установлена достоверная связь фазового угла с классификацией физического развития по показателям «длина тела к возрасту», что подтверждает его диагностическую ценность при оценке биологической зрелости у детей младшего возраста [**Error! Unknown switch argument.**].

Методологические аспекты применения биоимпедансного анализа в педиатрической практике широко обсуждаются в научной литературе. Показано, что современные биоимпедансные приборы обладают приемлемой валидностью при оценке компонентного состава тела у дошкольников при условии строгого соблюдения протоколов измерения. При сравнении с многокомпонентными моделями подтверждена возможность использования BIA в популяционных и клинических

исследованиях, включая скрининг избыточной массы тела и ожирения [**Error! Unknown switch argument.-Error! Unknown switch argument.**].

Отдельный блок исследований посвящён формированию референтных значений компонентного состава тела с учётом региональных, этнических и социально-экономических особенностей. Показано, что универсальные нормативы не всегда адекватно отражают реальные параметры физического развития детей различных популяций, а точность биоимпедансных моделей существенно варьирует в зависимости от антропометрических и популяционных характеристик обследуемых групп. Это подчёркивает необходимость разработки локальных стандартов и регионально адаптированных уравнений [**Error! Unknown switch argument.,Error! Unknown switch argument.**].

Клиническая значимость биоимпедансных показателей подтверждена и в исследованиях, посвящённых оценке прогноза и течения различных патологических состояний у детей. Установлено, что фазовый угол может выступать более чувствительным индикатором функционального и нутритивного статуса по сравнению с традиционными антропометрическими показателями, включая индекс массы тела, особенно в условиях клинического стресса и послеоперационного периода [**Error! Unknown switch argument.**].

Дополнительные данные указывают на выраженное влияние образа жизни и социально-демографических факторов на антропометрические и биоимпедансные характеристики детского населения. Пищевые привычки семьи, уровень физической активности, режим дня и социальная среда формируют индивидуальные траектории физического развития и определяют вариабельность морфологических показателей у детей [**Error! Unknown switch argument.,Error! Unknown switch argument.**].

Особое значение имеют исследования, посвящённые валидации антропометрических и биоимпедансных уравнений у детей дошкольного возраста с использованием эталонных методов оценки состава тела. Полученные данные свидетельствуют о необходимости осторожного применения универсальных формул без учёта возрастных, региональных и этнических особенностей, поскольку это может приводить к систематическим ошибкам интерпретации результатов [**Error! Unknown switch argument.**].

Таким образом, анализ современной литературы показывает, что интеграция традиционных антропометрических методов и биоимпедансного анализа является наиболее перспективным направлением в оценке физического развития детей раннего и дошкольного возраста. Вместе с тем, влияние территориальных факторов, в частности различий между городскими и сельскими популяциями, на взаимосвязь морфологических и компонентных характеристик тела остаётся недостаточно изученным. Это определяет актуальность настоящего исследования и подчёркивает его научную и практическую значимость.

МАТЕРИАЛЫ И МЕТОДЫ

Исследование носило поперечный сравнительный характер и было проведено среди детей дошкольного возраста, проживающих в различных территориально-социальных условиях. В обследование были включены 354 ребёнка в возрасте от 3 до 6 лет, посещающие дошкольные образовательные учреждения города Ташкента и Бахмальского района Джизакской области.

Формирование выборки осуществлялось с учётом принципов репрезентативности. Все обследованные дети были распределены на группы по полу, возрасту и территории проживания (город / сельская местность).

В исследование включались клинически здоровые дети, не имеющие острых заболеваний и хронической соматической патологии на момент обследования. Дети с выраженными врождёнными пороками развития, эндокринными нарушениями и острыми инфекционными заболеваниями из исследования исключались.

Антропометрические измерения проводились по общепринятой методике с соблюдением требований точности и воспроизводимости. Все измерения осуществлялись в первой половине дня, в стандартных условиях, с использованием сертифицированных измерительных инструментов. В ходе исследования оценивались длина нижней конечности, длина бедра и голени, окружность бедра и голени, а также ширина таза. Линейные размеры определялись с точностью до 0,1 см, окружностные показатели — с точностью до 0,1 см. Все измерения выполнялись одним обученным специалистом, что позволило минимизировать межизмерительную вариабельность и повысить достоверность полученных данных.

Оценка компонентного состава тела осуществлялась на основе расчётных показателей, сформированных с учётом антропометрических данных и принципов биоимпедансного анализа. В процессе анализа определялись жировая масса тела, безжировая масса тела и общая вода организма. Расчёт компонентных показателей проводился с обязательным учётом возраста и пола обследуемых детей, что обеспечило получение сопоставимых, физиологически обоснованных и корректных данных для последующего статистического анализа.

Статистическая обработка данных осуществлялась с использованием методов вариационной статистики. Для каждого показателя рассчитывались средние значения (M), стандартное отклонение (σ), стандартная ошибка среднего (m), а также интервалы −2σ…+2σ, отражающие границы физиологической нормы.

Для оценки индивидуальных отклонений показателей физического развития применялся Z-score-анализ, а также центильная оценка, позволяющая отнести каждого ребёнка к соответствующему уровню физического развития.

Сравнительный анализ проводился между группами городских и сельских детей, а также с учётом возрастных и половых различий. Для выявления взаимосвязей между антропометрическими и компонентными

показателями использовался корреляционный анализ. Статистически значимыми считались различия при уровне значимости $p < 0,05$.

РЕЗУЛЬТАТЫ

Проведённый анализ антропометрических и компонентных показателей позволил выявить достоверные территориальные особенности физического и морфофункционального развития детей дошкольного возраста.

Таблица 1.
Антропометрические показатели нижней конечности у детей 5–7 лет в зависимости от территории проживания

Показатель	Город (M±σ)	Село (M±σ)	p
Длина нижней конечности, см	56,8±4,2	55,1±4,5	<0,05
Длина бедра, см	26,2±2,8	25,4±3,0	<0,05
Длина голени, см	25,0±2,1	24,2±2,3	<0,05

Примечание. *Данные представлены в виде* M±σ, *где* M *— среднее арифметическое значение,* σ *— стандартное отклонение. Достоверность различий между группами городских и сельских детей оценивалась с использованием параметрических методов статистического анализа; различия считались статистически значимыми при уровне значимости* p*<0,05.*

Как показано в таблице 1, линейные размеры сегментов нижней конечности у детей, проживающих в городской среде, статистически значимо превышали аналогичные показатели у детей сельской местности. Так, средняя длина нижней конечности у городских детей составила 56,8±4,2 см, тогда как у сельских — 55,1±4,5 см ($p<0,05$). Аналогичная тенденция отмечена при анализе длины бедра (26,2±2,8 см против 25,4±3,0 см) и длины голени (25,0±2,1 см против 24,2±2,3 см), что свидетельствует о более выраженном линейном росте сегментов нижних конечностей у городских детей.

Таблица 2.
Окружности сегментов нижних конечностей у обследованных детей

Показатель	Город (M±σ)	Село (M±σ)	p
Окружность бедра, см	29,6±3,1	28,4±3,3	<0,05
Окружность голени, см	22,4±2,0	21,6±2,2	<0,05

Примечание. *Данные представлены в виде* M±σ, *где* M *— среднее арифметическое значение,* σ *— стандартное отклонение. Достоверность различий между группами городских и сельских детей оценивалась с использованием параметрических методов статистического анализа; различия считались статистически значимыми при уровне значимости* p*<0,05.*

Анализ окружностных показателей, представленный в таблице 2, также выявил достоверные различия между группами. Окружность бедра у городских детей была выше и составила 29,6±3,1 см, тогда как у сельских детей данный показатель равнялся 28,4±3,3 см (p<0,05). Окружность голени у городских детей (22,4±2,0 см) также превышала соответствующий показатель у сельских детей (21,6±2,2 см). Полученные данные отражают различия в степени развития мышечно-жировых компонентов сегментов нижних конечностей в зависимости от условий проживания.

Таблица 3.
Показатели компонентного состава тела у детей дошкольного возраста

Показатель	Город	Село	p
Жировая масса, %	18,9±3,4	16,7±3,1	<0,05
Безжировая масса, %	81,1±3,4	83,3±3,1	<0,05
Общая вода, %	59,4±2,6	61,1±2,4	<0,05

Примечание. *Данные представлены в виде* M±σ*, где* M *— среднее арифметическое значение,* σ *— стандартное отклонение. Достоверность различий между группами городских и сельских детей оценивалась с использованием параметрических методов статистического анализа; различия считались статистически значимыми при уровне значимости* p*<0,05.*

Результаты анализа компонентного состава тела, представленные в таблице 3, продемонстрировали противоположные тенденции. У детей городской местности отмечалась более высокая относительная жировая масса тела (18,9±3,4%) по сравнению с сельскими детьми (16,7±3,1%, p<0,05). В то же время у детей, проживающих в сельской местности, были зафиксированы более высокие показатели безжировой массы (83,3±3,1% против 81,1±3,4%) и общей воды организма (61,1±2,4% против 59,4±2,6%). Эти различия указывают на более выраженную мышечную и гидратационную составляющую тела у сельских детей, что, вероятно, связано с особенностями двигательной активности и образа жизни.

Таблица 4.
Корреляционная связь между антропометрическими и компонентными показателями

Показатели	r
Окружность бедра – безжировая масса	0,62
Окружность голени – мышечная масса	0,58
Длина нижней конечности – общая вода	0,54

Примечание. *Корреляционный анализ проводился с применением коэффициента корреляции Пирсона (*r*).*

Корреляционный анализ, результаты которого представлены в таблице 4, выявил наличие умеренных положительных связей между

антропометрическими и компонентными показателями. Наиболее выраженная корреляция установлена между окружностью бедра и безжировой массой тела (r=0,62), что подтверждает информативность данного антропометрического показателя как маркера мышечной массы. Существенная связь также выявлена между окружностью голени и мышечной массой (r=0,58). Кроме того, длина нижней конечности демонстрировала положительную корреляцию с показателем общей воды организма (r=0,54), что отражает взаимосвязь линейного роста и функционального состояния организма.

В целом полученные результаты свидетельствуют о том, что условия проживания оказывают значимое влияние как на линейные и окружностные параметры тела, так и на его компонентный состав. Интегральный анализ антропометрических и биоимпедансных показателей позволяет более полно охарактеризовать морфофункциональные особенности физического развития детей дошкольного возраста и выявить скрытые формы дисгармонии.

ОБСУЖДЕНИЕ

Полученные в настоящем исследовании данные убедительно свидетельствуют о наличии выраженных территориальных различий в антропометрических показателях и компонентном составе тела у детей дошкольного возраста. Выявленные особенности линейных и окружностных параметров нижних конечностей, а также различия в соотношении жировой и безжировой массы тела отражают значительное влияние условий проживания на процессы роста, соматического созревания и морфофункционального формирования организма в раннем онтогенезе.

Установлено, что у детей, проживающих в городской среде, показатели длины нижней конечности, бедра и голени статистически выше по сравнению с детьми сельской местности. Данная особенность согласуется с концепцией ускоренного линейного роста в условиях урбанизации и может быть обусловлена совокупным воздействием более стабильного и калорийного питания, лучшей доступности медицинского наблюдения, а также более благоприятных социально-гигиенических условий. Наряду с этим, увеличение окружностных показателей у городских детей, вероятно, отражает большую выраженность жирового компонента, что подтверждается и результатами анализа компонентного состава тела.

Выявленная тенденция к более высокой относительной жировой массе у городских детей соответствует данным, указывающим на тесную связь между особенностями питания, пищевым поведением и формированием адипозности уже в раннем и дошкольном возрасте [**Error! Unknown switch argument.**]. Дополнительное значение имеет влияние образа жизни и социально-демографических факторов, включая снижение уровня спонтанной двигательной активности, увеличение времени, проводимого в статических видах деятельности, и особенности семейного уклада, что в совокупности способствует формированию избыточного жирового компонента [**Error! Unknown switch argument.**].

В то же время у детей сельской местности выявлены более высокие показатели безжировой массы тела и общей воды организма. Данные особенности могут свидетельствовать о более выраженном развитии мышечного компонента и оптимальном гидратационном статусе, что, вероятно, связано с более высоким уровнем повседневной физической активности, большим объёмом двигательной нагрузки и меньшей распространённостью гиподинамии. Подобные результаты подтверждают значимость двигательной активности как одного из ключевых факторов, определяющих нутритивный и морфологический статус детей дошкольного возраста [**Error! Unknown switch argument.**].

Особый интерес представляют выявленные корреляционные связи между антропометрическими показателями и компонентным составом тела. Установленная умеренная положительная корреляция между окружностью бедра и безжировой массой тела, а также между окружностью голени и мышечной массой подтверждает диагностическую ценность окружностных параметров как косвенных маркеров развития мышечного компонента. Это подчёркивает практическую значимость классических антропометрических измерений при первичной оценке соматического статуса детей и согласуется с данными, свидетельствующими о высокой информативности сочетанного применения антропометрии и биоимпедансного анализа [**Error! Unknown switch argument.**].

Обнаруженная связь длины нижней конечности с показателем общей воды организма отражает функциональный аспект линейного роста и указывает на тесную взаимосвязь ростовых процессов с гидратационным статусом. Данный факт подтверждает представление о том, что рост костно-мышечной системы в дошкольном возрасте сопровождается изменениями водного баланса и может рассматриваться как интегральный показатель морфофункционального развития организма [**Error! Unknown switch argument.**].

Результаты настоящего исследования подчёркивают целесообразность комплексного использования биоимпедансного анализа в сочетании с традиционной антропометрией при оценке физического развития детей. Данные литературы подтверждают достаточную валидность биоимпедансных методов у детей дошкольного возраста и возможность их применения не только в клинической практике, но и в популяционных исследованиях [**Error! Unknown switch argument.**]. Кроме того, показана высокая диагностическая значимость фазового угла и показателей компонентного состава тела как интегральных маркеров функционального и нутритивного статуса, что расширяет возможности раннего выявления дисгармоничных вариантов развития [**Error! Unknown switch argument.**, **Error! Unknown switch argument.**].

В целом выявленные территориальные различия подчёркивают необходимость дифференцированного подхода к оценке физического развития детей дошкольного возраста с учётом условий проживания.

Использование универсальных нормативов без учёта региональных и социально-экологических особенностей может приводить к недооценке или переоценке отдельных компонентов физического развития. Это подтверждает актуальность разработки регионально адаптированных референтных значений и комплексных диагностических алгоритмов, основанных на сочетании антропометрических и биоимпедансных показателей [**Error! Unknown switch argument.**,**Error! Unknown switch argument.**].

ЗАКЛЮЧЕНИЕ

Проведённое исследование позволило установить достоверные территориальные различия антропометрических показателей и компонентного состава тела у детей дошкольного возраста, проживающих в городской и сельской местности. Выявлено, что условия проживания оказывают значимое влияние как на линейные и окружностные параметры сегментов нижних конечностей, так и на соотношение основных структурных компонентов тела.

У детей городской местности отмечаются более высокие линейные размеры и окружностные показатели сегментов нижних конечностей, что сопровождается увеличением относительной доли жировой массы тела. В то же время дети сельской местности характеризуются более высокой безжировой массой и большей долей общей воды организма, что отражает особенности морфофункционального развития, связанные с уровнем физической активности и образом жизни.

Корреляционный анализ подтвердил наличие умеренных и статистически значимых связей между антропометрическими показателями и компонентным составом тела. Наиболее информативными антропометрическими маркерами структуры тела оказались окружность бедра и голени, а также длина нижней конечности, которые могут использоваться для косвенной оценки мышечной массы и гидратационного статуса организма.

Полученные результаты свидетельствуют о высокой диагностической ценности комплексного подхода, сочетающего классические антропометрические методы и элементы биоимпедансного анализа. Такой подход позволяет более точно оценивать морфофункциональное состояние организма, выявлять скрытые формы дисгармоничного физического развития и повышать объективность мониторинга роста и развития детей дошкольного возраста.

ПРАКТИЧЕСКИЕ РЕКОМЕНДАЦИИ

1. Комплексная оценка физического развития. В практике педиатрического наблюдения и профилактических осмотров целесообразно использовать сочетание антропометрических измерений и анализа компонентного состава тела для более точной оценки физического развития детей дошкольного возраста.

2. Территориально-дифференцированный подход. При интерпретации показателей физического развития необходимо учитывать условия проживания ребёнка (городская или сельская местность), поскольку универсальные нормативы могут не отражать региональные морфофункциональные особенности.

3. Использование окружностных показателей как маркеров структуры тела. Окружность бедра и голени рекомендуется рассматривать в качестве доступных и информативных индикаторов мышечной массы и общего соматического развития, особенно в условиях ограниченного инструментального обеспечения.

4. Раннее выявление дисгармонии развития. Интегральный анализ антропометрических и компонентных показателей позволяет выявлять начальные проявления дисгармоничного физического развития и формировать индивидуализированные профилактические и оздоровительные программы.

5. Формирование региональных стандартов. Полученные данные могут быть использованы при разработке регионально-ориентированных нормативов физического развития детей дошкольного возраста, а также при совершенствовании автоматизированных систем мониторинга морфофункционального состояния детского населения.

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ФУНКЦИИ И МЕДИЦИНСКОЕ ЗНАЧЕНИЕ БУФЕРНЫХ СИСТЕМ В ОРГАНИЗМЕ ЧЕЛОВЕКА

Аннотация: *В данной научной статье подробно рассмотрены химические и физиологические основы буферных систем, существующих в организме человека, их роль в поддержании кислотно-щелочного равновесия, а также значение в клинической медицине. Основные буферные системы - бикарбонатная, фосфатная, белковая и гемоглобиновая - проанализированы отдельно, а механизмы их действия и взаимосвязь изложены на научной основе. Также рассмотрены патологические состояния, возникающие при нарушении функционирования буферных систем, и их диагностические и терапевтические аспекты.*

Ключевые слова: *буферная система, pH, ацидоз, алкалоз, бикарбонат, гемоглобин, гомеостаз, метаболизм, кислотно-щелочное равновесие.*

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FUNCTIONS AND MEDICAL SIGNIFICANCE OF BUFFER SYSTEMS IN THE HUMAN BODY

***Abstract**: This scientific article provides a detailed analysis of the chemical and physiological foundations of buffer systems in the human body, their role in maintaining acid–base balance, and their significance in clinical medicine. The main buffer systems—bicarbonate, phosphate, protein, and hemoglobin—are examined individually, and the mechanisms of their action and interrelationships are presented on a scientific basis. Pathological conditions arising from dysfunction of buffer systems, as well as their diagnostic and therapeutic aspects, are also discussed.*

***Keywords:** buffer system, pH, acidosis, alkalosis, bicarbonate, hemoglobin, homeostasis, metabolism, acid–base balance.*

Введение

Организм человека представляет собой сложную биохимическую систему, в которой все реакции протекают в строго определённых физико-химических условиях. Одним из важнейших показателей этих условий является кислотно-щелочное состояние среды, то есть уровень pH. В норме pH крови поддерживается в пределах 7,35-7,45, и даже незначительные отклонения от этих значений могут привести к серьёзным последствиям для организма.

В процессе метаболизма в организме постоянно образуются кислоты и основания. Например, при клеточном дыхании образуется углекислый газ, который, соединяясь с водой, образует угольную кислоту. В связи с этим в организме существуют специальные механизмы поддержания стабильного pH - буферные системы.

Буферные системы являются важнейшими защитными механизмами, стабилизирующими внутреннюю среду организма. Они обеспечивают не только химическое равновесие, но и нормальное протекание ферментативных реакций, газообмена и метаболических процессов.

Общее понятие о буферных системах

Буферная система - это система, состоящая из слабой кислоты и её сопряжённого основания или слабого основания и его сопряжённой кислоты, которая предотвращает резкие изменения pH при добавлении небольших количеств кислоты или щёлочи.

Основное свойство буферов заключается в их способности связывать избыточные ионы водорода (H^+) или гидроксид-ионы (OH^-), обеспечивая стабильность среды. Это свойство выражается уравнением Гендерсона-Хассельбаха:

$$pH = pKa + \log([A^-]/[HA])$$

Данное уравнение позволяет рассчитывать pH буферных растворов и объясняет их эффективность.

Виды буферных систем в организме

1. Бикарбонатная буферная система

Бикарбонатная система является одной из наиболее важных и быстро действующих буферных систем организма. Она состоит из угольной кислоты (H_2CO_3) и бикарбонат-иона (HCO_3^-):

$CO_2 + H_2O \rightleftharpoons H_2CO_3 \rightleftharpoons H^+ + HCO_3^-$

Особенностью данной системы является её тесная связь с двумя важнейшими органами - лёгкими и почками. Лёгкие регулируют pH за счёт выведения углекислого газа, а почки - за счёт реабсорбции или выведения бикарбонат-ионов.

Бикарбонатная система является основным буфером плазмы крови и обеспечивает значительную часть буферной ёмкости организма.

2. Фосфатная буферная система

Фосфатная буферная система функционирует преимущественно внутри клеток и в почечных канальцах. Она представлена следующей реакцией:

$H_2PO_4^- \rightleftharpoons H^+ + HPO_4^{2-}$

Данная система особенно эффективна во внутриклеточной среде и играет важную роль в нейтрализации кислот, образующихся в процессе метаболизма.

3. Белковая буферная система

Белки являются амфотерными веществами, содержащими функциональные группы с кислотными и основными свойствами, благодаря чему они способны принимать или отдавать ионы водорода.

Альбумины и глобулины плазмы крови обладают буферными свойствами. Белковые буферы также играют важную роль во внутриклеточной среде.

4. Гемоглобиновая буферная система

Гемоглобиновая буферная система локализована в эритроцитах и является одной из наиболее мощных буферных систем организма. Она не только транспортирует кислород, но и связывает ионы водорода, стабилизируя pH.

Дезоксигемоглобин обладает более выраженными буферными свойствами и играет важную роль в транспорте углекислого газа. Эта система особенно активна в тканях.

Физиологические функции буферных систем

Буферные системы выполняют ряд важнейших функций в организме:

- поддержание стабильного pH внутренней среды
- создание оптимальных условий для работы ферментов
- регуляция скорости биохимических реакций
- поддержание клеточной активности
- нейтрализация метаболических продуктов

Ферменты функционируют только в определённом диапазоне pH, поэтому буферные системы обеспечивают непрерывность ферментативных процессов.

Кислотно-щелочное равновесие и его регуляция

Кислотно-щелочное равновесие в организме регулируется тремя основными системами:

1. Химические буферные системы (быстрое действие)
2. Дыхательная система (удаление CO_2)
3. Почки (выведение и реабсорбция ионов)

Эти системы функционируют согласованно. Например, при повышении уровня CO_2 в крови усиливается дыхание, что способствует его выведению.

Нарушения буферных систем и патологические состояния

Ацидоз

Ацидоз характеризуется снижением pH крови ниже 7,35 и подразделяется на:

- метаболический ацидоз (например, диабетический кетоацидоз)
- респираторный ацидоз (в результате дыхательной недостаточности)

Алкалоз

Алкалоз характеризуется повышением pH крови выше 7,45:

- метаболический алкалоз (рвота, нарушения электролитного баланса)
- респираторный алкалоз (при гипервентиляции)

Эти состояния оказывают негативное влияние на сердце, мозг и другие жизненно важные органы.

Значение в клинической диагностике

В медицинской практике для оценки состояния буферных систем изучаются следующие показатели:

- уровень pH крови
- концентрация бикарбонатов
- парциальное давление CO_2 (pCO_2)
- анализ газов крови

Эти параметры имеют большое значение в реаниматологии, хирургии и интенсивной терапии.

Методы лечения и коррекции

При нарушении кислотно-щелочного равновесия применяются следующие меры:

- введение раствора бикарбоната натрия
- кислородотерапия
- искусственная вентиляция лёгких
- коррекция электролитного баланса

Метод лечения зависит от типа и тяжести патологического состояния.

Научные исследования и современные подходы

В последние годы активно развиваются научные исследования буферных систем. Современные диагностические методы позволяют более

точно оценивать кислотно-щелочное состояние организма. Также разрабатываются индивидуализированные подходы в интенсивной терапии.

Заключение

Буферные системы организма человека имеют жизненно важное значение, поскольку обеспечивают поддержание кислотно-щелочного равновесия и нормальное протекание всех физиологических процессов. Нарушение их функционирования приводит к серьёзным патологическим состояниям. Поэтому углублённое изучение буферных систем и их клинического значения является одним из важных направлений современной медицины.

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АРТЕРИАЛЬНАЯ ГИПЕРТЕНЗИЯ У БЕРЕМЕННЫХ: ИССЛЕДОВАНИЕ, ПРОВЕДЕННОЕ В КЛИНИКЕ САМАРКАНДСКОГО ГОСУДАРСТВЕННОГО МЕДИЦИНСКОГО УНИВЕРСИТЕТА

Аннотация*: Гипертония во время беременности представляет собой серьёзную проблему для здоровья, создавая риски как для матери, так и для плода. Цель данного исследования оценить распространённость, клинические особенности и методы лечения гипертонии у беременных женщин, проходивших лечение в клинике СамГМУ. Путём ретроспективного анализа данных были изучены демографические характеристики пациенток, динамика артериального давления, подходы к лечению и исходы беременности. Полученные результаты подчёркивают важность ранней диагностики и индивидуального подхода к лечению для снижения риска осложнений.*

Ключевые слова: *гипертония, беременность, преэклампсия, гестационная гипертония, материнское здоровье.*

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ARTERIAL HYPERTENSION IN PREGNANT WOMEN: A STUDY CONDUCTED AT THE CLINIC OF SAMARKAND STATE MEDICAL UNIVERSITY

Abstract: *Hypertension during pregnancy is a significant health issue, posing risks to both the mo1ther and fetus. This study aims to evaluate the prevalence, clinical features, and management of hypertension in pregnant women treated at the SamSMY clinic. Using retrospective data analysis, we assessed patient demographics, blood pressure trends, treatment approaches, and pregnancy outcomes. Our findings highlight the importance of early diagnosis and individualized treatment to reduce complications.*

Keywords: *hypertension, pregnancy, preeclampsia, gestational hypertension, maternal health.*

Введение

Гипертония во время беременности остаётся одной из ведущих причин материнской и перинатальной заболеваемости и смертности во всём мире.

Повышенное артериальное давление у беременных женщин может проявляться в виде хронической гипертонии, гестационной гипертонии или осложнённой преэклампсии — состояния, которое связано не только с повышенным артериальным давлением, но и с нарушением функции таких органов, как почки и печень. Эти состояния значительно повышают риск развития серьёзных осложнений, включая преждевременные роды, задержку развития плода, плацентарную недостаточность и даже смерть матери и ребёнка. Современная медицина уделяет особое внимание своевременному выявлению и эффективному лечению артериальной гипертензии у беременных, поскольку от этого зависит здоровье матери и плода. Несмотря на достижения в технологиях диагностики и лечения, гипертония остается серьезной проблемой и требует комплексного подхода к ведению беременных женщин.

Беременные женщины с артериальной гипертензией регулярно наблюдаются и лечатся в клинике СамГМУ что позволяет изучать особенности течения заболевания и эффективность применяемых терапевтических подходов. В настоящем исследовании проанализированы клиническая характеристика, методы лечения и исходы беременности у пациенток с различний.

Цель исследования:

Изучить особенности артериальной гипертензии у беременных женщин, диагностированных и лечившихся в клинике СамДТУ, и оценить эффективность применяемых методов диагностики и лечения. Определить распространенность и виды артериальной гипертензии у беременных женщин, диагностированных и лечившихся в клинике СамГМУ. Изучение клинических проявлений и факторов риска. Анализ методов лечения и их влияния на исходы беременности.

Исследование проводилось в клинике Самаркандского государственного медицинского университета с января по июнь 2025 года. Обследовано 45 беременных женщин с диагнозом артериальная гипертензия.

Критерии включения:

• Беременные женщины с артериальным давлением ≥140/90 мм рт. ст.

• Возраст от 18 до 45 лет

• Подтверждённый диагноз хронической или гестационной гипертензии

Методы:

• Анамнез и клиническое обследование.

• Регулярный контроль артериального давления.

• Лабораторные исследования (общий анализ крови, общий анализ мочи, биохимия).

• Ультразвуковое исследование плода и допплерометрия сосудов плаценты.

• Статистический анализ с использованием SPSS.

• Типы артериальной гипертензии.

Тип гипертонии	Номер (n)	Процент (%)
Гестационный	26	57.8
Хронический	12	26.7
Преэклампсия	7	15.5

• Средний возраст пациентов: 32,1 ± 4,5 года.

• Частота (%) осложнений беременности

Осложнения	Surunkali (%)	Gestatsion (%)	Preeklampsiya (%)
Преждевременные роды	8.3	7.7	21.4
Задержка роста плода	4.2	3.8	14.3
Смерть плода	0	0	7.1

Лечение: антигипертензивные препараты

Употребление нартиков	скорость (%)	Эффективность (%)	Побочные эффекты (%)
Метилдопа	62	87	9
Лабеталол	29	89	7
Нифидепин	9	78	4

Обсуждение

Результаты исследования подтвердили, что гестационная гипертензия остаётся наиболее распространённой формой гипертензивных расстройств у беременных – 57,8%. Доля хронической гипертензии составляет 26,7%, а преэклампсии – 15,5%, что указывает на её серьёзное осложнение с наибольшим риском перинатальных осложнений.

Частота осложнений у пациенток с преэклампсией оказалась значительно выше, особенно в плане преждевременных родов и задержки роста плода, что соответствует мировым тенденциям и требует особого внимания при ведении таких беременностей.

Применение современных антигипертензивных препаратов, таких как метилдопа и лабеталол, показало высокую эффективность и хорошую переносимость, что способствует улучшению клинических результатов.

Эти данные подчеркивают необходимость раннего выявления и постоянного мониторинга гипертонии во время беременности, что может снизить риски и улучшить здоровье как матери, так и ребенка.

Заключение

Исследование артериальной гипертензии у беременных, проведенное в клинике СамГМУ с участием 45 пациенток, подтвердило высокую распространенность гестационной гипертензии. Преэклампсия, хотя и встречается реже, остается серьезной угрозой для здоровья матери и плода, характеризуясь высоким уровнем осложнений, таких как преждевременные роды и задержка роста плода.

Раннее выявление, регулярный контроль артериального давления и персонализированная антигипертензивная терапия, включающая препараты с хорошей эффективностью и переносимостью, могут значительно снизить риск неблагоприятных исходов беременности.

Данные исследования подчеркивают важность комплексного подхода к ведению беременных женщин с артериальной гипертензией, что способствует успешному течению беременности и рождению здорового ребенка.

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СРАВНИТЕЛЬНАЯ ОЦЕНКА БИОЛОГИЧЕСКОЙ АКТИВНОСТИ КОАГУЛАЗООТРИЦАТЕЛЬНЫХ СТАФИЛОКОККОВ ПРИ КОЖНОЙ ПАТОЛОГИИ И У ЗДОРОВЫХ ЛИЦ

Аннотация. *В работе проведён сравнительный анализ биологических свойств коагулазоотрицательных стафилококков, изолированных от пациентов с кожной патологией и практически здоровых лиц. Исследовано 391 штамм с оценкой ДНКазной активности, продукции гемолизинов, бактериоциногенности, пигментообразования и антибиотикорезистентности. Показано, что изученные изоляты характеризуются биологической гетерогенностью и наличием отдельных признаков вирулентности. При этом по большинству показателей статистически значимых различий между группами не выявлено. Исключение составила продукция δ-гемолизина, которая достоверно чаще регистрировалась у штаммов, выделенных от больных ($p < 0,05$). Полученные данные свидетельствуют о преимущественно оппортунистическом характере коагулазоотрицательных стафилококков при кожной патологии.*

Ключевые слова: *коагулазоотрицательные стафилококки, кожная патология, δ-гемолизин, вирулентность, антибиотикорезистентность, биологические свойства, оппортунистическая инфекция.*

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COMPARATIVE EVALUATION OF THE BIOLOGICAL ACTIVITY OF COAGULASE-NEGATIVE STAPHYLOCOCCI IN SKIN PATHOLOGY AND IN HEALTHY INDIVIDUALS

Abstract. *This study presents a comparative analysis of the biological properties of coagulase-negative staphylococci isolated from patients with skin pathology and from healthy individuals. A total of 391 strains were examined, including the assessment of DNase activity, hemolysin production, bacteriocinogenic activity, pigment formation, and antibiotic resistance. The results demonstrated that the studied isolates exhibit biological heterogeneity and possess certain virulence-associated traits. However, no statistically significant differences were observed between the groups for most of the evaluated parameters. The only exception was δ-hemolysin production, which was significantly more frequent among strains isolated from patients ($p < 0.05$). These findings suggest that coagulase-negative staphylococci predominantly act as opportunistic microorganisms in the context of skin pathology.*

Keywords: *coagulase-negative staphylococci, skin pathology, δ-hemolysin, virulence, antibiotic resistance, biological properties, opportunistic infection*

Введение

В лабораторной практике одним из ключевых критериев идентификации стафилококков традиционно служит реакция плазмокоагуляции [4]. Коагулазоотрицательные стафилококки (КНС) длительное время рассматривались как представители нормального микробиоценоза человека и оценивались преимущественно как комменсальные микроорганизмы с ограниченным клинико-эпидемиологическим значением [1,7].

Вместе с тем результаты современных фундаментальных и клинических исследований последних десятилетий свидетельствуют о необходимости пересмотра данной точки зрения [3,8]. Установлено, что КНС, в частности *Staphylococcus epidermidis*, могут выступать в роли оппортунистических патогенов и участвовать в развитии различных инфекционных процессов, включая инфекции мочевыводящих путей, неонатальные конъюнктивиты, раневые и гнойно-септические осложнения, гастроэнтериты, а также инфекционный эндокардит [2].

В связи с этим комплексное изучение биологических и вирулентных свойств коагулазоотрицательных стафилококков, а также переоценка их патогенного потенциала представляют собой одно из актуальных направлений современной микробиологии и клинической медицины [5,6].

Цель исследования

Оценить потенциальную патогенность коагулазоотрицательных стафилококков на основе сравнительного анализа их биологических свойств

у штаммов, изолированных от пациентов с кожной патологией и у практически здоровых лиц.

Материалы и методы

В исследование было включено 120 человек, из которых 79 составляли пациенты с различными формами кожных заболеваний, а 41- группа практически здоровых лиц. Забор биологического материала осуществляли с использованием стерильных тампонов со слизистой оболочки губ, носа и ротоглотки, слизистой оболочки половых органов, а у пациентов дополнительно — из очагов кожных поражений. Полученные образцы высевали на желточно-солевой агар с последующей инкубацией при температуре 37°С в течение 48 часов. Выделенные колонии пересевали на мясопептонный агар для дальнейшего изучения их морфологических и биохимических характеристик. У изолированных штаммов коагулазоотрицательных стафилококков определяли активность лизоцимоподобного фермента, способность к продукции гемолизинов (α, β и δ), пигментообразование, бактериоциногенную активность, а также фагочувствительность с использованием стандартных микробиологических методов.

Результаты и обсуждение

В ходе исследования было проанализировано 391 штамм коагулазоотрицательных стафилококков. Полученные данные свидетельствуют о выраженной биологической гетерогенности данной группы микроорганизмов, а также о наличии у части изолятов признаков, ассоциированных с вирулентностью.

Установлено, что ДНКазная активность выявлялась у 41,3% штаммов, что может указывать на их потенциальную способность к деструкции тканевых структур и инвазии. Кроме того, у 34,6% изолятов отмечена продукция лизоцимоподобного фермента, что, вероятно, способствует повышению их конкурентоспособности в условиях микробного сообщества.

Анализ гемолитической активности показал, что способность к продукции α- и δ-гемолизинов регистрировалась соответственно у 37% и 35% штаммов. При этом β-гемолизин не был выявлен ни в одном случае, что может свидетельствовать о невысокой распространенности классических высоковирулентных фенотипов в исследуемой популяции.

Бактериоциногенная активность была обнаружена лишь у 15,3% штаммов, что характеризует ограниченный уровень антагонистических взаимодействий в составе микробиоценоза. В то же время у 48,6% изолятов выявлена множественная устойчивость к антибиотикам, что существенно повышает их клиническую значимость и указывает на возможную роль в формировании оппортунистических инфекционных процессов.

Способность к пигментообразованию отмечена только у 5,9% штаммов, что свидетельствует о низкой распространенности данного признака среди исследуемых изолятов.

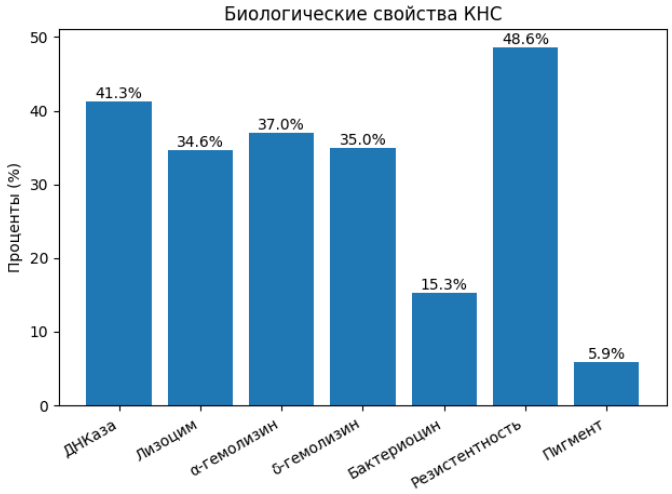

Рис. 1. Спектр биологических свойств коагулазоотрицательных стафилококков.

Проведённый сравнительный анализ продемонстрировал отсутствие статистически достоверных различий по большинству исследованных биологических характеристик между штаммами, выделенными от пациентов с кожной патологией и практически здоровых лиц.

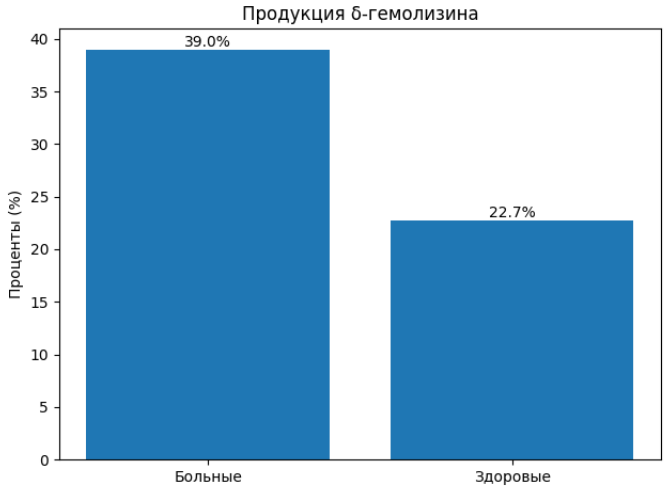

Рис. 2. Продукция δ-гемолизина коагулазоотрицательными стафилококками.

Анализ данных, представленных на рис. 2, показал наличие статистически значимых различий по частоте продукции δ-гемолизина между исследуемыми группами. Так, данный показатель у пациентов с кожной патологией составил 39%, тогда как у практически здоровых лиц - 22,7% ($p < 0,05$). Полученные результаты свидетельствуют о возможном участии данного фактора в реализации патогенетических механизмов инфекционного процесса.

В целом проведённое исследование подтверждает, что коагулазоотрицательные стафилококки характеризуются выраженной биологической гетерогенностью, а отдельные штаммы обладают признаками, ассоциированными с вирулентностью. Вместе с тем установлено, что уровень биологической активности штаммов,

изолированных из очагов кожных поражений, не имеет тенденции к значительному повышению по сравнению с изолятами, полученными от здоровых лиц. Это позволяет рассматривать коагулазоотрицательные стафилококки преимущественно не как первичные патогены, а как оппортунистические микроорганизмы или компоненты сопутствующей микрофлоры.

В то же время более высокая частота продукции δ-гемолизина у пациентов позволяет рассматривать данный фактор в качестве потенциального маркера патогенности. Цитотоксическое действие δ-гемолизина и его влияние на клеточные мембраны могут играть существенную роль в развитии инфекционно-воспалительных процессов.

Дополнительно следует отметить высокий уровень антибиотикорезистентности (48,6%) среди исследованных штаммов, что значительно повышает их клиническую значимость и указывает на необходимость учёта данных микроорганизмов в патогенезе оппортунистических инфекций.

Сравнительный анализ штаммов коагулазоотрицательных стафилококков, изолированных из различных анатомических локусов, выявил определённую вариабельность их биологических свойств в зависимости от места выделения. В частности, штаммы, полученные со слизистой оболочки половых органов, характеризовались более высокой частотой выявления ДНКазной активности, а также повышенной продукцией α- и δ-гемолизинов по сравнению с изолятами из других биотопов. Данный факт может свидетельствовать о том, что особенности микроэкологической среды указанного локуса способствуют более выраженной экспрессии потенциальных факторов вирулентности у стафилококков.

В то же время штаммы, выделенные из ротоглотки, отличались сравнительно более высокой бактериоциногенной активностью, что, вероятно, отражает их способность к эффективной конкуренции с другими представителями микробиоценоза. При этом большинство остальных изученных биологических характеристик проявлялись с сопоставимой частотой независимо от анатомического источника, что указывает на относительную стабильность фенотипического профиля коагулазоотрицательных стафилококков.

Выводы

Таким образом, коагулазоотрицательные стафилококки являются широко распространёнными представителями резидентной микрофлоры организма человека. Несмотря на наличие у части штаммов факторов вирулентности, их роль в развитии кожных заболеваний, по-видимому, носит вторичный или оппортунистический характер. В то же время увеличение частоты продукции δ-гемолизина позволяет рассматривать данный показатель в качестве дополнительного диагностического маркера при оценке патогенного потенциала коагулазоотрицательных стафилококков.

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ДИНАМИКА СОДЕРЖАНИЯ АСКОРБИНОВОЙ КИСЛОТЫ В СЫВОРОТКЕ КРОВИ И ГРУДНОМ МОЛОКЕ В ПЕРИОД БЕРЕМЕННОСТИ И ЛАКТАЦИИ

Аннотация. *Исследование посвящено оценке содержания аскорбиновой кислоты в сыворотке крови и грудном молоке в период беременности и лактации. Проанализированы образцы крови пупочной вены, крови беременных женщин на различных сроках гестации, а также молозива и грудного молока. Установлено, что содержание аскорбиновой кислоты в крови пупочной вены выше, чем в крови матери, при этом в процессе беременности наблюдается его постепенное снижение. В молозиве выявлен высокий уровень витамина С, тогда как в грудном молоке отмечена его вариабельность в разные периоды лактации. Полученные данные свидетельствуют о значительной роли материнского организма в обеспечении плода и новорождённого витамином С.*

Ключевые слова: *аскорбиновая кислота, беременность, лактация, сыворотка крови, грудное молоко, молозиво, витамин С*

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DYNAMICS OF ASCORBIC ACID CONTENT IN BLOOD SERUM AND BREAST MILK DURING PREGNANCY AND LACTATION

Abstract. *This study is devoted to the assessment of ascorbic acid content in blood serum and breast milk during pregnancy and lactation. Samples of umbilical cord blood, peripheral blood of pregnant women at different gestational stages, as well as colostrum and breast milk were analyzed. It was established that the level of ascorbic acid in umbilical cord blood is higher than in maternal blood, while a gradual decrease is observed throughout pregnancy. A high concentration*

of vitamin C was detected in colostrum, whereas its level in breast milk showed variability during different periods of lactation. The obtained data indicate the significant role of the maternal organism in providing the fetus and newborn with vitamin C.

Keywords: *ascorbic acid, pregnancy, lactation, blood serum, breast milk, colostrum, vitamin C.*

Введение

В период беременности и лактации в организме женщины происходят значительные изменения обмена веществ, что сопровождается повышенной потребностью в витаминах, в частности в аскорбиновой кислоте. Аскорбиновая кислота, обладая выраженными антиоксидантными свойствами, защищает клетки от окислительного стресса, участвует в синтезе коллагена и обеспечивает нормальное функционирование иммунной системы. Согласно данным исследований, проведённых учёными Национальных институтов здравоохранения США, гомеостаз аскорбиновой кислоты в организме человека находится под строгим регуляторным контролем, а её дефицит оказывает неблагоприятное влияние на физиологические процессы [1,7,8]. Снижение уровня аскорбиновой кислоты в период беременности обусловлено её активным потреблением развивающимся плодом, что подтверждается различиями в концентрации витамина в крови матери и в крови пупочной вены [2,6]. В период лактации аскорбиновая кислота выделяется с грудным молоком, причём её содержание во многом определяется характером питания женщины. Результаты исследований свидетельствуют о том, что при недостаточном поступлении витамина с пищей его концентрация в грудном молоке снижается [3,5]. По данным Всемирной организации здравоохранения, суточная потребность в витамине С у беременных и кормящих женщин возрастает, а его дефицит может оказывать отрицательное влияние как на состояние матери, так и на здоровье ребёнка [4]. В связи с этим изучение динамики содержания аскорбиновой кислоты в сыворотке крови и грудном молоке в период беременности и лактации представляет собой важную научно-практическую задачу, имеющую значение для профилактики гиповитаминозов и оптимизации рационального питания.

Цель исследования

Определение содержания аскорбиновой кислоты в сыворотке крови пупочной вены, периферической крови женщин на различных сроках беременности, а также в составе грудного молока.

Материалы и методы исследования

В исследование были включены 59 рожениц, у которых определяли содержание аскорбиновой кислоты в сыворотке крови пупочной вены. Кроме того, было проанализировано 20 образцов первичного молока (молозива) и 80 образцов грудного молока, полученных в различные периоды лактации. Также проведено определение уровня витамина С в 82

пробах крови женщин на разных сроках беременности. Образцы крови пупочной вены, молозива, а также крови беременных женщин на различных сроках гестации были получены в акушерско-гинекологическом отделении Самаркандского государственного медицинского университета. Определение содержания аскорбиновой кислоты в сыворотке крови и грудном молоке проводилось микроаналитическим методом, предложенным профессором Л. Н. Лапиным, основанным на использовании 2,6-дихлорфенолиндофенола. С целью повышения точности анализа из исследуемых образцов предварительно удаляли белки с получением безбелкового фильтрата. Время взаимодействия фильтрата с красителем было максимально сокращено, что позволяло минимизировать влияние других редуцирующих веществ и тем самым повышало достоверность получаемых результатов. Применённый метод обеспечивал относительно селективное определение аскорбиновой кислоты в биологических жидкостях.

Результаты и их обсуждение

По результатам проведённого анализа установлено, что среднее содержание аскорбиновой кислоты в крови пупочной вены составило 2,13 мг%, при колебаниях от 0,50 до 4,16 мг%. В крови беременных женщин уровень аскорбиновой кислоты варьировал в пределах от 0,50 до 5,28 мг% в зависимости от срока беременности, при среднем значении 1,56 мг% (таблица 1).

Таблица 1

Содержание аскорбиновой кислоты в сыворотке крови женщин на различных сроках беременности

Срок беременности			
5-8 недель	6	0,50-5,28	2,68
9-12 недель	9	1,38-2,74	2,08
13-16 недель	11	0,90-3,52	1,85
17-20 недель	8	0,90-3,52	1,76
21-24 недель	15	0,90-2,44	1,60
25-28 недель	13	0,90-2,1	1,31
29-32 недель	12	0,50-1,76	1,03
33-36 недель	4	0,50-1,38	0,92
37-40 недель	4	0,50-0,90	0,70

Анализ данных, представленных в таблице 1, свидетельствует о последовательном снижении содержания аскорбиновой кислоты в сыворотке крови женщин по мере увеличения срока беременности. Так, при сроке 5–8 недель средний уровень витамина С составлял 2,68 мг%, тогда как к 17–20 неделям он снижался до 1,76 мг%. В поздние сроки беременности (37–40 недель) отмечено дальнейшее уменьшение данного показателя до 0,70 мг%.

Сопоставительный анализ содержания аскорбиновой кислоты в крови беременных женщин и крови пупочной вены показал, что последняя характеризуется более высоким уровнем данного витамина. Это, вероятно, обусловлено не только необходимостью обеспечения интенсивных

окислительно-восстановительных процессов в организме быстро развивающегося плода, но и формированием определённого запаса аскорбиновой кислоты в его тканях.

Вместе с тем накопление аскорбиновой кислоты в организме плода происходит параллельно с истощением её запасов в организме матери. Указанный дефицит может усугубляться в период лактации, поскольку молозиво и грудное молоко содержат сравнительно высокие концентрации аскорбиновой кислоты, выделяющейся за счёт материнского организма.

С целью оценки суточного выделения аскорбиновой кислоты молочными железами был проведён анализ 100 образцов грудного молока и молозива, полученных у женщин в различные периоды лактации. Полученные результаты представлены в таблице 2.

Таблица 2

Содержание витамина С в грудном молоке женщин в различные периоды лактации

Сроки лактации	Количество случаев	Предельные колебания (мг %)	Среднее значение (мг %)
Первичное молоко (молозиво)	20	0,6-6,0	3,0
в 1 месяц	7	0,2-1,8	0,5
в 2 месяца	4	0,4-2,2	1,2
в 2 месяца	7	0,2-3,2	0,9
в 2 месяца	8	0,2-3,4	1,4
в 5 месяцев	10	0,2-2,8	1,1
в 6 месяцев	9	0,2-2,2	0,9
в 7 месяцев	5	0,2-2,4	1,3
в 8 месяцев	4	0,6-3,2	1,4
в 9 месяцев	4	0,4-1,2	0,9
в 10 месяцев	4	0,4-1,4	0,9
в 11 месяцев	4	1,0-3,8	2,0
в возрасте 12–24 месяцев	14	0,1-4,9	2,4

Полученные результаты свидетельствуют о высоком содержании аскорбиновой кислоты в молозиве: её средний уровень составил 3,0 мг% при колебаниях в пределах 0,6–6,0 мг%. В грудном молоке содержание аскорбиновой кислоты характеризовалось значительной вариабельностью в различные периоды лактации и в среднем составляло 1,37 мг%.

Согласно данным А. Ф. Тура, у здоровых кормящих женщин суточная продукция молока в среднем составляет 1,0–1,5 литра, а в отдельных случаях может увеличиваться в 2–3 раза. В связи с этим в послеродовом периоде женщины теряют с грудным молоком в среднем 20–25 мг аскорбиновой кислоты в сутки, что составляет приблизительно 50% суточной потребности в данном витамине.

Выводы

Сыворотка крови пупочной вены характеризуется высоким содержанием аскорбиновой кислоты, что свидетельствует о значительном потреблении данного витамина организмом развивающегося плода. Беременность является физиологическим состоянием, сопровождающимся относительным снижением обеспеченности организма женщины витамином С. В послеродовом периоде истощение запасов аскорбиновой кислоты усиливается, поскольку до 50% суточного количества данного витамина выделяется через молочные железы.

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АНАЛИЗ ДИНАМИКИ РАСПРОСТРАНЕНИЯ ОСТРЫХ КИШЕЧНЫХ ИНФЕКЦИЙ В САМАРКАНДСКОЙ ОБЛАСТИ

Аннотация. *В работе представлен анализ динамики распространения острых кишечных инфекций среди детского населения Самаркандской области за 2023–2024 годы. Установлено увеличение заболеваемости в 1,5 раза, а также рост интенсивных показателей. Выявлены территориальные различия с наиболее высокими уровнями в городе Самарканде, Самаркандском и Ургутском районах. Проведён анализ этиологической структуры, показавший незначительный рост сальмонеллёза и снижение бактериальной дизентерии. Отмечены недостатки в организации бактериологических исследований, особенно в отдалённых районах, что приводит к диагностическим ошибкам и нерациональному лечению. Полученные результаты подчёркивают необходимость совершенствования эпидемиологического надзора и повышения качества диагностики и профилактики острых кишечных инфекций среди детей.*

Ключевые слова: *острые кишечные инфекции, дети, заболеваемость, эпидемиология, динамика, Самаркандская область, диагностика, профилактика*

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ANALYSIS OF THE DYNAMICS OF THE SPREAD OF ACUTE INTESTINAL INFECTIONS IN THE SAMARKAND REGION

Abstract. *This study analyzes the dynamics of acute intestinal infections among children in the Samarkand region for 2023–2024. A 1.5-fold increase in incidence and a rise in morbidity rates were identified. Territorial differences were observed, with the highest rates in Samarkand city, Samarkand district, and Urgut district. The etiological analysis showed a slight increase in salmonellosis and a decrease in bacterial dysentery. недостатки в бактериологической диагностике, особенно в отдалённых районах, were revealed, leading to diagnostic errors and inappropriate treatment. The findings highlight the need to improve epidemiological surveillance, diagnostic quality, and preventive measures for acute intestinal infections in children.*

Keywords: *acute intestinal infections, children, morbidity, epidemiology, dynamics, Samarkand region, diagnosis, prevention*

Введение

Острые кишечные инфекции широко распространены во всем мире и остаются одной из значимых проблем здравоохранения, представляя серьёзную угрозу для здоровья населения [1,8]. Данные заболевания особенно часто встречаются среди детей, лиц пожилого возраста и людей с ослабленной иммунной системой, характеризуясь высоким уровнем заболеваемости и риском развития осложнений [2]. В Самаркандской области на распространение острых кишечных инфекций оказывают влияние такие факторы, как рост численности населения, внутренняя и внешняя миграция, различия в санитарно-гигиенических условиях, а также выраженная сезонность (в частности, в летний период) [3,7]. Дополнительную роль играют нарушения правил хранения и приготовления пищевых продуктов, а также недостаточный уровень санитарного контроля, что может способствовать увеличению заболеваемости [4]. В настоящее время особую значимость приобретает углублённое изучение эпидемиологических особенностей данных инфекций [5]. Анализ динамики их распространения позволяет выявить основные факторы риска и обосновать эффективные меры профилактики [6]. В этой связи исследование динамики острых кишечных инфекций в Самаркандской области, выявление закономерностей их распространения и разработка научно обоснованных рекомендаций по снижению заболеваемости представляют важную задачу для практического здравоохранения и системы общественного здоровья [3].

Цель исследования

Изучить эпидемиологическую ситуацию по диарейным заболеваниям у детей среди населения Самаркандской области.

Материалы и методы

Исследование выполнено на основе статистических данных Управления санитарно-эпидемиологического благополучия и общественного здоровья Самаркандской области. Проведён анализ показателей заболеваемости острыми кишечными инфекциями у детей за 2023–2024 годы.

Результаты и обсуждение

В 2024 году отмечен рост заболеваемости острыми кишечными инфекциями среди детей по сравнению с 2023 годом в 1,5 раза: зарегистрировано 8170 случаев против 4821 в 2023 году. Интенсивный показатель на 100 тыс. населения составил 198,9, тогда как в 2023 году он равнялся 121,9.

Анализ полученных данных показал, что наиболее высокие показатели заболеваемости выявлены среди населения города Самарканда - 496,5, Самаркандского района - 378,6 и Ургутского района - 208,0, что превышает среднеобластной уровень.

При изучении заболеваемости по городам и районам области в 2023-2024 годах установлено, что в городе Самарканде зарегистрировано 1633/3151 случаев (интенсивный показатель 271,3/793,5 соответственно), в городе Каттакургане - 43/9 (51,1/106,4), в Самаркандском районе - 189/1025 (70,3/378,6), в Ургутском районе - 491/1062 (96,5/208,0). Полученные данные свидетельствуют о нарастающей тенденции заболеваемости острыми кишечными инфекциями среди детского населения.

При анализе этиологической структуры установлено, что заболеваемость сальмонеллёзом в области увеличилась: если в 2023 году зарегистрировано 2 случая, то в 2024 году - 4 случая, при этом интенсивный показатель составил 0,1 на 100 тыс. населения.

В то же время отмечено снижение заболеваемости бактериальной дизентерией на 54,7%: в 2023 году зарегистрировано 53 случая (интенсивный показатель - 1,3), в 2024 году - 29 случаев (0,7 на 100 тыс. населения). Удельный вес дизентерии в общей структуре острых кишечных инфекций составил 0,4%.

Областной показатель заболеваемости дизентерией составил 0,7 на 100 тыс. населения. При сравнительном анализе по территориям наиболее высокие значения отмечены в Нурабадском районе - 5,9, Нарпайском - 2,9, городе Каттакургане - 2,4, Тайлякском районе - 1,9; более низкие показатели зарегистрированы в городе Самарканде - 0,7, Пайарыкском - 0,4, Пастдаргомском - 0,3 и Пахтачинском районах - 0,6.

Анализ возрастной структуры показал, что среди всех зарегистрированных случаев острых кишечных инфекций доля детей до 1 года составила 14,3% (наименьший показатель в Пахтачинском районе - 1,8%), а среди детей до 2 лет - 51,8% (наименьший показатель в городе Каттакургане - 18,3%).

В 2024 году в городах и районах Самаркандской области функционировало более 280 медицинских пунктов, через которые было выявлено 7474 пациента (в 2023 году - 4795). В среднем на один медицинский пункт приходилось 26,7 обследованных пациентов. В разрезе территорий наибольшее среднее число обращений на один пункт отмечено в Нурабадском районе - 7,3, Кушрабадском - 6,2, Нарпайском - 3,8, Джамбайском - 3,3, а также в Пайарыкском и Каттакурганском районах - по 2,6 пациента.

Выводы

Полученные результаты свидетельствуют о том, что заболеваемость острыми кишечными инфекциями среди детей увеличилась в 1,5 раза по сравнению с предыдущим годом. Это указывает на недостаточный уровень выявления данных заболеваний и проведения своевременных противоэпидемических мероприятий. Несмотря на значительный рост заболеваемости в 2024 году в ряде районов, в Нурабадском, Пахтачинском и Ургутском районах не проводились бактериологические исследования у контактных лиц. Установлено, что в некоторых отдалённых районах

недостаточно организовано проведение бактериологических исследований для диагностики таких инфекций, как брюшной тиф, паратиф, дизентерия и сальмонеллёз, а также отмечается нехватка квалифицированных специалистов. В связи с этим часть детей с острыми кишечными инфекциями получала лечение в соматических отделениях по ошибочному диагнозу.

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ИНФОРМАЦИОННЫЕ И КОММУНИКАТИВНЫЕ ТЕХНОЛОГИИ

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ПОВЫШЕНИЕ ЭФФЕКТИВНОСТИ ПРОИЗВОДСТВЕННО-ВНЕДРЕНЧЕСКОГО ЦИКЛА ИМПОРТОЗАМЕЩЕННЫХ ВЫСОКОНАГРУЖЕННЫХ ПРОГРАММНО-АППАРАТНЫХ КОМПЛЕКСОВ

Аннотация. *В статье рассмотрена проблема уменьшения временных затрат на изготовление и внедрение импортозамещенных высоконагруженных программно-аппаратных комплексов (ПАК). В ходе выполнения анализа всех имеющихся процессов, была разработана целевая модель, где были представлены контрольные точки, артефакты и технические средства для систематизации и контроля деятельности. Пилотный цикл с четырьмя экземплярами ПАК показал снижение времени производственного цикла на 30%, времени внедрения на 31%, а количество возвратов уменьшилось на 65-70%.*

Ключевые слова: *программно-аппаратный комплекс, жизненный цикл, импортозамещение, управление конфигурацией, поток создания ценности, коэффициент процессного цикла, автоматизация проверок.*

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IMPROVING THE EFFICIENCY OF THE PRODUCTION AND IMPLEMENTATION CYCLE OF IMPORT-SUBSTITUTED HIGH-LOAD SOFTWARE-HARDWARE COMPLEXES

Abstract. *The article discusses the problem of reducing the time required for the production and implementation of import-substituting high-load software*

and hardware complexes (HSC). During the analysis of all existing processes, a target model was developed, which included control points, artifacts, and technical tools for systematizing and monitoring activities. A pilot cycle with four instances of HSC resulted in a 30% reduction in production cycle time, a 31% reduction in implementation time, and a 65-70% reduction in the number of returns.

Keywords: *hardware-software complex, lifecycle management, import substitution, configuration management, value stream mapping (VSM), process cycle efficiency (PCE), automated verification.*

Введение

Актуальность рассматриваемой темы обусловлена тем, что на сегодняшний день в условиях активного импортозамещения в сегменте отечественных высоконагруженных программно-аппаратных комплексов происходят серьезные изменения.

Идет тенденция смены используемого программного обеспечения от компаний-производителей из других стран на отечественное программное обеспечение и комплектующие, что приводит к увеличению разнообразия конфигураций и увеличению сложности настройки и тестирования. В свою очередь за счет ожиданий заказчиков и большей зрелости зарубежных решений повышаются требования к качеству продукции и срокам их внедрения.

Программно-аппаратные комплексы (ПАК), это многокомпонентные системы, включающие в себя серверное оборудование, системное и прикладное программное обеспечение, средства управления, приобретаемые у различных поставщиков и не всегда на одинаково зрелой стадии развития. В частности, при замещении иностранных комплектующих и расширении ассортимента импортозамещаемых изделий усложняется их совместное применение в законченных изделиях и усложняется взаимодействие с иными компонентами. Вследствие этого проявляются проблемы «сырости» (недостаточной зрелости) новых компонентов или комплекса, что приводит к несовместимости и ошибкам, проявляющиеся в реальных условиях на поздних стадиях производства и внедрения ПАК.

Цель исследования - снижение временных затрат на производства и внедрения на этапах жизненного цикла импортозамещенных высоконагруженных ПАК. Объект исследования - процессы управления жизненным циклом ПАК на этапах производства и внедрения. Предмет исследования - средства, направленные на повышение согласованности и управляемости этими процессами. Новизна работы, разработка и пилотная проверка целевой модели управления жизненным циклом импортозамещенных высоконагруженных ПАК на этапах производства и внедрения. Модель сочетает в себе критерии готовности, артефакты и автоматизированные проверки, обеспечивающее сокращение длительности циклов и возвратов.

Методы и материалы исследования

Исследование было выполнено на материалах реального производственно-внедренческого цикла предприятия, выпускающего импортозамещенные ПАК.

В качестве основы были взяты соответствующие международные и отечественные стандарты в области жизненного цикла систем и программного обеспечения. В соответствии с ГОСТ 57193 [1] приводится рамочная модель жизненного цикла и устанавливаются требования к документам по этапам и воздействиям на переходы между состояниями системы. Стандарт ISO 15288 [2] охватывает жизненный цикл систем, в том числе их разработку, эксплуатацию и поддержку. Он предусматривает возможность итеративного и параллельного выполнения процессов. А управление конфигурацией в настоящей работе опирается на положения стандарта ISO 10007 [3] по фиксации базовой линии, учету изменений и обеспечению прослеживаемости состава изделия, а также на принципы системной инженерии, в частности, трассируемости «требование, проверка, результат», планирования верификации и смещения контроля в сторону ранних этапов [4].

На первом этапе был проведен анализ текущих бизнес-процессов – интервью с сотрудниками, изучения внутренней документации, фиксирования ролей, контрольных точек, возвратов и артефактов на каждом этапе. По выявленным проблемам разработана целевая модель процессов с применением подхода, который оставляет структуру процессов, но меняет конкретные участки, приводящие к потере времени.

Так как целевая модель явилась концептуально-теоретической частью работы, для проверки эффективности целевой модели была использована методологии единичного случая (case study) на пилотном цикле из четырех экземпляров программно-аппаратного комплекса. Для количественной оценки эффективности использован метод картирования потока создания ценности (Value Stream Mapping, VSM) [6] с расчетом коэффициента эффективности потока (Process Cycle Efficiency, PCE).

Результаты исследования

Обзор ситуации выявил, что существенные потери времени, складываются в зонах разграничения ответственности между этапами, где отсутствует формализация критериев готовности к переходам, используются различные по структуре и полноте протоколы проверок, не ведется учет изменений конфигурации изделия. Возвраты, обусловленные поздним выявлением несоответствий, в среднем составляли 5,7 случаев на партию в производстве и 3,3 случаев на внедрении.

Предложена модель, в основе которой на каждой стадии создаются конечные артефакты, а переход между стадиями осуществляется согласно критериям готовности. Механизмы обнаружения несоответствий были введены на ранних этапах, что реализует принцип «сдвига влево» (shift left), широко применяемый в практике системной инженерии [4], [5]. Были

реализованы проверки стандарта модуля, введен счетчик возвратов с эскалацией на руководство, аудит конфигурационных файлов, параллельный запуск приемки и подготовки конфигураций, тестирование с использованием диагностического профиля. В процессе внедрения производится проверка конфигурации с фактом на площадке, разовое прохождение smoke-теста, диагностика профиля площадки с автоматическим сравнением с эталоном и приемо-сдаточные испытания (ПСИ) по унифицированному чек-листу и добавление проблем в реестр замечаний, чтобы учесть существующие сложности в будущем.

В рамках усовершенствованной модели были разработаны и внедрены шаблоны и артефакты: регламент управления конфигурацией на базе Ansible, система автоматизированной проверки параметров и фреймворк для массовой удаленной диагностики узлов.

Таблица 1.

Сравнительный анализ показателей AS-IS и TO-BE

Показатель	AS-IS (n=12)	TO-BE (n=4)	Изменение
Длит. произв. цикла, раб. дн./экз.	18,5	13,0	–30%
Длит. цикла внедрения, раб. дн./экз.	12,3	8,5	–31%
Возвраты на производстве, шт./партию	5,7	2,0	–65%
Возвраты на внедрении, шт./партию	3,3	1,0	–70%
Доля ПСИ с первой попытки, %	65	100	+35 п.п.
Доля ручных операций проверки, %	~70	~40	–30 п.п.
Полнота комплекта артефактов, %	~55	100	+45 п.п.

Результаты (таблица 1) показали, что модель работоспособна и обеспечивает существенное снижение временных затрат и количества возвратов по сравнению с исходным состоянием (AS-IS). Максимальный эффект от предложенной модели наблюдался по возвратам на предыдущие стадии - 65% на производстве и 70% на внедрении вследствие переноса на ранние этапы контроля и формализации критериев готовности.

Таблица 2.

Временная структура потока создания ценности

Параметр	Произв. AS-IS	Произв. TO-BE	Внедр. AS-IS	Внедр. TO-BE
Общее время, раб. дн.	18,5	13,0	12,3	8,5
Операционное время, раб. дн.	9,2	8,8	5,8	5,6
Время ожидания, раб. дн.	5,1	2,8	3,2	1,9
Время возвратов, раб. дн.	4,2	1,4	3,3	1,0
PCE, %	49,7	67,7	47,2	65,9

С помощью картирования потока создания ценности VSM (таблица 2) выяснилось, что главным результатом проведенных мероприятий стало устранение потерь в процессах - ожидание уменьшилось на 45%, возвраты, на 67%, коэффициент процессного цикла (PCE) вырос примерно с 48% до 66%.

Заключение

За счет целевой модели управления жизненным циклом ПАК, созданной для этапов производства и внедрения, получилось сократить время циклов на 30%, уменьшить количество возвратов на 65% и достичь почти 100% успешных приемо-сдаточных испытаний с первой попытки. Эффект достигается не за счет ускорения отдельных операций, а за счет вытеснения непроизводственных потерь, а именно, формализации критериев готовности этапа с проверкой, взаимозаменяемости артефактов и переноса контрольных операций на ранние этапы.

В настоящее время основные ограничения связаны с размером пилотной выборки (4 экземпляра ПАК) и проведенными испытаниями на двух типах изделий. Для повышения достоверности результатов планируется увеличить выборку до 15-25 экз. и отслеживать показатели в течение 6-12 мес. Основные направления развития лежат в применении модели в различных стадиях жизненного цикла, в глубокой автоматизации и формировании прогнозных моделей временного цикла.

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ОЦЕНКА И ВЫБОР ИМПОРТОЗАМЕЩЕННОЙ СИСТЕМЫ СЛУЖБЫ КАТАЛОГОВ ДЛЯ КРИТИЧЕСКОЙ ИНФРАСТРУКТУРЫ БАНКА

Аннотация: *Представлены результаты сравнительной оценки пяти отечественных систем службы каталогов для замещения Microsoft Active Directory в крупном банке. Применен метод взвешенной балльной оценки с пороговой фильтрацией и стендовыми испытаниями. ALD Pro 3.0 получил индекс 0.878, превысив ближайшего конкурента на 35%.*

Ключевые слова: *система службы каталогов, импортозамещение, Active Directory, ALD Pro, аутентификация, информационная безопасность.*

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EVALUATION AND SELECTION OF AN IMPORT-SUBSTITUTED DIRECTORY SERVICE SYSTEM FOR CRITICAL BANKING INFRASTRUCTURE

Abstract: *A comparative evaluation of five domestic directory service systems for replacing Microsoft Active Directory in a large bank is presented. A weighted scoring method with threshold filtering and bench testing was applied. ALD Pro 3.0 achieved the highest compliance index of 0.878, exceeding the nearest competitor by 35%.*

Keywords: *directory service system, import substitution, Active Directory, ALD Pro, authentication, information security.*

Система службы каталогов на базе Microsoft Active Directory (AD DS) в российских банках на данный момент обеспечивает аутентификацию пользователей через Kerberos V5, управление учетными записями и групповыми политиками, выдачу тикетов для доступа к автоматизированной банковской системе, дистанционному банковскому обслуживанию и другим критичным системам банка. В условном банке инфраструктура AD DS

насчитывается около 12000 пользовательских, 350 сервисных, 4500 машинных учетных записей и 800 групп безопасности. А прекращение поставки обновлений безопасности Microsoft приводит к накоплению уязвимостей. Ввиду этого, статистика компании BI.ZONE, занимающаяся управлением цифровыми рисками и кибербезопасностью, показывает, что ущерб лишь от одного инцидента компрометации AD в финансовом секторе составляет около 50-500 млн. рублей, а регуляторные штрафы по 187 Федеральному закону «О безопасности критической информационной инфраструктуры Российской Федерации» достигают примерно 10-50 млн. рублей [1, 2, 3, 9].

На российском рынке представлены пять альтернатив: ALD Pro, Альт Домен, РЕД АДМ, а FreeIPA и Samba AD DC являются открытыми проектами. Для объективного сравнения применена двухэтапная методика. На первом этапе каждое решение проверяется на шесть обязательных требований - поддержка протоколов LDAPv3 и Kerberos V5, отказоустойчивость с георасределением, разграничение прав и журналирование, миграция с MS AD, документация и сертификация Федеральной службы по техническому и экспортному контролю (ФСТЭК). А FreeIPA и Samba AD DC - не прошли фильтрацию из-за отсутствия вендорской поддержки и сертификации ФСТЭК. К количественному сравнению допущены - ALD Pro, Альт Домен и РЕД АДМ [4, 5, 6, 7, 8].

На втором этапе три выше описанных импортозамещенных решения оценены экспертами по информационной безопасности, системной архитектуре и бизнесу по восьми критериям по формуле совокупного индекса соответствия $I = \sum (w_i \times s_i)$, где w_i - вес i-го критерия (сумма всех весов равна 1) и s_i - нормированная оценка решения по i-му критерию (от 0 до 1): безопасность - по 0.20, функциональность, надежность и миграция - по 0.15, совместимость и экономика - по 0.10, масштабируемость - 0.08, документация - 0.07. Оценки ALD Pro основаны на 12 стендовых тестах с контроллерами домена на системе службы каталогов ALD Pro версии 3.0 и операционной системой Astra Linux SE 1.8 и эмулятором MS AD. При ста одновременных kinit скриптах, выполняющих одновременную аутентификацию, среднее время аутентификации достигает 0.42 секунд, центральный процессор загружен - на 34%, а при остановке основного контроллера аутентификация через резервный восстановилась за 12 секунд, смена роли за 3 минуты 20 секунд, восстановление из бэкапа за 32 минуты. Два замечания из 12 тестов устранимы при подготовке данных для миграции системы [5].

ALD Pro набрал наивысшие оценки по семи из восьми критериев: безопасность - 1.00 (сертификат ФСТЭК 2-го уровня, мандатный контроль), миграция - 0.85 (встроенная синхронизация, механизм в протоколе аутентификации Kerberos, позволяющий пользователям одного домена получать доступ к ресурсам другого домена), совместимость – 0.90 (Astra Linux, ALT Linux, РЕД ОС, Windows). И Альт Домен уступает по критериям

безопасности равный 0.60 и миграции - 0.50, а РЕД АДМ - по масштабируемости по 0.50 и миграции по 0.45. Итоговый индекс соответствия: ALD Pro – 0.878, Альт Домен - 0.646, РЕД АДМ - 0.592 [5, 6, 7].

Анализ чувствительности при изменении весов на 20 процентов в четырех сценариях - Базовый, Приоритет безопасности, Приоритет экономики, Приоритет миграции - подтверждает устойчивость ранжирования ALD Pro сохраняет первое место с минимальным отрывом - в 0.22 балла. Совокупная стоимость владения за пять лет для банка с 10000 учетными записями при эксплуатации MS AD без поддержки составляет - 90841 рублей, из которых 43000 рублей приходится на стоимость рисков. При миграции на ALD Pro этот показатель снижается до 66941 рублей, а рисковая составляющая сокращается до 1700 руб. Общее снижение совокупной стоимости владения составляет 26.3%, а рисковой составляющей - 96%.

Проведенная двухэтапная оценка показала, что ALD Pro 3.0 обеспечивает наивысший интегральный индекс соответствия и устойчиво сохраняет первое место при изменении весов критериев. Для рассматриваемого банка миграция на ALD Pro позволяет снизить совокупную стоимость владения на 26.3% и сократить рисковую составляющую затрат на 96%. Полученная методика может быть использована другими финансовыми организациями при выборе импортозамещенной службы каталогов с учетом требований 187-ФЗ и стандартов информационной безопасности. Новизна предложенного решения состоит в применении комплексной методики выбора импортозамещенной службы каталогов для критической инфраструктуры банка с учетом регуляторных требований и совокупной стоимости владения.

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ГЕОХИМИЧЕСКИЕ ОСОБЕННОСТИ ВТОРИЧНЫХ МЕТАБОЛИТОВ ЛИШАЙНИКА PHYSCIA DUBIA КАК ИНДИКАТОРОВ УСЛОВИЙ СРЕДЫ ГОРНЫХ ЭКОСИСТЕМ УЗБЕКИСТАНА

Аннотация: *Лишайники являются чувствительными биоиндикаторами, отражающими геохимические условия среды через профиль вторичных метаболитов. В работе представлен первичный анализ лишайника Physcia dubia, собранного в горной зоне перевала Камчик (Узбекистан). Экстракция этилацетатом дала выход около 2–3% от массы сухого сырья. Методом тонкослойной хроматографии выявлены два основных компонента, различающиеся по полярности и предположительно относящиеся к депсидам и/или депсидонам. Обсуждается связь химического профиля с условиями местообитания, включая высоту и состав субстрата. Полученные результаты подтверждают потенциал использования лишайников как индикаторов геохимических факторов среды.*

Ключевые слова: *лишайники; биоиндикация; геохимия; Physcia dubia; вторичные метаболиты; депсиды; ТСХ.*

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GEOCHEMICAL FEATURES OF SECONDARY METABOLITES OF THE LICHEN *PHYSCIA DUBIA* AS INDICATORS OF ENVIRONMENTAL CONDITIONS IN MOUNTAIN ECOSYSTEMS OF UZBEKISTAN

Abstract: *Lichens are sensitive bioindicators that reflect geochemical environmental conditions through their secondary metabolite profiles. This study*

presents a preliminary analysis of the lichen Physcia dubia collected from the mountainous Kamchik Pass (Uzbekistan). Ethyl acetate extraction yielded approximately 2–3% of dry biomass. Thin-layer chromatography (TLC) revealed two major components differing in polarity, tentatively attributed to depsides and/or depsidones. The relationship between the chemical profile and habitat conditions, including altitude and substrate composition, is discussed. The results confirm the potential of lichens as indicators of geochemical environmental factors.

Keywords: *lichens; bioindication; geochemistry; Physcia dubia; secondary metabolites; depsides; TLC.*

В геохимических и геоэкологических исследованиях лишайники широко используются как природные сенсоры состояния окружающей среды. Благодаря отсутствию корневой системы и способности поглощать вещества непосредственно из атмосферы и субстрата, они аккумулируют химические элементы и синтезируют специфические вторичные метаболиты, отражающие условия произрастания.

Вторичные метаболиты лишайников, такие как депсиды, депсидоны и дибензофураны, выполняют не только защитные функции, но и могут изменять свой количественный и качественный состав под воздействием факторов среды - высоты, инсоляции, влажности и геохимии субстрата. Это делает их перспективными маркерами для геохимического мониторинга.

Горные регионы Узбекистана, включая перевал Камчик, характеризуются сложными климатическими и геологическими условиями, включая значительные перепады температур, высокую солнечную радиацию и разнообразие минеральных субстратов. Несмотря на это, химический состав лишайников данного региона остаётся недостаточно изученным.

Целью работы является первичный анализ вторичных метаболитов лишайника Physcia dubia и оценка их потенциальной связи с геохимическими условиями среды.

Материалы и методы

Объект и район исследования

Образцы лишайника Physcia dubia собраны в Ташкентской области (перевал Камчик, ~2200 м н.у.м.), характеризующейся горным рельефом и каменистыми субстратами. Видовая идентификация проведена с участием специалиста.

Подготовка образцов

Слоевища очищали от минеральных частиц, промывали дистиллированной водой и высушивали при комнатной температуре. Масса подготовленного образца составляла около 9 г.

Экстракция

Экстракцию проводили этилацетатом (ч.д.а.) в течение 24 часов при комнатной температуре. Экстракты объединяли и упаривали до сухого остатка.

Хроматографический анализ

Качественный анализ выполняли методом ТСХ:

неподвижная фаза: силикагель;

подвижная фаза: бензол : метанол (10:1);

детекция: УФ (254 и 365 нм).

Зафиксированы две основные зоны с Rf:

0.35–0.45

0.60–0.70

Результаты и обсуждение

Выход и физико-химические свойства

Выход экстракта составил порядка 2–3%, что соответствует типичным значениям для лишайников, произрастающих в условиях ограниченного водного режима и высокой инсоляции.

Растворимость выделенных соединений (низкая в спиртах, высокая в хлороформе и ацетоне) указывает на их умеренно гидрофобный характер.

Хроматографический профиль

ТСХ-анализ показал наличие двух доминирующих компонентов. Подобная «упрощённая» картина может быть характерна для лишайников, растущих в стрессовых условиях, где метаболический профиль сдвигается в сторону синтеза ограниченного набора защитных соединений.

Геохимическая интерпретация

Полученные данные могут быть интерпретированы с учётом условий местообитания:

Высотный фактор (~2200 м):

усиленная УФ-радиация может стимулировать синтез фенольных соединений с фотозащитной функцией (депсиды, депсидоны);

Минеральный субстрат:

каменистая основа может влиять на ионный состав среды, косвенно определяя метаболический профиль лишайника;

Климатические условия:

ограниченная влажность и температурные колебания могут приводить к снижению разнообразия метаболитов и доминированию наиболее устойчивых соединений.

Сопоставление с литературными данными

Для рода Physcia характерно наличие атранорина и родственных соединений. Наблюдаемые значения Rf и растворимость согласуются с этими данными.

Отсутствие широкого набора компонентов может указывать либо на раннюю стадию анализа (ограничения метода ТСХ), либо на реальное сужение метаболического спектра под влиянием локальных геохимических факторов.

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ЭКОЛОГИЧЕСКОЕ ОБРАЗОВАНИЕ В УЗБЕКИСТАНЕ: СОСТОЯНИЕ И ПЕРСПЕКТИВЫ

Аннотация: *Данная статья посвящена анализу текущего состояния экологического образования в Узбекистане, вызовам, с которыми сталкивается эта сфера, а также перспективным направлениям развития. Понимание этих процессов позволит оценить потенциал экообразования в формировании устойчивого и экологически ориентированного общества в Узбекистане.*

Ключевые слова: *экологическое образование, устойчивое развитие, экологическое просвещение, экологическая грамотность, экологическая культура, «зеленые» компетенции.*

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ENVIRONMENTAL EDUCATION IN UZBEKISTAN: CURRENT STATUS AND PROSPECTS

Annotation: *This article examines the current state of environmental education in Uzbekistan, the challenges facing this field, and promising areas for future development. Understanding these processes will allow for an assessment of the potential of environmental education in shaping a sustainable and environmentally conscious society in Uzbekistan.*

Keywords: *environmental education, sustainable development, environmental awareness, environmental literacy, environmental culture, "green" competencies.*

Введение

В современном мире экологическая грамотность окончательно перешла из разряда «социальной ответственности» в категорию жестких экономических компетенций. В условиях глобального истощения ресурсов, изменения климата и стремительного ужесточения природоохранного законодательства экологическое образование становится фундаментом новой модели роста. Сегодня это не просто вопрос сохранения биоразнообразия, а стратегия выживания и конкурентоспособности государств, корпораций и каждого отдельного специалиста.

Современное экологическое образование давно вышло за рамки уроков биологии. Сегодня это междисциплинарная база, объединяющая экономику,

экологию и технологическое проектирование. В центре обучения стоит концепция устойчивого развития (Sustainable Development), которая учит бизнес и общество эффективно распределять капитал, минимизируя экологические риски. Ключевой навык, который дает такое образование — это способность мыслить категориями жизненного цикла продукта: от добычи сырья до финальной утилизации или возврата в производственный цикл.

Основная часть

В эпоху, когда вопросы сохранения окружающей среды и устойчивого развития приобретают все большую актуальность на глобальном уровне Узбекистан уверенно идет по пути интеграции принципов экообразования во все сферы жизни общества. Меняющийся климат, растущая нагрузка на природные ресурсы и необходимость формирования ответственного отношения к экосистемам диктуют особую важность экологической грамотности для каждого гражданина.

Экообразование в Узбекистане – это не просто предмет в школьной программе, а комплексный подход, нацеленный на формирование у подрастающего поколения и взрослых осознанного понимания взаимосвязей в природе, развития критического мышления в отношении экологических проблем и, что самое главное, – способности действовать для их решения. Это инвестиция в будущее страны, в сохранение ее уникального природного наследия и обеспечение благополучия последующих поколений.

За последние годы в Узбекистане были приняты следующие важные документы в области развития экологического образования и просвещения:

- Указ Президента Республики Узбекистан «Об утверждении Концепции охраны окружающей среды Республики Узбекистан до 2030 года» от 30.10.2019 г. № УП-5863
- Постановление Кабинета Министров Республики Узбекистан «Об утверждении Концепции по развитию экологического образования в Республике Узбекистан» от 27.05.2019 г. № 434

Состояние экологического образования в Узбекистане сегодня переживает этап масштабной трансформации. В мае 2025 года Президент Узбекистана утвердил Концепцию повышения экологической культуры населения до 2030 года (ПП-184)[4]. Это фундаментальный документ, который сделал экологическое образование обязательным на всех уровнях. Согласно этому документу к 2030 году планируется обучить 3,3 млн детей в детсадах, 4,2 млн школьников и около 1,9 млн студентов вузов. Уровень экологической грамотности теперь включен в ключевые показатели эффективности (KPI) руководителей министерств и ведомств.

Экологическое просвещение в Узбекистане активно выходит за рамки учебных классов. Масштабная инициатива по высадке деревьев стала практическим уроком экологии для миллионов граждан. Ежегодно проводятся конкурсы научных и практических проектов среди студентов с грантовой поддержкой от государства. С конца 2025 года в стране запущена

Интерактивная карта экологического мониторинга. Это инструмент гражданского образования, который позволяет каждому жителю в реальном времени видеть качество воздуха и статус зеленых насаждений. Такая открытость данных формирует общественный контроль и личную ответственность граждан за состояние окружающей среды.

Статистика подтверждает, что экологическая грамотность напрямую конвертируется в экономические показатели. К примеру, в странах ЕС, где экологическое образование интегрировано в школьную программу более 20 лет, отрасль переработки отходов создает миллиарды долларов добавленной стоимости в год. Простое обучение сотрудников офисов правилам энергосбережения снижает коммунальные расходы компании на 10–15% без внедрения дорогостоящего оборудования и др.

Если в Узбекистане раньше были разрозненные инициативы по экологическому образованию и образованию для устойчивого развития, то к настоящему времени экологическое просвещение стало полноценной государственной стратегией, закрепленной законодательно.

Для Узбекистана экологическое образование сегодня — это не просто социальный проект, а вопрос национальной безопасности и устойчивости экономики в условиях дефицита ресурсов.

В последние годы Узбекистан предпринял важные шаги по усилению роли экологического образования. Процесс внедрения непрерывного экологического образования начинается с самых ранних этапов. Экологические темы включены в такие предметы, как «Окружающий нас мир» (1-2 классы) и «Природоведение» (3-4 классы), а также интегрированы в старших классах. В рамках Климатического образование в школьные программы внедряются темы, связанных с изменением климата. Проводятся масштабные программы переподготовки и повышения квалификации учителей для преподавания новых экологических и климатических тем. Разрабатываются методические пособия для начальной школы, а также образовательные комплекты для занятий в регионах.

В вузах и средне-специальных учебных заведениях роль экологического образования возрастает:

- Экологические дисциплины и курсы по устойчивому развитию внедряются в образовательные программы.
- Увеличивается количество специалистов в области возобновляемой энергетики, экологичного сельского хозяйства и управления отходами.
- Активизируется работа по экологическим исследованиям, в том числе, связанным с рациональным водопользованием и ликвидацией последствий Аральского кризиса.
- Реализуются совместные проекты с международными организациями (ООН, ПРООН, ЮНЕСКО) по внедрению международных стандартов ОУР.

Экологические Неправительственные Некоммерческие Организации Узбекистана тоже активно продвигают вопросы экологического образования и культуры.

Экологическое образование в Узбекистане носит прикладной характер. К примеру, Проект «Eco-Schools Uzbekistan» охватывает сотни школ, обучая детей бережливому потреблению ресурсов. Школы, получившие статус «Зеленого флага», экономят до 20% воды и электроэнергии благодаря активному участию самих учеников [2].

Инициатива «Яшил макон»-масштабная кампания по высадке миллионов деревьев стала живой лабораторией для граждан. Образовательная составляющая здесь заключается в обучении правильному подбору саженцев и уходу за ними в условиях засушливого климата [3].

К 2026 году страна совершила качественный переход от разовых акций к выстраиванию целостной государственной системы эко-просвещения. Создание Центральноазиатского университета изучения окружающей среды и изменения климата (Green University) в Ташкенте стало знаковым событием. Это учебное заведение превратилось в региональный хаб, где готовят специалистов по управлению водными ресурсами, борьбе с опустыниванием и внедрению ВИЭ (возобновляемых источников энергии). Подготовка кадров теперь ведется с учетом специфики Приаралья и климатических вызовов Центральной Азии. Этот подход соответствует мировому тренду на формирование "зеленых" рабочих мест и повышение конкурентоспособности рабочей силы.

Несмотря на имеющиеся успехи в осуществлении экологического образования и просвещения основными вызовами остаются такие вопросы как качество воздуха в крупных городах (особенно в Ташкенте), что требует более глубокого обучения населения основам энергоэффективности и транспортной экологии; управление отходами: переход на систему «3 корзин» (сортировка мусора) в жилых массивах, рациональное использование питьевой воды, что невозможно без массового переобучения бытовым привычкам; адаптация усиливающимся последствиям изменения климата и другие.

Отмечая значительный прогресс в области экологического образования в Узбекистане остаются и некоторые нерешенные проблемы:

- Требуется дальнейшее повышение квалификации преподавателей и специалистов, особенно в области междисциплинарного подхода в осуществлении экологического образования и воспитания.
- Существует необходимость разработки большего количества адаптированных учебных материалов, отражающих региональную специфику экологических проблем (Арал, водный дефицит, загрязнение атмосферы).
- Требуется более глубокой и системной интеграции экологического образования между различными министерствами и ведомствами.

- Несмотря на рост внимания, финансирование программ по экологическому образованию, развитию экологической инфраструктуры в образовательных учреждениях все еще требует увеличения.
- Задача состоит в том, чтобы перейти от простого информирования к формированию практических навыков устойчивого поведения и «зеленых» компетенций, особенно среди молодежи.

Главным препятствием сегодня остается формализм. Эффективное экологическое образование должно уходить от «лекций о вреде пластика» к практическим кейсам и цифровым инструментам контроля углеродного следа. Необходимо интегрировать экологические модули во все технические и гуманитарные специальности вузов, чтобы инженер, юрист или маркетолог будущего изначально обладали «зеленым» фильтром восприятия.

Заключение

Проведенный анализ состояния экологического образования в Узбекистане выявил ряд как существующих достижений, так и актуальных вызовов. Безусловно, в последние годы в стране предприняты значительные шаги по интеграции экологических аспектов в образовательные программы, повышению осведомленности населения и формированию экологической культуры. Разработаны соответствующие государственные стратегии, активно внедряются новые методики преподавания, проводятся образовательные акции и кампании.

Однако, несмотря на эти усилия, остаются нерешенными ряд проблем, требующих системного и комплексного подхода. К ним относятся: необходимость повышения квалификации педагогических кадров в области экологии, усовершенствование материально-технической базы образовательных учреждений для практического освоения экологических знаний, а также обеспечение более тесной связи между теоретическими знаниями и практической природоохранной деятельностью. Важным остается вопрос формирования у обучающихся не только знаний, но и устойчивой мотивации к активному участию в решении экологических проблем.

Перспективы развития экологического образования в Узбекистане тесно связаны с дальнейшим укреплением межведомственного взаимодействия, привлечением к процессу общественности и международных партнеров, использованием современных цифровых технологий для дистанционного обучения и распространения информации. Инновационные подходы, такие как проектная деятельность, полевые исследования, развитие экотуризма и формирование "зеленого" мышления с раннего возраста, способны существенно повысить эффективность экологического образования.

Успешное решение задач, стоящих перед экологическим образованием, напрямую влияет на формирование ответственного отношения граждан к окружающей среде, что является залогом устойчивого развития Узбекистана и сохранения его уникальной природы для будущих

поколений. Таким образом, дальнейшее развитие и совершенствование системы экологического образования остается одним из ключевых приоритетов государственной политики страны.

Использованные источники:

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2. Об утверждении Концепции по развитию экологического образования в Республике Узбекистан. Постановление Кабинета Министров Республики Узбекистан, от 27.05.2019 г. № 434. Вступила в силу: 28.05.2019 Доступ по ссылке: lex.uz
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4. Официальный портал с данными по мониторингу воздуха и отчетностью по программе «Яшил макон». Доступ по ссылке: eco.gov.uz
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ЗНАЧЕНИЕ МЕЖДИСЦИПЛИНАРНОЙ ИНТЕГРАЦИИ ПРИ ПРЕПОДАВАНИИ КВАНТОВОЙ ТЕОРИИ РОЖДЕНИЯ ЗВЁЗД

Аннотация: *В данной статье изложена методика анализа результатов астрофизических исследований возникновения, строения и развития Вселенной на основе междисциплинарной интеграции при подготовке будущих учителей физики в педагогических высших учебных заведениях. Показано, что интерпретация астрофизических процессов с точки зрения квантовой механики и ядерной физики способствует совершенному изучению их закономерностей и повышению эффективности обучения.*

Ключевые слова: *Высшее образование, учителя физики, интеграция, астрофизика, ядерная физика, квантовая механика, вакуум, звезды, возмущения, гравитация.*

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THE IMPORTANCE OF INTERDISCIPLINARY INTEGRATION IN TEACHING THE QUANTUM THEORY OF STAR FORMATION

Abstract: *This article presents a methodology for analyzing the results of astrophysical research on the origin, structure, and development of the Universe on the basis of interdisciplinary integration in the training of future physics teachers at pedagogical higher education institutions. It is shown that the interpretation of astrophysical processes from the standpoint of quantum mechanics and nuclear physics contributes to a more comprehensive study of their regularities and increases the effectiveness of teaching.*

Keywords*: higher education, physics teachers, integration, astrophysics, nuclear physics, quantum mechanics, vacuum, stars, perturbations, gravity.*

Как известно, основной задачей астрофизики и космологии является поиск решения вопроса о происхождении Вселенной, закономерностях ее развития и определение на основе этих законов ее последующих этапов. Конечно, еще в древности, когда космология как наука еще не была сформирована, человечество занималось различными рассуждениями о сотворении мира. Но эти рассуждения не имели четкого научного обоснования. На самом деле исследование возникновения Вселенной является философско - научным вопросом, решение которого, изучая законы мироздания, служило повышению уровня человеческого образа жизни. При изучении происхождения Вселенной еще до XIX века считалось, что она создана Богом и основной задачей научных исследований является определение совершенства Вселенной, созданной Богом, – гармонии Вселенной. Такие взгляды можно увидеть в трудах средневековых восточных мыслителей, а также в научных трудах европейских ученых XVII-XVIII веков. К XIX веку возникла астрофизика, наука, изучающая физическую природу Вселенной и ее составляющих, физические законы. Становление этой науки можно рассматривать как синтез нескольких известных в тот период наук. Из истории научных исследований известно, что процесс познания природы осуществлялся в различных направлениях, которые первоначально отделялись от естествознания и изучали явления, не связанные друг с другом с первого взгляда. Но чем глубже мы изучаем эти явления, тем больше раскрываются неразрывные связи между ними. В связи с этим взаимозависимость научных результатов, полученных в различных направлениях современной науки, т. е. тот факт, что явления природы находятся в неразрывной связи, свидетельствует о том, что при их изучении и анализе также следует руководствоваться принципом междисциплинарной интеграции.

В данной статье изложена методика анализа результатов астрофизических исследований по возникновению, строению и развитию Вселенной на основе междисциплинарной интеграции при подготовке будущих учителей физики. Средневековые и более поздние этапы развития научных мировоззрений о происхождении и устройстве Вселенной можно представить на основе схемы на рис.1 [1].

Анализ этих историко-биографических данных, изучение хронологии развития науки в ходе семинаров, практических занятий или курсовых работ в процессе изучения и преподавания природы астрофизических процессов служат повышению эффективности обучения.

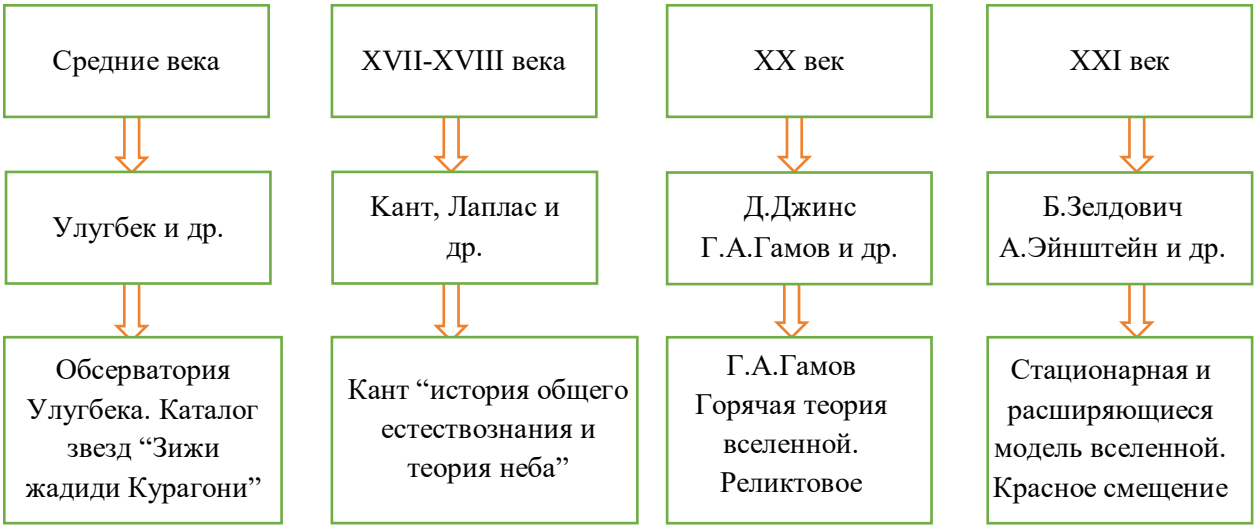

Рис.1. Этапы развития научных мировоззрений о происхождении и строении Вселенной.

В настоящее время одной из основных моделей строения Вселенной является теория Большого взрыва вытекающей из общей теории относительности Эйнштейна и модели расширяющейся Вселенной, из ее решения. Стоит отметить, что чем больше мы изучаем строение Вселенной и ее свойства, тем больше возникает новых вопросов, на которые трудно ответить. Один из таких вопросов сформулируется так: “-Что такое сама Вселенная и в каком состоянии находилась Вселенная до Большого взрыва?

Одно из научно обоснованных представлений о происхождении Вселенной принадлежит академику Я.Б. Зельдовичу. Он считал, что “для возникновения Вселенной не требуется никакой материальной формы материи, известной нам в настоящее время. Вселенная возникла из ничего, другими словами, в первоначальном состоянии существовал только вакуум” [2]. Вспомним ответ Эйнштейна на вопрос журналистов на одной из научных конференций: “- Можете ли вы объяснить теорию относительности, упростив ее для нас”- “-До теории относительности мы понимали, что если материя бытия исчезнет из вселенной, то останется пустое пространство, тогда как согласно теории относительности, если материя исчезнет, то исчезнет и пространство”. Учитывая этот ответ, можно сделать вывод, что пустота в гипотезе Зельдовича не является классическим вакуумом [3]. Следовательно, согласно выводам современной квантовой физики, вакуум рассматривается как одна из форм существования материи. В невозбужденном уплотненном состоянии этот вакуум не дает о себе знать и гармонирует с классическим вакуумом. В то время как возмущенный вакуум превращается в поля и материальные формы материи. С этой точки зрения гипотеза Зельдовича не вступает в противоречие с фундаментальной теорией современной физики. Если мы понимаем “нет”, сказанное Зельдовичем, как неизвестную нам форму материи – вакуум, то эта гипотеза не является спорной даже с философской точки зрения.

Эволюцию формирования Вселенной на основе представлений, лежащих в основе гипотезы Зельдовича, можно объяснить на основе современных достижений многих наук. Поэтому роль междисциплинарной интеграции в этом процессе имеет первостепенное значение. Указание учащимся роли различных наук в процессе обучения эволюции Вселенной служит для закрепления и углубления знаний интегративным междисциплинарным применением знаний. На схемах на рис.2 и 3 возникновение и эволюция Вселенной представлены на интегральном разрезе между дисциплинами и между темами обучаемого предмета.

Схема 1

Рисунок 2. Схема образования паразвезды в процессе эволюции Вселенной.

Схема 2

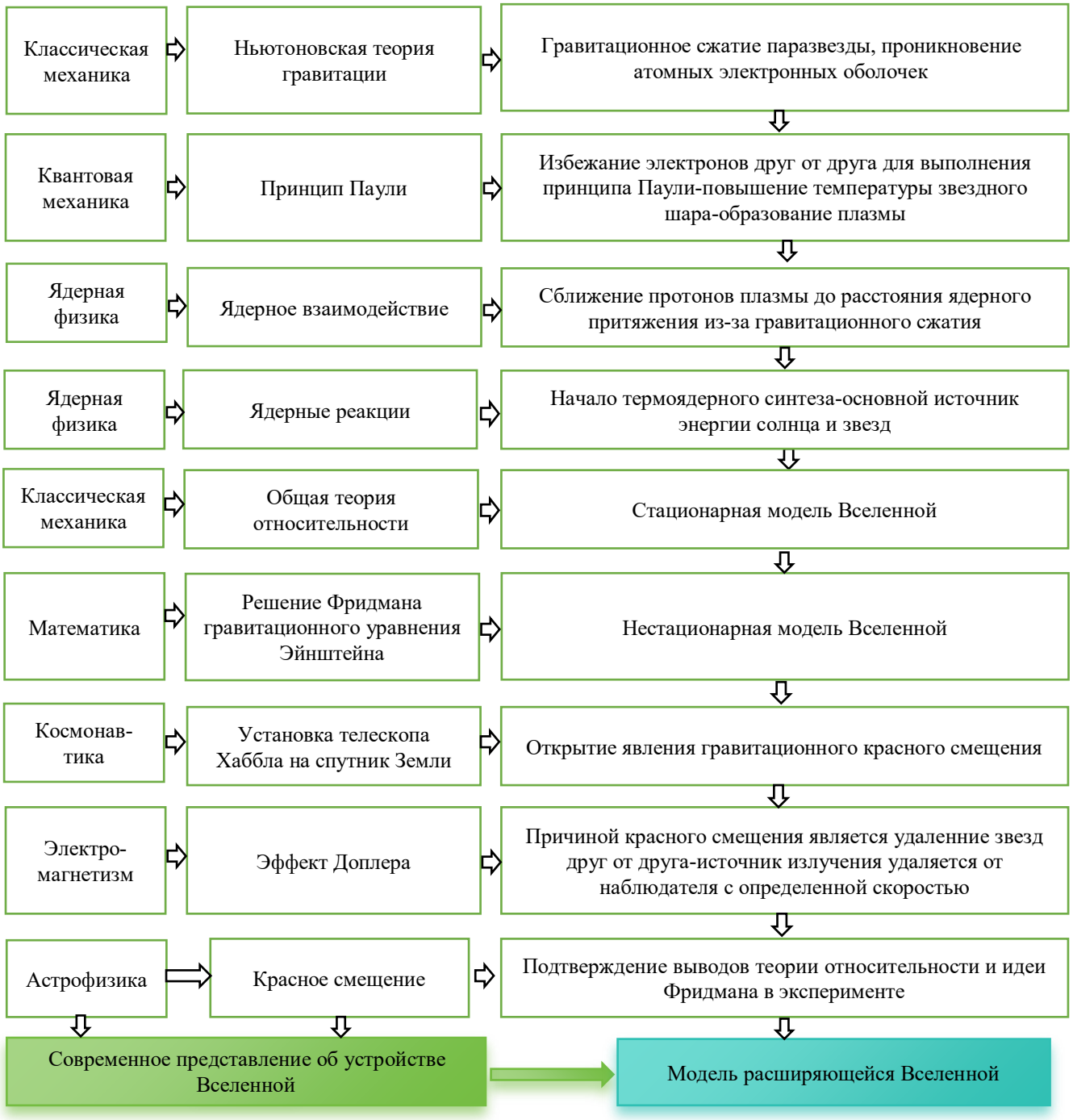

Рисунок 3. Рождение звезд и расширение Вселенной в процессе эволюции.

Первочнальный “толчок”, который привел к возмущению вакуума-первичная причина как показано на схеме неизвестна. Переход материи в поле и материальные проявления в результате возмущений можно объяснить на основе законов квантовой механики и ядерной физики. Плотность и температура должны быть чрезвычайно высокими в точках сингулярности – первичных телах, образующихся при возмущении вакуума. По меняемым академика Я.В.Зельдович в момент Большого взрыва плотность этого тела

составляла 10^{33} г/см^3, температура-10^{13} градусов Цельсия, давление-10^{54} Дин/см^2=10^{48} атмосферы [2, 3]. В этих условиях тело состоит из смеси различных частиц и античастиц, чего нельзя сказать о молекулах, атомах и ядрах [2]. Тяжелые частицы и античастицы аннигилируют, превращаясь в кванты-фотоны с массой покоя, равной нулю, и образуя смесь, состоящую из протонов, нейтронов, фотонов и нейтрино. С точки зрения современной астрофизики, около 12-18 млрд лет назад во Вселенной произошел Большой взрыв. Этот взрыв существенно отличается от взрыва известного нам на земле который начинается с одного центра и распространяется в пространстве и начинается одновременно во всех точками вселенной [4]. Эти точки взрыва должны совпадать с точками сингулярности, упомянутыми выше. В это время каждая частица во Вселенной пыталась избежать другой. Наличие плотности, температуры и давления выше точек сингулярности в начальный момент Большого взрыва было отражено в горячей модели Вселенной. Правильность этой модели была доказана реликтовым излучением фотонов и нейтрино, обнаруженным в 1965 году и которые сформировалось на ранней стадии расширения Вселенной. Элементарные частицы, образующиеся при большом взрыве, образуются в центре (ядре)галактик и в этих же центрах вырабатывается водород, который считается основным строительным материалом Вселенной. Электромагнитное притяжение между протонами и электронами должно быть основной причиной образования атома водорода. На следующем этапе происходит накопление (сгущение) атомов водорода в определенных точках пространства за счет взаимодействия атомов водорода с внешними электромагнитными полями. Это приводит к образованию газовых туманностей в космосе. Увеличение объема и массы газовых туманностей с течением времени можно объяснить теорией гравитационного притяжения Ньютона. Из-за того же гравитационного притяжения давление и плотность увеличиваются в центре газовой туманности, которая приобретает сферическую форму. Такие газовые туманности называют начальной формой звездообразования – паразвездами. Механизм повышения температуры у паразвезды стал известен науке после открытия законов квантовой механики. Известно, что в квантовой механике состояние микрочастиц определяется принципом запрета Паули, согласно которому два фермиона не могут занимать одно и то же квантовое состояние. При увеличении плотности вещества частицы в центре звезды пытаются избежать друг друга из-за принципа Паули. Это, в свою очередь, приводит к повышению температуры в центре, и когда температура достигает нескольких десятков миллионов градусов, вещество переходит в плазменное состояние. Объяснить дальнейшие этапы эволюции паразвезды стало возможным благодаря научным достижениям и исследованиям в области ядерной физики. Ядра, отделенные от электронной оболочки в результате гравитационного сжатия вещества в плазменном состоянии, сближаются друг с другом на расстояние ядерного взаимодействия. На таком близком

расстоянии действуют силы ядерного притяжения, в 137 раз превышающие силу электромагнитного отталкивания между нуклонами. В результате этого притяжения начинается слияние легких ядер -реакция термоядерного синтеза. В этой связи следует отметить, что реакция термоядерного синтеза в природе является следствен энергетической выгодности слияния лёгких ядер, связанное дефектом массы и формулой Эйнштейна по эквивалентности массы и энергии. Начала термоядерного синтеза является рождением звезды и начало ее жизни, длящейся несколько десятков или сотен миллиардов лет. В этому состоянии поддерживается определенный стационарный объем звезды из-за равенства внутреннего и внешнего давлений [5].

Квантовомеханическая теория рождения звезд, основанная на новейших достижениях атомной и ядерной физики способствует объяснению астрофизических явлений в интеграции законов макро- и микромира. С другой стороны междисциплинарный подход к анализу астрофизических процессов является одним из методов углубленного обучения при подготовке высококвалифицированных специалистов для различных отраслей науки и промышленности.

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ВЗЫСКАНИЕ АЛИМЕНТОВ НА НЕСОВЕРШЕННОЛЕТНИХ ДЕТЕЙ В РОССИИ: ИСТОРИКО-ПРАВОВОЙ АСПЕКТ

Аннотация: *в статье анализируются изменения законодательства в отношении взыскания алиментов на содержание несовершеннолетних детей в исторической ретроспективе, начиная от бессистемных актов (Соборного Уложения 1649 г.) к современной отрасли - семейному праву. Изучение эволюции правовых норм необходимо для понимания причин и условий возникновения современного правового института алиментирования в отношении несовершеннолетних детей в РФ.*

Ключевые слова: *взыскание алиментов, несовершеннолетние дети, денежное содержание.*

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CHILD SUPPORT COLLECTION IN RUSSIA: A HISTORICAL AND LEGAL ASPECT

Abstract: *This article analyzes legislative changes regarding the collection of child support payments for minor children from a historical perspective, beginning with unsystematic acts (the Cathedral Code of 1649) and continuing to the modern field of family law. Studying the evolution of legal norms is necessary to understand the causes and conditions for the emergence of the modern legal institution of child support payments for minors in the Russian Federation.*

Keywords: *child support collection, minor children, financial support.*

Введение

Актуальность темы исследования обусловлена тем, что институт взыскания алиментов представляет собой юридическую гарантию семейно-правовых взаимоотношений. От эффективности функционирования данного института, а именно при четком соблюдении порядка взыскания алиментов

зависит финансовая обеспеченность детей. Развитие законодательства о взыскании алиментов на содержание детей прошло путь от обычного права до детального регулирования современным правовым актом, Семейным кодексом РФ.

Основным методом исследования является сравнительно-правовой метод.

Изучение проблем развития взыскания алиментов в пользу несовершеннолетних в Российской Федерации имеет продолжительную историю, связанную с историей российского государства и права.

Так, в Уложении 1649 г. – первом своде законов Русского царства, принятого Земским собором при царе Алексее Михайловиче, устанавливалась пожизненная родительская власть над детьми. Алиментных обязательств в современном понимании в данном нормативном акте не было, но он регулировал правоотношения между супругами и детьми в вопросах наследования имущества [4].

До правления Петра I, в России обязательства по содержанию детей основывались на обычаях и применялись в отношении нуждающихся со стороны членов семьи или общины. 26 апреля 1715 года Петром I был подписан и утвержден первый военно-уголовный кодекс России – «Артикул воинский». В данном документе в. пункте 176, который отнесен к главе 20 «О содомском грехе, о насилии и блуде» говорится, что: «ежели холостый человек пребудет с девкою, и она от него родит, то оный для содержания матери и младенца, по состоянию его, и платы нечто имеет дать, и сверх того тюрьмою, церковным покаянием имеет быть наказан, разве что он потом на ней женитца, и возмет ее за сущую жену, и в таком случае их не штрафовать» [5].

В научной литературе принято считать «Артикул воинский» документом, впервые закрепившим новую систему алиментных обязательств. До его введения на территории государства действовали церковные и общинные нормы, которые предписывали родителям содержать своих детей.

В Своде законов Российской Империи 1833 г. в главе IV статье 172 указывалось: «Родители обязаны дать несовершеннолетним детям пропитание, одежду и воспитание, доброе и честное, по своему состоянию» [6]. Акт действовал вплоть до 1917 года, когда после Февральской революции и падением монархи перестал быть источником права.

В советской России Декретом ВЦИК и СНК «О расторжении брака» от 16 декабря 1917 г. помимо порядка расторжения брака было определено, что: «В случае соглашения о том супругов, судья, одновременно с постановлением о расторжении брака, определяет, у кого из родителей остаются несовершеннолетние дети, прижитые в браке, и кто из супругов и в какой мере должен нести издержки по содержанию и воспитанию детей...» [7].

Кодексом законов РСФСР об актах гражданского состояния, брачном, семейном и опекунском праве, принятом 16 сентября 1918 г., пунктом 161 было предусмотрено следующее: «Родители обязаны доставлять несовершеннолетним, нетрудоспособным и нуждающимся детям пропитание и содержание» [8]. Пунктом 162 этого же акта регламентировалось следующее: «Обязанность содержания лежит на родителях в равной мере и размер выдаваемого ими содержания определяется в зависимости от их материального положения, но сумма, затрачиваемая каждым из родителей, не может быть менее половины прожиточного минимума, установленного для ребенка в данной местности. Родители, не могущие уплатить свою долю полностью, уплачивают часть ее» [8]. Если же родители отклонялись от уплаты содержания на несовершеннолетних детей, тогда дети имели право обратиться в Отдел Социального Обеспечения при губернском Совете депутатов. При исследовании обстоятельств данным Отделом выносилось постановление о выдаче содержания на ребенка, его размере и форме исходя из нуждаемости заявителя, а также руководствуясь размерами прожиточного минимума, установленного для данной местности. Постановления Отдела были обязательны для исполнения всеми лицами и учреждениями и имели силу судебного решения.

Позднее было принято Постановление ВЦИК от 19 ноября 1926 г. - Кодекс законов о браке, семье и опеке. В соответствии с п. 42 данного акта устанавливалось следующее: «Родители обязаны доставлять содержание несовершеннолетним детям, а также нуждающимся нетрудоспособным детям» [9]. Согласно п. 48 данного правового документа было предусмотрено, что: «Обязанности содержания детей лежат на обоих родителях; размер выдаваемого ими содержания определяется в зависимости от их материального положения» [9]. Действовал данные кодекс до 1 января 1927 года. Затем его сменил новый Кодекс о браке, семье и опеке РСФСР (утвержденный ВЦИК и СНК РСФСР 19.11.1926, но вступивший в силу с 1 января 1927 года).

Затем Указом Президиума Верховного Совета СССР «Об улучшении порядка уплаты и взыскания алиментов на содержание детей», принятым в 1967 г., был урегулирован досудебный порядок уплаты и взыскания алиментов на содержание детей. Была предусмотрена возможность добровольной выплаты алиментов родителем путем написания заявления об удержании у него денежных средств для содержания ребенка по месту работы. Таким образом, были утверждены два варианта уплаты алиментов (судебный порядок и добровольный).

В 1967 г. был принят Закон СССР от 27.06.1968 № 2834-УП «Об утверждении Основ законодательства Союза ССР и союзных республик о браке и семье» [11].

Данному правовому акту впоследствии на смену пришел новый Кодекс о браке и семье РСФСР в 1969 году (Закон РСФСР от 30 июля 1969 года «Кодекс о браке и семье РСФСР») [10]. Именно в данном кодексе впервые

появилась отдельная глава, посвященная алиментным обязательствам родителей и детей. Так ст. 67 данного правового акта было предусмотрено, что родители обязаны содержать своих несовершеннолетних детей и нетрудоспособных совершеннолетних детей, нуждающихся в помощи [10].

Впоследствии правовые нормы названных нормативных правовых актов лягут в основу современного Семейного кодекса РФ.

Статья 38 Конституции РФ провозглашает и гарантирует материнству, детству и семье особую защиту со стороны государства1. Семейные взаимоотношения в соответствии с Семейным кодексом РФ, прежде всего, основываются на таких принципах как взаимопомощь и ответственность перед семьей всех ее членов.

Указанные принципы реализуются посредством обязанности родителей по содержанию своих детей. От их надлежащего выполнения зависит физическое, психическое, интеллектуальное, нравственное развитие детей. Алименты на содержание несовершеннолетних детей могут выплачиваться родителями на основе соглашения либо в принудительном порядке. Обязанность по принудительному взысканию алиментов возложена на Федеральную службу судебных приставов (ФССП РФ), которая действует на основании судебного решения или соглашения. Порядок взыскания алиментов определен федеральным законом № 229-ФЗ от 02.12.2007 г. «Об исполнительном производстве» [3].

Современное состояние института семьи в РФ, большое количество разводов, а также уклонение должников в уплате алиментов на несовершеннолетних детей ставят во главу угла решение данных проблем. Статистические данные свидетельствуют о динамике увеличения задолженности по уплате алиментов на несовершеннолетних детей. Сумма взысканных алиментных платежей возросла с 66,5 млрд. руб. в 2023 году до 92 млрд. руб. в 2024 году; в 2024 г. [12]. Общий объем взысканных алиментов в 2025 году превысил 110 млрд. руб. [12]

Таким образом, соблюдение и выполнение порядка взыскания алиментов является важнейшей задачей российского государства по защите имущественных прав несовершеннолетних граждан. В этой связи интересным будет обратиться к историческому аспекту правового регулирования алиментных обязательств в отношении несовершеннолетних детей в России. Формирование алиментов как денежного содержания родителей по отношению к своим несовершеннолетним детям имеет богатую историю.

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СОВРЕМЕННЫЕ ТЕХНОЛОГИИ УПРАВЛЕНИЯ ОРГАНИЗАЦИЕЙ

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ИННОВАЦИОННЫЙ МАРКЕТИНГ В АВТОБИЗНЕСЕ В УСЛОВИЯХ ИНСТИТУЦИОНАЛЬНЫХ ОГРАНИЧЕНИЙ: АНАЛИЗ КЕЙСА CHERY В РОССИЙСКОЙ ФЕДЕРАЦИИ

Аннотация: *автомобильная промышленность России переживает период глубокой турбулентности, вызванный беспрецедентным санкционным давлением. Негативное влияние в основном проявилось из-за невозможности ввоза комплектующих в страну и массового ухода зарубежных автопроизводителей. В этих условиях китайские автобренды заняли доминирующие позиции. Среди них особого внимания заслуживает компания Chery, которая не только сумела адаптироваться к новым реалиям, но и продемонстрировала впечатляющие результаты. На примере данной компании в статье показано, что инновационный маркетинг в условиях институциональных ограничений выходит за рамки традиционных коммуникационных инструментов и приобретает системный характер, интегрируя производственные, регуляторные и поведенческие аспекты.*

Ключевые слова: *автомобильный рынок, инновационный маркетинг, институциональные ограничения, санкционное давление, параллельный импорт, локализация производства*

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INNOVATIVE MARKETING IN THE AUTOMOTIVE BUSINESS UNDER INSTITUTIONAL CONSTRAINTS: A CASE STUDY OF CHERY IN THE RUSSIAN FEDERATION

Annotation: *The automotive industry in Russia is going through a period of deep turbulence caused by unprecedented sanctions pressure. The negative impact was mainly due to the impossibility of importing components into the country and the mass departure of foreign automakers. Under these conditions, Chinese car brands have taken dominant positions. Among them, Chery deserves special attention, as the company not only managed to adapt to the new realities but also*

demonstrated impressive results. Using the example of Chery, the article shows that innovative marketing under institutional constraints goes beyond traditional communication tools and takes on a systemic nature, integrating production, regulatory, and behavioral aspects.

Keywords: *automobile market, innovative marketing, institutional constraints, sanctions pressure, parallel imports, production localization.*

Введение

В последние годы автомобильный рынок в России претерпевает существенные структурные изменения, обусловленные не только и не столько технологическими инновациями, сколько трансформацией институциональной среды. Санкционные ограничения, изменение торговых режимов и усиление роли государства в регулировании отрасли привели к формированию принципиально новых условий функционирования компаний.

Как отмечается в ряде современных исследований, посвящённых международному маркетингу, институциональная среда перестает быть внешним фоном и становится активным фактором, определяющим стратегическое поведение компаний. В частности, исследования показывают, что в условиях ограничений компании вынуждены адаптировать не только продукт и каналы сбыта, но и саму логику маркетинга, смещая акцент с дифференциации продукта[70] на адаптацию к регуляторным условиям [1].

В данном контексте особый интерес представляет кейс Chery, демонстрирующий переход от традиционного маркетинга к интегрированной модели, основанной на подобной институциональной адаптации.

Теоретические основы инновационного маркетинга в автомобильной промышленности

В современной экономической науке маркетинг инноваций рассматривается как комплекс мер по выявлению, прогнозированию и удовлетворению спроса на инновационные продукты. Однако, в условиях институциональных ограничений маркетинг трансформируется по нескольким направлениям. Во-первых, происходит смещение акцента с брендинга как самостоятельной ценности на формирование комплексного предложения, включающего доступность и соответствие регуляторным требованиям. Во-вторых, возрастает значение локализации, которая рассматривается не только как производственная стратегия, но и как инструмент формирования доверия [2]. В-третьих, усиливается роль государства как косвенного участника маркетингового процесса через механизмы субсидирования и регулирования.

Развитие маркетинговой стратегии Chery можно рассматривать как последовательный переход от классической ценовой конкуренции к сложной

[70] Маркетинговая стратегия, направленная на выделение товара или услуги компании на фоне конкурентов за счёт подчёркивания уникальных характеристик.

интегрированной системе. На ранних этапах компания позиционировалась как производитель доступных автомобилей, ориентированных на массового потребителя. Однако по мере усиления конкуренции и роста требований к качеству акцент сместился в сторону повышения технологичности и формирования доверия [3].

Кардинальные изменения произошли в условиях институциональных ограничений, когда маркетинговая стратегия стала учитывать не только рыночные, но и регуляторные факторы. Локализация производства, ранее рассматриваемая как инструмент снижения издержек, стала ключевым элементом позиционирования. Аналогичным образом суббрендинг превратился из инструмента сегментации в механизм снижения политических и репутационных рисков.

Применительно к Chery инновационный маркетинг проявился в следующих аспектах:

- Институциональная инновация – создание новых организационных форм ведения бизнеса (бренд Tenet);
- логистическая инновация – перестройка цепочек поставок через механизмы параллельного импорта;
- финансовая инновация – внедрение субсидированных кредитных программ с эффективной ставкой 0,01%;
- производственная инновация – локализация сборки на российских мощностях.

Институциональные ограничения российского автомобильного рынка в условиях санкций

Санкционные меры, введённые в отношении России после 2014 года и многократно усиленные в 2022 году, стали грубейшим инструментом внешнеэкономического давления, преследующим цель ослабления российской экономики и ограничения доступа к международным финансовым рынкам и технологиям. Ключевым последствием стало массовое прекращение деятельности западных автопроизводителей, что привело к разрыву традиционных логистических и сбытовых цепочек [4]. И пока этот кризис не преодолен - по итогам 2025 года продажи новых легковых автомобилей в России снизились примерно на 20%, до 1,3 млн штук. Основными причинами стали повышение утилизационного сбора и снижение автокредитования из-за высокой ключевой ставки Центрального банка.

Параллельный импорт стал легальным ответом на уход с российского рынка крупных международных автопроизводителей. Он представляет собой легальный ввоз оригинальных автомобилей без участия официальных дистрибьюторов и без разрешения производителя, но с соблюдением всех таможенных процедур. В 2022 году Правительство РФ легализовало эту схему, которая регулируется Постановлением № 506.

Самый массовый поток альтернативного импорта пришёлся на 2023 год, когда было ввезено 225 тыс. автомобилей. Более 45% параллельного

импорта составляют китайские автомобили. Однако к 2025 году ситуация изменилась: механизм параллельного импорта ужесточился, а его объёмы существенно сократились. Ввоз юридическими лицами китайских машин, официально представленных в России, оказался законодательно запрещён.

2025 год стал переломным для российского автомобильного рынка. Новый механизм утилизационных сборов и сложная структура параллельного импорта трансформировали отрасль. Ключевым фактором текущего периода стал резкий рост стоимости новых автомобилей. Индексация утилизационного сбора сделала импорт машин (особенно с объёмом двигателя выше 2 литров) экономически сложным.

Кроме того, в 2025 году российские власти ввели ряд дополнительных мер, направленных на стимулирование локализации производства, включая ужесточение требований к автопроизводителям и поэтапного повышение утильсбора до 85%. Эти меры создали дополнительные барьеры для китайских автопроизводителей, вынудив их пересматривать стратегии ведения бизнеса.

Инновационные маркетинговые стратегии Chery в условиях институциональных ограничений

В отличие от традиционного подхода, в котором ограничения рассматриваются как барьер, кейс Chery демонстрирует их трансформацию в источник конкурентных преимуществ. Введенные санкции, ограничившие доступ западных производителей, создали условия для перераспределения рыночных долей. Однако ключевым фактором успеха стало не просто заполнение освободившейся ниши, а способность компании адаптировать свою стратегию к новым условиям.

Одним из ключевых механизмов, позволивших Chery сохранить присутствие на российском рынке в условиях санкций, стал параллельный импорт. Однако, уже в 2025 году Chery начала постепенный отказ от масштабного импорта в пользу локализованного производства. По данным аналитиков, импорт китайских автомобилей марки Chery в Россию рухнул в сто раз из-за перехода на локализованный бренд Tenet: за январь–февраль 2026 года было ввезено всего 41 новый автомобиль против 4,2 тысячи за аналогичный период 2025 года. Это свидетельствует о сознательной трансформации логистической модели компании.

Наиболее значимой инновационной стратегией Chery стало активное развитие локализации производства. К концу 2025 года доля локализованных китайских автомобилей в общем достигла 43%, а у Chery этот показатель составил 63% – более чем 6 тысяч реализованных машин были собраны на российских предприятиях.

Chery занимает второе место среди китайских марок по уровню локализации в России, уступая лишь Haval [4], 93% автомобилей которого производятся на заводах в Тульской и Калужской областях. Производственные мощности Chery расположены на бывших заводах

Volkswagen и Hyundai, что позволило компании использовать уже существующую промышленную инфраструктуру.

Локализация производства позволила снизить влияние утилизационного сбора и одновременно сформировать образ «локального» продукта [6]. Использование суббрендов обеспечило гибкость позиционирования и снижение рисков, связанных с международной деятельностью. Участие в государственных программах стало важным элементом ценностного предложения, напрямую влияющим на решение о покупке.

Ключевой инновационной маркетинговой стратегией Chery стало создание нового бренда Tenet, под которым на российском рынке выпускаются автомобили, являющиеся лицензионными копиями моделей Chery. В рамках специального инвестиционного контракта, заключённого между «АГР Холдингом», китайской государственной компанией Defetoo и Минпромторгом, на бывшем заводе Volkswagen в Калуге начался выпуск автомобилей под брендом Tenet. Производство кроссоверов локализовано с августа 2025 года на калужской площадке, где выпускаются три модели – T4, T7 и T8.

Согласно известным ОТТС[71], новинки Tenet являются моделями Chery с измененным шильдиком: Tenet T7 соответствует Chery Tiggo 7L, Tenet T4 – Chery Tiggo 4, Tenet T8 – Chery Tiggo 8 Pro Max.

По итогам 2025 года Tenet, вышедший на рынок только к началу осени, за несколько месяцев вошёл в топ-10 по продажам с результатом 33,4 тысячи штук.

Инновационный подход Chery проявился и в финансовой сфере. В июле 2025 года компания впервые в этом году заняла первое место среди иностранных автомобильных брендов на российском рынке, продав 13 502 автомобиля, что составило 5,1% от общего объёма продаж и позволило обойти Haval.

Эксперты связывают этот успех с несколькими факторами, среди которых особо выделяется агрессивная политика субсидирования автокредитов с номинальной ставкой 0,01%. Как отмечает генеральный директор ГК «Аларм-Моторс» Роман Слуцкий, компания оперативно отслеживала продажи в сравнении с планами и действиями конкурентов и неоднократно усиливала условия кредитования по ключевым моделям – прежде всего, Tiggo 4 и Tiggo 7 [7].

В условиях роста стоимости привлечения клиентов Chery активно использовала инструменты цифрового маркетинга для оптимизации затрат. Кейс одного из автодилеров Chery демонстрирует, как применение

[71] документ, который удостоверяет, что транспортное средство (ТС) соответствует требованиям и стандартам страны Таможенного союза (ЕАЭС)

инновационных digital-инструментов позволило снизить стоимость лида[72] в 2,5 раза и выйти на 91 лид за два месяца, из которых было совершено 8 продаж при среднем CPL[73] 9 739 рублей.

Анализ эффективности и ограничений инновационных стратегий

Инновационные маркетинговые стратегии Chery принесли впечатляющие количественные результаты. По итогам 2025 года Chery заняла третье место по продажам в России с результатом около 99,9 тысячи автомобилей. В октябре 2025 года доля локализованных автомобилей Chery достигла 63%. За несколько месяцев присутствия на рынке Tenet вошёл в топ-10 по продажам, реализовав 33,4 тысячи автомобилей.

Таблица 1

Эволюция инновационного маркетинга Chery (2020–2025 гг.)

Год	Маркетинговая модель (РФ)	Ключевые инновации	Институциональная среда	Результат на рынке РФ
2020	Продуктово-ценовой маркетинг	Запуск PRO-линейки (Tiggo 7/8 Pro), акцент на технологии и гарантии	Стабильный рынок, конкуренция с KIA/Hyundai	Рост узнаваемости и доверия
2021	Маркетинг качества и имиджа	Улучшение дизайна, digital-коммуникации, усиление бренда	Усиление конкуренции, насыщенный рынок	Закрепление в сегменте массовых SUV
2022	Адаптивный (кризисный) маркетинг	Быстрая переориентация на РФ, расширение модельного ряда	Уход западных брендов, санкции	Резкий рост продаж и доли рынка
2023	Экспансионный маркетинг	Масштабирование дилерской сети, агрессивное продвижение	Освобождение рынка, рост спроса на китайские авто	Вход в топ-2 брендов РФ (~11% рынка)
2024	Институционально-локализованный маркетинг	Запуск локальной сборки (бывшие заводы Nissan/VW), суббренды	Рост утильсбора, давление на импорт	Рост продаж +51%, закрепление в топ-3
2025	Гибридный (скрытая локализация + суббрендинг)	Перезапуск моделей под локальными брендами (Tenet), снижение прямого присутствия	Санкционные риски, давление IPO, регулирование	Снижение доли бренда Chery, но сохранение влияния через суббренды

Несмотря на успехи, стратегия Chery сталкивается с существенными ограничениями. Японское агентство Nikkei в конце сентября 2025 года

72 потенциальный клиент, который проявил интерес к продукту или услуге и выполнил целевое действие, например оставил контактные данные, подписался на рассылку, заполнил форму обратной связи, запросил коммерческое предложение или взаимодействовал с рекламой

73 (Cost Per Lead) — метрика в маркетинге, которая показывает стоимость привлечения одного лида (потенциального клиента)

сообщило со ссылкой на внутренние документы компании, что Chery планирует сократить присутствие в России к 2027 году [8]. В качестве причины называется запланированное IPO – листинг акций на бирже в Гонконге, в результате которого компания собирается привлечь 1,2 млрд долларов инвестиций. Успех этого IPO критически важен для привлечения крупных международных инвесторов, которые крайне чувствительны к санкционным рискам. Создание бренда Tenet представляет собой наиболее интересную институциональную инновацию в практике Chery. Эта стратегия позволяет компании достичь нескольких целей одновременно: во-первых, минимизировать риски вторичных санкций за счёт формального использования российского юридического лица; во-вторых, соответствовать требованиям российских властей по локализации производства; в-третьих, сохранить технологическую и продуктовую преемственность с основным брендом.

Однако устойчивость этой стратегии вызывает вопросы. Замещение Chery на Tenet создаёт определённые сложности в учёте долей рынка, поскольку формально речь идёт уже о другой марке. Кроме того, сохраняется риск того, что и Tenet может попасть под санкционные ограничения как аффилированная структура Chery.

Заключение

Проведенное исследование подтверждает, что инновационный маркетинг в автомобильной отрасли приобретает системный характер и выходит за рамки традиционных представлений. В условиях институциональных ограничений ключевым фактором успеха становится способность компании интегрировать маркетинговые, производственные и регуляторные решения. Кейс Chery демонстрирует формирование новой маркетинговой парадигмы, в которой основное внимание уделяется не столько характеристикам продукта, сколько условиям его доступности и соответствия институциональной среде.

Вместе с тем видно, что столь успешная адаптационная стратегия имеет свои пределы. Глобальные амбиции Chery, связанные с выходом на международные финансовые рынки, вступают в противоречие с необходимостью сохранять значительное присутствие на рынке российском. Этот конфликт интересов может привести к дальнейшей трансформации бизнес-модели компании – возможно, к полному переходу на бренд Tenet с постепенным сворачиванием операций под оригинальным названием.

Опыт Chery показывает, что инновационный маркетинг в условиях институциональных ограничений требует не только творческого подхода к продвижению продукта, но и глубокого переосмысления самой бизнес-модели, вплоть до изменения корпоративной идентичности. Этот кейс представляет значительный интерес для дальнейших исследований в области адаптационных стратегий международных компаний в условиях геополитической турбулентности.

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АТРИБУЦИЯ ИНДИВИДУАЛЬНОГО ВКЛАДА РАБОТНИКА В КОЛЛЕКТИВНЫЙ РЕЗУЛЬТАТ: МЕТОДИЧЕСКИЕ ПОДХОДЫ И ИХ ОГРАНИЧЕНИЯ

Аннотация: *В статье рассматривается методическая проблема разграничения вклада отдельного работника в результат, формирующийся усилиями коллектива, проектной команды или нескольких подразделений. Систематизированы пять групп подходов к атрибуции — прямые, параметрические, экспертные, теоретико-игровые и косвенные — с описанием информационных требований, областей применимости и характерных ограничений каждой группы. Показано, что при усложнении функционального состава задач и увеличении доли результатов с отсроченной реализацией ни один из подходов не обеспечивает корректной атрибуции в изолированном виде. Обоснована необходимость комбинированного применения методов в зависимости от типа выполняемых задач.*

Ключевые слова: *производительность труда, коллективный результат, атрибуция вклада, оценка персонала, командная работа, KPI, теоретико-игровые методы.*

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ATTRIBUTION OF AN INDIVIDUAL EMPLOYEE'S CONTRIBUTION TO THE COLLECTIVE RESULT: METHODOLOGICAL APPROACHES AND THEIR LIMITATIONS

Abstract: *The article addresses the methodological problem of separating an individual employee's contribution from the result generated by a team, project group, or several units. Five groups of attribution approaches are systematised — direct, parametric, expert-based, game-theoretic, and indirect — with a description of the informational requirements, areas of applicability, and typical limitations of each group. It is shown that as the functional composition of tasks becomes more complex and the share of deferred-realisation results increases,*

none of the approaches in isolation provides correct attribution. The need for combined application of methods depending on the type of tasks performed is substantiated.

Keywords: *labour productivity, collective result, contribution attribution, personnel assessment, teamwork, KPI, game-theoretic methods.*

Введение

Постиндустриальная трансформация занятости сопровождается ростом доли трудовой деятельности, осуществляемой в рамках проектных команд, кросс-функциональных групп и распределенных коллективов [3; 5]. В этих условиях экономический результат всё чаще выступает продуктом совместных усилий нескольких работников, что порождает методическую задачу его обоснованного разграничения между участниками. От корректности её решения зависит работоспособность систем оплаты по результату, объективность аттестации, обоснованность кадровых перестановок и устойчивость мотивационных схем.

Сложность задачи обусловлена тем, что в большинстве случаев индивидуальный вклад работника в коллективный результат не поддается прямому измерению. Совместная деятельность характеризуется эффектом синергии, при котором совокупный результат не сводится к арифметической сумме индивидуальных усилий [4]. Кроме того, функциональный состав задач отдельного работника, как показано в ранее опубликованных исследованиях [1; 2], не является однородным: одни задачи допускают прямое количественное измерение, другие — лишь косвенное, третьи в принципе не поддаются краткосрочной квантификации. Применение единого метода атрибуции к разнородным задачам систематически искажает оценку.

Несмотря на наличие отдельных работ по теории игр, теории контрактов и управленческому учету, в которых рассматриваются частные случаи распределения результата, систематизированного описания методов атрибуции индивидуального вклада применительно к экономике труда в отечественной литературе не представлено. Цель настоящей работы — систематизировать сложившиеся методические подходы к атрибуции индивидуального вклада работника в коллективный результат, описать их информационные требования и ограничения, а также обосновать принципы их комбинированного применения в зависимости от характера выполняемых задач.

Методы и материалы

Методологическую основу исследования составили теоретический анализ научной литературы, методы классификации и структурно-логического моделирования. Информационную базу образуют работы по экономике труда [3; 5; 6], теории мотивации и оплаты по результату, отдельные публикации по теории кооперативных игр в их приложении к управленческому учёту, а также собственные предшествующие работы

автора по функциональной структуре труда [1; 2]. Систематизация подходов проводилась по следующим критериям: характер исходной информации (количественная / экспертная), уровень формализации процедуры (алгоритмический / суждения), область применимости (тип задач, по которому метод дает корректный результат).

Результаты

Систематизация подходов к атрибуции индивидуального вклада

Анализ практик оценочной деятельности и положений теории экономики труда позволяет выделить пять основных групп методов атрибуции индивидуального вклада, различающихся по информационной базе и логике распределения коллективного результата.

Первая группа — прямые методы. К ним относятся равное распределение коллективного результата между участниками, распределение пропорционально отработанному времени и распределение по фиксированным должностным коэффициентам. Преимущество прямых методов — простота реализации и прозрачность для исполнителей. Принципиальное ограничение состоит в допущении однородности труда участников: метод предполагает, что каждый из них вносит одинаковый или формально соизмеримый вклад в результат. При выраженной функциональной неоднородности задач, описанной в предшествующих работах автора [1; 2], применение прямых методов порождает систематическое смещение оценки в пользу либо в ущерб отдельным категориям работников.

Вторая группа — параметрические методы. Они предполагают расчёт индивидуального вклада как взвешенной свёртки частных показателей: достижение плановых KPI, объём выполненных работ, число обработанных запросов, количество завершённых проектных операций. Логика метода — приведение трудовой деятельности к набору измеримых параметров с заранее установленными весами. Сфера корректного применения параметрических методов — задачи с прямо измеримым результатом и стабильным функциональным составом. Их методическая уязвимость определяется зависимостью оценки от полноты и репрезентативности выбранной системы показателей. Если значимая часть выполняемых задач не охвачена параметрическим набором (а в условиях цифровой трансформации это типичная ситуация для специалистов с подвижной структурой функций), параметрический метод воспроизводит логическую ошибку: он измеряет лишь ту часть результата, которая поддаётся количественному учёту, и приписывает её работнику в качестве полного вклада.

Третья группа — экспертные методы. К ней относятся оценки руководителя, процедуры взаимной оценки коллег (peer review), методология «360 градусов», а также экспертные комиссии. Преимущество экспертных методов — способность учитывать качественные аспекты результата и контекст совместной работы, не сводимые к формальным

показателям. Ограничения связаны с субъективностью суждений, эффектами групповой динамики (склонность к усреднению, ореола, недавности), а также с возможным искажением оценок под влиянием неформальных связей. Экспертные методы остаются необходимым инструментом для тех результатов труда, которые не поддаются прямой и косвенной квантификации, однако применение их в качестве единственного механизма атрибуции порождает риск воспроизводства организационной иерархии в оценочных решениях.

Четвёртая группа — теоретико-игровые методы. Их методологическим ядром выступает значение Шепли — функция распределения совокупного выигрыша кооперативной игры между игроками с учётом их предельного вклада во все возможные коалиции [4]. В управленческом учёте подобные методы применяются для распределения косвенных доходов и затрат между подразделениями; в маркетинге — для атрибуции конверсий между каналами цифрового продвижения. Применительно к атрибуции индивидуального трудового вклада теоретико-игровые методы остаются преимущественно теоретической конструкцией: их практическая реализация требует исчерпывающего описания всех возможных коалиций работников и оценки результата каждой такой коалиции, что в условиях реальных организаций технически нереализуемо. Перспективное направление их использования связано с моделированием атрибуции на стилизованных подмножествах задач, для которых возможна количественная оценка коалиционных эффектов.

Пятая группа — косвенные методы, основанные на исчислении вклада по совокупности характеристик работника (квалификационные коэффициенты, балльно-факторные модели, разряды, грейды), сопряжённых с коллективным результатом через систему весовых множителей. Косвенные методы логически восходят к традиции советской школы экономики труда [5; 6], в которой индивидуальная производительность исчислялась через нормированные коэффициенты сложности и разряды труда. Применительно к современной интеллектуальной деятельности косвенные методы дают приближённое решение задачи атрибуции в условиях, когда прямое и параметрическое измерение неприменимо. Принципиальное ограничение — допущение устойчивости связи между квалификационным профилем работника и его фактическим вкладом в результат конкретного коллектива, не всегда соблюдаемое в реальной практике.

Сопоставление подходов и области их применимости

Сопоставление выделенных групп методов по ключевым характеристикам представлено в таблице 1. Сопоставление позволяет сделать следующее наблюдение: ни одна из групп методов не обеспечивает корректной атрибуции для всех типов трудовых задач одновременно. Прямые и параметрические методы работоспособны для производственно-исполнительных задач со стабильным составом и прямо измеримым результатом. Экспертные методы покрывают качественную составляющую

труда и креативно-стратегические задачи. Теоретико-игровые методы дают строгое решение для ограниченного класса задач с описуемой коалиционной структурой. Косвенные методы выступают приближённым средством атрибуции в условиях информационного дефицита.

Таблица 1.
Сопоставление методов атрибуции индивидуального вклада в коллективный результат

Группа методов	Информационная база	Преимущество	Ключевое ограничение
Прямые	Списки участников, табельный учёт	Простота, прозрачность	Игнорирует функциональную неоднородность задач
Параметрические	Системы KPI, плановые показатели	Формализуемость, повторяемость	Учитывает только квантифицируемую часть результата
Экспертные	Оценки руководителя, peer review, «360 градусов»	Учёт качественных аспектов результата	Субъективность, эффекты групповой динамики
Теоретико-игровые	Описание коалиций и их результатов (значение Шепли)	Строгая теоретическая основа	Высокие информационные требования; ограниченная реализуемость в реальной практике
Косвенные	Квалификационные характеристики работника, балльно-факторные модели	Применимость в условиях информационного дефицита	Допущение устойчивой связи квалификации и фактического вклада

Источник: составлено автором.

Принципы комбинированного применения методов

Из проведённого сопоставления следует, что в условиях функционально-неоднородной трудовой деятельности задача атрибуции вклада решается не выбором единственного метода, а формированием комбинированной схемы, в которой к каждому типу задач применяется методически адекватный инструмент. Опираясь на ранее предложенную автором четырёхтиповую классификацию задач [1] (исполнительский блок, координационный блок, креативно-стратегический блок, аналитико-адаптивный блок — см. подробнее [1]), допустимо сформулировать следующее распределение методов:

— для исполнительского блока (стандартизированные регламентированные задачи с прямо измеримым результатом) — параметрические методы с фиксированным набором показателей;

— для координационного блока (взаимодействие с внутренними и внешними участниками, информационный обмен) — экспертные методы с акцентом на оценку коллег и партнёров (peer review, «360 градусов»);

— для креативно-стратегического блока (генерация концепций, формирование стратегического позиционирования) — экспертные методы с участием профильных руководителей и косвенные методы на основе квалификационных характеристик;

— для аналитико-адаптивного блока (анализ данных, тестирование гипотез, оптимизация на основе обратной связи) — параметрические методы, скорректированные экспертной оценкой содержательной значимости полученных аналитических выводов.

Совокупный индивидуальный вклад работника в коллективный результат при таком подходе представляет собой свёртку частных оценок по типам задач с весами, отражающими долю каждого типа в фактической функциональной структуре труда конкретного работника. Подобная свёртка требует периодического пересмотра весовых коэффициентов в связи с изменением функционального профиля сотрудника, что, в свою очередь, согласуется с общей логикой адаптивной настройки оценочного инструментария [2].

Заключение

Систематизированы пять групп методов атрибуции индивидуального вклада работника в коллективный результат — прямые, параметрические, экспертные, теоретико-игровые и косвенные. Для каждой группы описаны информационные требования, преимущества и ограничения. Установлено, что ни одна из групп не обеспечивает корректной атрибуции для всех типов трудовых задач в изолированном виде: прямые и параметрические методы работают на материале однородной деятельности с измеримым результатом, экспертные — на материале качественных и креативных задач, теоретико-игровые — в ограниченном классе задач с описуемой коалиционной структурой, косвенные — в условиях информационного дефицита. Обоснован принцип комбинированного применения методов: распределение их по четырём типам задач, выделенным в ранее опубликованных исследованиях автора, с последующей свёрткой частных оценок в интегральный индивидуальный показатель.

Предложенная схема выступает основой для построения адаптивных систем атрибуции индивидуального вклада, способных учитывать функциональную неоднородность труда современных специалистов. Дальнейшие исследования могут быть направлены на разработку практических процедур весовой настройки и эмпирическую верификацию предложенной схемы на материалах конкретных организационных кейсов.

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ИЗМЕРИТЕЛЬНЫЙ ИНСТРУМЕНТАРИЙ ПРОИЗВОДИТЕЛЬНОСТИ ТРУДА: ПАРАДИГМАЛЬНАЯ ПЕРИОДИЗАЦИЯ И ЛОГИКА МЕТОДОЛОГИЧЕСКИХ ПЕРЕХОДОВ

Аннотация: *В статье построена периодизация методологических рамок измерения производительности труда — от классической политэкономической до современной, формирующейся в условиях цифровой трансформации. Каждая из восьми выделенных рамок охарактеризована по сопоставимому набору признаков: предмет измерения, единица учёта, центральная категория и условие применимости. Зафиксирован механизм методологических переходов: смена рамок детерминирована не теоретическими предпочтениями, а структурной перестройкой самой трудовой деятельности. Сделан вывод о том, что современная методологическая ситуация характеризуется не исчерпанностью какой-либо рамки, а отставанием темпов развития измерительного аппарата от изменения форм трудовой деятельности.*

Ключевые слова: *производительность труда, история экономической мысли, измерение, парадигма, нематериальный труд, парадокс производительности, экономика труда.*

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MEASUREMENT TOOLKIT FOR LABOUR PRODUCTIVITY: PARADIGMATIC PERIODISATION AND THE LOGIC OF METHODOLOGICAL TRANSITIONS

Abstract: *The article constructs a periodisation of methodological frameworks for measuring labour productivity — from the classical political economy framework to the contemporary one emerging under digital transformation. Each of the eight identified frameworks is characterised by a comparable set of features: subject of measurement, unit of accounting, central category, and condition of applicability. The mechanism of methodological transitions is established: the change of frameworks is driven not by theoretical*

preferences but by structural transformations in labour activity itself. It is concluded that the current methodological situation is characterised not by the exhaustion of any specific framework but by the lagging development of the measurement apparatus relative to changes in the forms of labour activity.

Keywords: *labour productivity, history of economic thought, measurement, paradigm, non-material labour, productivity paradox, labour economics.*

Введение

Методический инструментарий измерения производительности труда — счётная база показателей, единицы учёта, процедуры свёртки результатов в интегральные оценки — формировался не одномоментно, а в виде последовательности концептуальных рамок, сменявших друг друга на протяжении более чем двух столетий. Каждая такая рамка вырастала из определённой структуры реальной трудовой деятельности и оптимизировалась под её измерительные свойства. По мере того как структура труда менялась, сложившийся аппарат обнаруживал систематические искажения и уступал место новой методологической рамке.

В отечественных учебных и обзорных работах по экономике труда эволюция категории производительности рассматривается, как правило, в составе общетеоретического блока [3; 4; 8]. При этом самостоятельная задача периодизации измерительного инструментария — выделения дискретных методологических рамок, сопоставимых между собой по единым критериям, — обычно остаётся в стороне. Между тем именно эта задача даёт наибольшее приращение для прикладного исследователя: позволяет выяснить, какая из исторически сложившихся рамок применима к конкретному виду трудовой деятельности, в каких границах она работает корректно и где обнаруживается её методологический предел.

Цель настоящего исследования — построить периодизацию методологических рамок измерения производительности труда, охарактеризовать каждую из них по сопоставимому набору признаков и зафиксировать механизм методологических переходов между рамками. Постановка такой задачи отличает настоящую работу от обзорно-описательных текстов: акцент сделан не на персоналиях и их вкладах, а на структуре самого измерительного аппарата и условиях его работоспособности.

Методы и материалы

Методологическую основу исследования составили историографический и проблемно-хронологический методы, а также сравнительный анализ концептуальных рамок. Сопоставление подходов проводилось по следующим единым критериям: предмет измерения (что именно понимается под производительным результатом); единица учёта (физическая, стоимостная, временная); центральная категория, через которую раскрывается понятие производительности; и ключевые методологические ограничения, обнаруживаемые при выходе за границы

исходных предпосылок подхода. Информационную базу составили классические работы политэкономии и экономической теории [1; 9; 11], труды отечественной школы экономики труда [3; 4; 6; 8; 10], а также современные эмпирические исследования по производительности интеллектуального труда [2; 5; 7].

Результаты

Периодизация методологических рамок

Сопоставление работ классиков экономической мысли и современных исследований по экономике труда позволяет выделить восемь концептуальных рамок, последовательно сменявших друг друга в развитии измерительного инструментария.

Первая рамка — классическая политэкономическая (вторая половина XVIII — середина XIX в.). Категория производительного труда формировалась здесь под задачу разграничения тех видов деятельности, которые непосредственно увеличивают общественное богатство, и тех, которые перераспределяют уже созданный продукт [1; 11]. Измерительная единица — материальный продукт труда, выраженный в физических либо стоимостных показателях; инструментарий сводился к сопоставлению трудозатрат, потребовавшихся на получение единицы продукта. Допущение, на котором держалась рамка, — однородность результата трудовой деятельности и принципиальная сводимость сложного труда к простому через временной коэффициент.

Вторая рамка — маржиналистская (последняя треть XIX — начало XX в.). Содержательный сдвиг этой рамки состоит в переходе от категории производительного труда к категории предельной производительности — приращения совокупного выпуска при наращивании трудовых затрат на единицу при прочих равных условиях. Маржиналистский подход обеспечил методологический выход за границы материального производства: предельная производительность могла быть рассчитана для любой деятельности, в которой определены измеримый выпуск и измеримые трудовые затраты. Условие применимости рамки — допущение непрерывности и дифференцируемости производственной зависимости, не выполняющееся в значительной части практической трудовой деятельности.

Третья рамка — научная организация труда и тейлоризм (начало — первая треть XX в.). Принципиальный сдвиг этой рамки состоит в переносе измерительной процедуры с уровня агрегата на уровень элементарного трудового действия [9]. Базовый инструмент — хронометраж операций с последующим выведением нормативной выработки в стоимостных или натуральных единицах. Рамка обеспечила беспрецедентный уровень практической применимости измерения, но потребовала допущения о возможности декомпозиции трудовой деятельности на стандартизированные операции с устойчивыми временными нормативами. Применительно к интеллектуальному и творческому труду такое допущение оказывается несостоятельным.

Четвёртая рамка — макроэкономическое измерение через производственные функции (середина XX в.). Центральное методологическое решение этой рамки — представление взаимосвязи между затратами труда и совокупным выпуском в виде формальной аналитической функции. Производственная функция Кобба — Дугласа, развитая в работах Р. Солоу [12], дала аппарат для исчисления вклада труда в совокупный экономический результат и для аналитического разделения этого вклада с вкладом капитала и технологического прогресса. Принципиальное смещение, происходящее в этой рамке, — перенос предмета измерения с уровня индивидуального работника на уровень национальной экономики; микроэкономическое измерение осталось преимущественно в ведении тейлористского по логике инструментария.

Пятая рамка — отечественная школа экономики труда (середина XX — 1980-е гг.). На материале плановой экономики получила развитие развёрнутая система категорий — производительность общественного труда, производительная сила труда, интенсивность труда, — позволяющая методически развести близкие, но не тождественные характеристики трудовой деятельности [3; 4; 6]. Существенный методологический вклад школы — разработка нормативных коэффициентов сложности труда, учитывающих квалификационные характеристики работника. Условием работоспособности рамки выступала стабильность функциональной структуры рабочих мест и устойчивость нормативной системы во времени — условия, действительно соблюдавшиеся в плановой экономике, но утратившие свою силу в современных условиях подвижного функционального состава задач.

Шестая рамка — управленческие подходы конца XX в. (1980–1990-е гг.). Здесь предприняты попытки преодолеть дефицит количественных индикаторов в сфере нематериальной деятельности через расширение номенклатуры показателей: концепция экономической добавленной стоимости (EVA), сбалансированная система показателей Р. Каплана и Д. Нортона [10], системы ключевых показателей эффективности (KPI). Принципиальная новация рамки — включение в оценочную модель нефинансовых параметров (потребительская удовлетворённость, обучение и развитие персонала, качество внутренних процессов). Вместе с тем структурная предпосылка осталась прежней: предполагалось, что функциональный состав задач работника устойчив во времени и может быть зафиксирован в виде заранее установленного набора количественных индикаторов с фиксированными весами.

Седьмая рамка — постиндустриальная (рубеж XX–XXI вв.). П. Друкер обозначил производительность работника умственного труда (knowledge worker) как одну из принципиальных открытых задач менеджмента и зафиксировал, что её решение требует не количественного дробления операций, а содержательной характеристики результата — его новизны, сложности, влияния на стратегические показатели организации [13]. Т.

Давенпорт развил данный подход в типологии задач интеллектуального труда по уровню структурированности и сложности [14]. Принципиальная новизна рамки — отказ от единого инструментария в пользу дифференцированного по типу деятельности; вместе с тем операциональные процедуры, реализующие этот переход, на момент формирования рамки оставались преимущественно описательными.

Восьмая рамка — современный измерительный аппарат в условиях цифровой трансформации (с 2010-х гг. по настоящее время). Отличительный признак этой рамки — постановка эмпирически зафиксированной проблемы, известной под названием парадокса производительности при цифровизации: масштабное внедрение цифровых технологий в трудовую деятельность не сопровождалось пропорциональным ростом измеряемой производительности [2]. Среди объяснительных гипотез выделяется группа, связанная именно с измерительными ограничениями: эффекты цифровой трансформации проявляются с временными лагами и через каналы, не охватываемые традиционным инструментарием. Современные эмпирические исследования, в том числе по применению генеративных моделей искусственного интеллекта в качестве инструмента поддержки интеллектуальной деятельности [5], дают первые свидетельства частичного снятия парадокса, но требуют существенной методологической доработки измерительных процедур для нематериального труда.

Сводная характеристика методологических рамок

Сопоставление выделенных рамок по сопоставимому набору признаков представлено в таблице 1.

Таблица 1.
Методологические рамки измерения производительности труда: сопоставительный анализ

Этап	Предмет измерения	Центральная категория	Ключевое ограничение
1. Классическая политэкономия (XVIII–XIX вв.)	Материальный продукт труда	Производительный труд	Внепроизводственные виды труда выпадают из измерения
2. Маржиналистский поворот (конец XIX — нач. XX в.)	Приращение выпуска при изменении трудозатрат	Предельная производительность	Допущение непрерывности производственной зависимости
3. Тейлоризм (нач. — первая треть XX в.)	Элементарная операция	Норма выработки	Декомпозиция труда на стандартные операции
4. Производственные функции (середина XX в.)	Совокупный выпуск национальной экономики	Эластичность выпуска по труду	Смещение к макроуровню; индивидуальный труд вне фокуса
5. Отечественная школа экономики труда (СССР, сер. — кон. XX в.)	Трудовая деятельность с устойчивой структурой	Производительность общественного труда	Ориентация на стабильную функциональную структуру задач
6. Управленческие подходы (конец XX в.)	Совокупность нормированных показателей	KPI / BSC / EVA	Допущение устойчивости функциональной структуры труда
7. Постиндустриальная парадигма (рубеж XX–XXI вв.)	Результат интеллектуальной деятельности	Производительность knowledge worker	Преимущественно описательный характер инструментария
8. Цифровая трансформация (с 2010-х гг.)	Эффекты цифровой деятельности	Парадокс производительности	Лаги и ненаблюдаемые каналы реализации эффектов

Источник: составлено автором.

Логика методологических переходов

Сопоставление рамок обнаруживает закономерность, отличающую развитие измерительного аппарата производительности труда от внутренних логик других экономических дисциплин. Смена методологической рамки происходит не как реакция на теоретические дебаты, а как ответ на структурную перестройку самой трудовой деятельности. Маржиналистская рамка отвечает на формирование рынков сложных услуг. Тейлористская — на массовое индустриальное производство с детальным разделением труда. Рамка производственных функций — на потребности послевоенного макроэкономического планирования и межстрановых сопоставлений. Управленческие рамки конца XX в. реагируют на рост сложности корпоративной деятельности. Постиндустриальная рамка фиксирует количественный и качественный рост сектора интеллектуального труда.

Современный методологический кризис связан с тем, что новые формы занятости — распределённые команды, креативные индустрии, проектная работа, поддерживаемая искусственным интеллектом интеллектуальная деятельность — опередили развитие соответствующего измерительного инструментария.

Из приведённой логики следует методологический вывод, имеющий значение для прикладных исследований. Каждая из выделенных рамок не отменяется последующими, а сохраняет работоспособность в том сегменте трудовой деятельности, для которого её исходные допущения остаются справедливыми. Тейлористский аппарат корректно работает на стандартизированных операциях; маржиналистский — на видах труда с непрерывным результатом; отечественная школа — на деятельности с устойчивой функциональной структурой; управленческие подходы конца XX в. — на функциях со стабильным составом задач. Постановка задачи современных исследований состоит не в обосновании очередной универсальной рамки, а в дифференцированном подборе методологического инструментария применительно к каждому конкретному типу трудовой деятельности.

Заключение

В работе построена периодизация методологических рамок измерения производительности труда, охватывающая восемь концептуальных рамок — от классической политэкономической до современной, формирующейся в условиях цифровой трансформации. Каждая рамка охарактеризована по сопоставимому набору признаков (предмет измерения, единица учёта, центральная категория, условие применимости). Установлено, что переходы между рамками детерминированы изменениями в структуре самой трудовой деятельности, а не внутренней логикой теоретических дебатов; каждая из исторически сложившихся рамок сохраняет применимость в том сегменте труда, в котором её исходные допущения соблюдаются. Современная методологическая ситуация характеризуется не исчерпанностью какой-либо отдельной рамки, а отставанием темпов развития измерительного инструментария от темпов изменения форм трудовой деятельности — прежде всего в сфере интеллектуального и креативного труда.

Перспективные направления дальнейших исследований включают сопоставление международных и отечественных рамок в рамках выделенной периодизации, а также эмпирическое уточнение современного состояния измерительного инструментария применительно к новым формам занятости.

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ОПРЕДЕЛЕНИЕ ЭКОНОМИИ ЭНЕРГИИ ПУТЕМ РАСЧЕТА ТЕПЛОВОГО СОПРОТИВЛЕНИЯ МНОГОСЛОЙНЫХ ОГНЕСТОЙКИХ ТЕПЛОИЗОЛЯЦИОННЫХ МАТЕРИАЛОВ

Аннотация. *В статье проводится углублённый анализ энергоэффективности многослойных огнеупорных изоляционных систем на основе расчёта теплового сопротивления. Основная цель исследования заключается в количественном доказательстве снижения тепловых потерь и энергопотребления за счёт оптимизации толщины и структуры стен промышленных печей. Использованы фундаментальные уравнения теплопроводности, включая закон Фурье и модель суммарного теплового сопротивления. Результаты показывают, что применение многослойной изоляции с низкой теплопроводностью позволяет снизить тепловые потери до 80%. Научная новизна заключается в выявлении нелинейной зависимости между ростом теплового сопротивления и снижением энергопотребления.*

Ключевые слова: *закон Фурье теплопередачи, плотность теплового потока, закон сохранения энергии материалов, высокий температурный градиент, максимальное термическое сопротивление.*

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DETERMINING ENERGY SAVINGS BY CALCULATING THERMAL RESISTANCE OF MULTILAYER FIRE-RESISTANT THERMAL INSULATION MATERIALS

Abstract. *This study provides a rigorous analysis of energy efficiency in multilayer refractory insulation systems based on thermal resistance calculations. The objective is to quantitatively demonstrate the reduction of heat losses and electrical energy consumption through optimization of wall thickness and material composition. The methodology is based on Fourier's law of heat conduction and total thermal resistance models. Results indicate that advanced multilayer insulation systems can reduce heat losses by up to 70–80%. The novelty lies in*

demonstrating the nonlinear relationship between thermal resistance and energy efficiency.

Keywords: *Fourier's law of heat transfer, Heat flux density, energy conservation of materials, high temperature gradient, maximum thermal resistance.*

Теоретическое обоснование и формулы для расчетов. Следующие формулы приведены в удобном для копирования виде:

1. Закон Фурье теплопроводности

$q = \lambda * (T_1 - T_2) / \delta$

или в дифференциальной форме:

$q = -\lambda * dT/dx$

2. Тепловое сопротивление (для одного слоя)

$R = \delta / \lambda$

3. Общее тепловое сопротивление многослойной системы

$R_total = (\delta_1 / \lambda_1) + (\delta_2 / \lambda_2) + (\delta_3 / \lambda_3) + ... + (\delta_n / \lambda_n)$

4. Плотность теплового потока (в многослойной системе)

$q = (T_1 - T_2) / R$

5. Потеря энергии (с течением времени)

$Q = q * A * t$

здесь:

- Q — энергия (Дж или кВт·ч)
- A — площадь (м²)
- t — время (часы или секунды)

РАСЧЕТ И ЭМПИРИЧЕСКИЙ АНАЛИЗ

Исходные параметры:

$T_1 = 1000$ °C

$T_2 = 50$ °C

$\Delta T = 950$ °C

$A = 10$ м²

$t = 10$ часы

НАУЧНАЯ ТАБЛИЦА

Влияние многослойной теплоизоляции на тепловое сопротивление и энергоэффективность.

Вариант	Структура материала	δ (м)	λ (W/мК)	P (м²К/W)	q (W/ м²)	Потери энергии (кW)
1	**Обычный кирпич**	0.30	1.4	0.214	4439	443.9
2	**Кирпич + волокнистая изоляция**	0.20 + 0.10	1.4 / 0.1	1.143	831	83.1
3	**Оптимизированная 3-слойная конструкция**	0.15 + 0.10 + 0.05	1.4 / 0.1 / 0.08	1.93	492	49.2

Анализ таблицы

Результаты таблицы показывают, что с увеличением теплового сопротивления тепловой поток уменьшается не линейно, а резко. При переходе от варианта 1 к варианту 3 тепловой поток уменьшился с 4439 Вт/м² до 492 Вт/м², то есть уменьшился почти в 9 раз. При этом потери энергии снизились с 443,9 кВт·ч до 49,2 кВт·ч.

Это доказывает следующее:

• Тепловое сопротивление является основным контролирующим параметром

• Материалы с низким значением λ играют решающую роль в энергосбережении

• Выбор материала важнее, чем увеличение толщины

• Многослойные системы обеспечивают экспоненциальную эффективность

Заключение

В данном исследовании на основе комплексного физико-математического подхода был проанализирован процесс теплопередачи в многослойных огнеупорных изоляционных системах, а также доказан на глубокой научной основе механизм достижения энергосбережения путем оптимизации структурных параметров стенок печи. Полученные результаты показывают, что проблема теплопотерь представляет собой не только вопрос выбора материала, но и многофакторную, нелинейную и систематическую задачу оптимизации.

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МОДЕЛЬ ОПТИМИЗАЦИИ ТРУДОВЫХ ОТНОШЕНИЙ НА ОСНОВЕ УПРАВЛЕНИЯ ЧЕЛОВЕЧЕСКИМИ РЕСУРСАМИ В СИСТЕМЕ ОБЩЕГО СРЕДНЕГО ОБРАЗОВАНИЯ

Аннотация: *Представленная модель направлена на радикальное повышение качества образования через внедрение инновационных методов управления человеческими ресурсами. Автор предлагает отказаться от традиционного администрирования в пользу стратегического сотрудничества и цифровой трансформации трудовых отношений. В основе системы лежит использование искусственного интеллекта для прозрачного рекрутинга и объективной оценки учителей по показателям KPI. Особое внимание уделено защите профессиональных прав педагогов и профилактике их эмоционального выгорания. Реализация данной HR-архитектуры обеспечит превращение учителей в главный стратегический актив современной школы.*

Ключевые слова: *управление персоналом, среднее образование, KPI, ИИ-рекрутинг, трудовые отношения.*

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OPTIMIZATION MODEL OF LABOR RELATIONS BASED ON HUMAN RESOURCE MANAGEMENT IN THE SYSTEM OF GENERAL SECONDARY EDUCATION

Abstract: *The proposed model aims to radically improve educational quality by implementing innovative human resource management methods. The author suggests moving away from traditional administration toward strategic collaboration and the digital transformation of labor relations. The system is based on using artificial intelligence for transparent recruitment and objective teacher evaluation through KPI metrics. Special attention is paid to protecting the professional rights of educators and preventing occupational burnout. Implementing this HR architecture ensures that teachers become the primary strategic asset of the modern school system.*

Keywords: *HRM, secondary education, KPI, AI recruitment, labor relations.*

Стратегия развития нового Узбекистана поставила перед собой приоритетную задачу развития человеческого капитала и радикального повышения качества образования [74] . Создание эффективной системы управления в условиях современных общеобразовательных средних учебных заведений напрямую связано с внедрением инновационных моделей управления человеческими ресурсами. Сегодня необходимо вывести трудовые отношения между учителями и работодателями на уровень стратегического сотрудничества, отказавшись от традиционных административных методов[75].

Правовой и методической основой для представленной модели служат Закон Республики Узбекистан «Об образовании» и Трудовой кодекс нового издания[7677]. Эти документы служат основой для защиты профессиональных прав учителей, создания справедливой системы оплаты их труда и внедрения механизмов непрерывной мотивации работников.

Внедрение модели управления человеческими ресурсами в системе образования охватывает следующие стратегические направления:

Цифровая трансформация: использование «электронного правительства» и цифровых HR-технологий в управлении трудовыми отношениями[78].

Профессиональные стандарты: Сертификация профессионального уровня учителей и создание системы оценки на основе КПИ (показателей эффективности).

Социальная защита: Укрепление принципов трехстороннего сотрудничества (государство, работник, профсоюз) в трудовых отношениях. В этом контексте анализируемая модель направлена на обеспечение стабильности системы путем повышения «человеческих ресурсов» до уровня стратегического актива в управлении школой и формирования «HR-бренда» образовательных учреждений[79].

Представленная «Модель оптимизации трудовых отношений на основе управления человеческими ресурсами в системе общего среднего образования» предусматривает вывод трудовых отношений в секторе образования на новый качественный уровень. Актуальность данной модели объясняется следующими факторами:

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[74] Указ Президента Республики Узбекистан № УП-60 от 28 января 2022 года “О Стратегии развития Нового Узбекистана на 2022–2026 годы”.

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[77] Закон Республики Узбекистан «Об образовании» № ЗРУ-637 от 23.09.2020 г.

[78] Ахмедов Р.Т. Цифровая трансформация и HR-технологии в государственном управлении.

[79] Указ Президента Республики Узбекистан № УП-134 от 11 мая 2022 года «Об утверждении Национальной программы по развитию народного образования в 2022–2026 годах».

Человекоцентричное управление: Основная философия модели направлена на рассмотрение учителя не просто как «трудовой силы», а как главного стратегического актива и ценности системы.

Технологическая интеграция: Обеспечение прозрачности и точности управленческих решений путем внедрения современных HR-технологий, а именно ИИ, цифрового рекрутинга, HR-аналитики, в управление образованием.

Систематичность и последовательность: Модель построена на основе согласованности целевых, организационных и результативных блоков, что направлено на создание целостной экосистемы управления качеством образования.

В настоящее время в системе образования сохраняются такие проблемы, как мотивация учителей, синдром выгорания, субъективность при отборе персонала и несовершенная оценка эффективности работы. Данная модель предлагает решение вышеуказанных системных проблем путем пересмотра трудовых отношений на уровне «Архитектуры и механизмов».

Целевой блок представляет собой стратегические задачи и приоритетные направления – это концептуальная основа управления человеческим капиталом в общеобразовательных средних учебных заведениях. Его главная задача – регулирование трудовых отношений, которое базируется на следующих трех областях:

1. Совершенствование нормативно-правовой базы: Для внедрения системы управления персоналом в школьное управление необходимо, прежде всего, адаптировать местные документы: внутренние трудовые правила, должностные инструкции к современному трудовому законодательству. Этот процесс должен полностью соответствовать требованиям действующего Трудового кодекса и гарантировать права работников.

2. Административно-организационное управление: Эта область предполагает повышение гибкости вертикального управления в цепочке «директор – заместитель – учитель». Цель состоит в том, чтобы сократить бюрократию и вовлечь учителей в процесс принятия решений.

3. Стимулирование и сертификация: Важнейшая часть целевого блока - справедливая оценка эффективности работы учителя. В данном случае основная цель -обеспечение профессионального роста учителя посредством дифференцированной системы оплаты труда и процессов сертификации, основанных на международных стандартах.

Организационный блок: Называемый «Практические механизмы и HR-технологии», он является основным «двигателем» модели.

Рисунок -1. HR-архитектура и механизмы организации трудовых отношений в сфере образования

Источник: *Составлено автором*

Этот блок служит для формирования «Школьной HR-архитектуры» и охватывает следующие области (см.рисунок-1):

1. Интеграция современных методов подбора персонала и ИИ (искусственного интеллекта). Предлагается использовать технологии искусственного интеллекта для искоренения субъективности при отборе персонала. В этом случае электронное портфолио, результаты психологического скрининга и «демонстрационных уроков» кандидатов анализируются с помощью алгоритмов. Эта система позволяет автоматически отбирать наиболее подходящий персонал и исключать коррупционные факторы. Она также помогает школе снизить человеческий фактор при отборе персонала и повысить качество.

Анализ электронного портфолио: ИИ оценивает не только диплом кандидата, но и его цифровую базу данных достижений, статей и фрагментов уроков.

Психологический скрининг: Специальные алгоритмы определяют стрессоустойчивость кандидата и его психологическую предрасположенность к работе с детьми.

Демонстрационный урок и видеоинтервью: Педагогические навыки кандидата первоначально оцениваются с помощью дистанционных и автоматизированных систем.

2. Мотивация и КПИ (КПД). Модель вводит «ориентированную на результат» систему вознаграждения за работу учителей. Показатели КПИ определяются не только оценками учеников, но и методическими нововведениями учителя, участием в международных олимпиадах и вкладом в командную работу.

Здесь речь идет не только о зарплате, но и о справедливой системе.

Дифференцированный подход: Формирование разницы между зарплатой учителя высшей категории и обычного учителя на основе КПИ, то есть ключевых показателей эффективности.

Нематериальные поощрения: Статус «Учитель года», социальные льготы и направления на зарубежные курсы повышения квалификации.

Индекс эффективности: Оценка учителя основывается не только на оценках учеников, но и на их жизненных навыках и результатах в конкурсах.
3. HR-аналитика и цифровое управление. Динамика профессионального роста сотрудников отслеживается по принципу «1,2 х 1,2 = 1,44». С помощью цифровых платформ постоянно анализируются причины текучести кадров, уровень «профессионального выгорания» сотрудников и социально-психологический климат в команде.

На наш взгляд, принцип «1,2 х 1,2 = 1,44» обеспечивает коллективный рост, поскольку при формировании наиболее перспективной, высокомотивированной команды наблюдаются значительные изменения в ее целях и действиях.

Анализ текучести кадров: Почему учителя уходят? Необходимо выявлять проблемные области посредством систематического анализа.

Профессиональная диагностика: Целесообразно видеть сильные и слабые стороны каждого учителя на цифровой карте и, соответственно, составлять для них индивидуальный план развития.

Прогнозирование: Необходимо заранее рассчитать, по каким предметам в ближайшие годы будет нехватка кадров.

4. Трехсторонность и корпоративная культура. В трудовых отношениях укрепляется цепочка «Государство – Работник – Профсоюз». Это создает организационную среду, гарантирующую не только выполнение обязанностей учителя, но и его правовую и социальную защиту.

Основа для создания здоровой атмосферы в школе.

Коллективные договоры: Гарантирование обязательств между работодателем и работником.

Профилактика «профессионального выгорания»: Психологическое обучение и систематическая организация отдыха и отпусков сотрудников.

Корпоративный брендинг: Обеспечение участия учителя в формировании имиджа школы и гордости за свою профессию.

Заключительная часть модели, блок «Результаты», представляет собой набор показателей, измеряющих эффективность всех реализованных реформ и организационных механизмов. Этот блок показывает, что является «продуктом» системы.

Ниже приведено расширенное объяснение трех основных областей блока «Результаты» и соответствующей литературы:

III. Блок результатов: Эффективность и стратегическое воздействие

В этом блоке оценивается успешность применяемой модели управления персоналом на основе трех критериев:

1. Социальная эффективность (Индекс удовлетворенности сотрудников)

Основное внимание здесь уделяется состоянию «человеческого капитала».

Мотивация и лояльность: у учителей повышается гордость за свою профессию и их внутреннее стремление к достижению школьных целей.

Снижение профессионального выгорания: в результате правильно организованного разделения труда и психологической поддержки снижается уровень «стресса» среди учителей.

Социальный статус: укрепляется авторитет учителя в обществе и сообществе, что создает сильную корпоративную культуру.

1. Образование

3. Качество (результат синергии)

Это важнейший показатель блока, напрямую влияющий на образовательный процесс.

Показатели успеваемости: Высокомотивированный и профессиональный учитель проводит высококачественные уроки, что приводит к повышению уровня знаний учащихся (международные оценки, такие как PISA, PIRLS).

Инновационная среда: Смелое использование учителями новых педагогических технологий и появление творческого подхода к образованию.

3. Экономическая эффективность (оптимизация ресурсов)

Обосновывает экономическую целесообразность управления персоналом.

Снижение текучести кадров: Экономия затрат на поиск и переподготовку новых сотрудников.

Производительность труда: Получение максимальных результатов от имеющихся ресурсов по формуле «1,2 х 1,2 = 1,44».

Инвестиционная привлекательность: Повышение привлекательности школы с сильными человеческими ресурсами для государственного и частного секторов.

Конечно, для определения эффективности данной модели и обеспечения функционирования ее постоянных механизмов важно установить регулярный циклический контроль и мониторинг. Организация управления персоналом в системе общего среднего образования на основе нового, стратегического подхода является логическим продолжением современных образовательных реформ. В результате анализа разработанной в ходе исследования модели были сделаны следующие важные выводы:

1. Систематичность и целостность: Представленная модель работает на основе взаимозависимости целевых, организационных и результативных блоков. Только внедрение целостной системы, а не отдельных элементов управления персоналом, может обеспечить эффект «синергии» (1,2 х 1,2 = 1,44).

2. Инвестиции в человеческий капитал: Важнейшим аспектом модели является признание учителя в качестве основного капитала. В то время как современные технологии рекрутинга и искусственного интеллекта обеспечивают справедливость в отборе персонала, система KPI гарантирует прозрачность в оплате труда.

3. Социально-экономическая устойчивость: Предложенные механизмы не только повысят качество образования, но и послужат рациональному использованию государственных ресурсов, снижению текучести кадров и восстановлению социального престижа профессии учителя.

4. Цифровая трансформация: инструменты HR-аналитики и цифрового управления позволят директорам школ и высшим должностным лицам отслеживать ситуацию в режиме реального времени и принимать решения на основе данных.

В заключение можно сказать, что внедрение этой HR-модели является наиболее эффективным способом преобразования школ в современные, инновационные и конкурентоспособные организации. Это, в свою очередь, послужит прочной основой для подготовки высококвалифицированных кадров и создания фундамента Третьего Возрождения.

Также внедрение этой модели будет способствовать созданию здоровой рабочей среды в общеобразовательных средних школах, повышению престижа учителей и, в конечном итоге, обеспечению эффективного функционирования цепочки «Школа – Учитель – Результат».

Для повышения научной и практической значимости модели и ее эффективного внедрения в жизнь можно выдвинуть следующие предложения и рекомендации. Эти рекомендации непосредственно направлены на управление школами и реформы на министерском уровне.

В заключение можно сказать, что внедрение этой модели является наиболее эффективным способом преобразования школ в современные, инновационные и конкурентоспособные организации.

1. О совершенствовании нормативно-правовой базы:

Введение обязательной стратегии управления персоналом: Включение «Стратегии управления человеческими ресурсами» в качестве отдельного раздела во внутренние регламенты общеобразовательных средних учебных заведений и интеграция её в план развития школы.

Укрепление системы KPI в законодательстве: Разработка и внедрение механизма выплаты дополнительных премий, основанных не только на стаже и категории, но и на индивидуальных показателях эффективности (KPI) при оплате труда учителей.

2. О цифровизации и внедрении технологий:

Создание платформы «Умный рекрутинг»: Запуск национальной платформы, исключающей человеческий фактор при отборе персонала и оценивающей психологические и профессиональные компетенции кандидатов с использованием ИИ (искусственного интеллекта).

Система HR-панели: Внедрение цифровой панели для директоров школ, которая отслеживает динамику персонала, карты карьерного развития сотрудников и уровень «профессионального выгорания».

3. О профессиональном развитии и мотивации:

Индивидуальная траектория развития (ИПР): Формирование для каждого учителя индивидуального плана профессионального роста на основе его сильных и слабых сторон и его привязка к традиции «учитель-ученик».

Психологическая поддержка: Повышение эффективности работы путем организации специальных «комнат отдыха и релаксации» и коучинговых сессий в школах не только для учеников, но и для учителей.

4. Об укреплении социального партнерства:

Активизация механизма трехстороннего сотрудничества: Четкие (недекларативные) положения об отдыхе, восстановлении здоровья и социальной защите работников в коллективных договорах.

определить цели и подвергнуть их реализацию общественному контролю.

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В СТАТЬЕ АНАЛИЗИРУЮТСЯ СТРУКТУРА И ПРИНЦИП РАБОТЫ АСИНХРОННЫХ МАШИН

Аннотация. *В электрических машинах стальной сердечник изготавливается из специального тонкого листа электротехнической стали. Стальные сердечники статора и ротора содержат 1–3% кремния. Толщина стальных листов составляет 0,3–0,5 мм. После сборки стального сердечника его запрессовывают на раму. Рама статора может быть изготовлена из алюминия или чугуна. В асинхронных машинах стальной сердечник ротора также собирается из специальных стальных листов и запрессовывается на вал (ось) или втулку ротора. В микромашинах стальные сердечники собираются из пластин железоникелевого сплава.*

Ключевые слова: *короткое замыкание ротора, сердечник ротора, контактное кольцо, регулировочные реостаты, вращающееся магнитное поле, звездообразная цепь, частота.*

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THE STRUCTURE AND OPERATING PRINCIPLE OF ASYNCHRONOUS MACHINES ARE ANALYZED.

Abstract. *In electric machines, the steel core is made of a special thin sheet of electrical steel. The steel cores of the stator and rotor contain 1...3% silicon. The thickness of the steel sheets is 0.3-0.5 mm. After the steel core is assembled, it is pressed onto the frame. The stator frame can be made of aluminum or cast iron. In asynchronous machines, the steel core of the rotor is also assembled from special steel sheets and pressed onto the shaft (axis) or rotor sleeve. In micromachines, the steel cores are assembled from iron-nickel alloy plates.*

Key words: *rotor short circuit, rotor core, slip ring, control rheostats, rotating magnetic field, star circuit, frequency.*

Введение

Асинхронные машины классифицируются по структуре ротора:

1) с короткозамкнутым ротором, рис. 1.

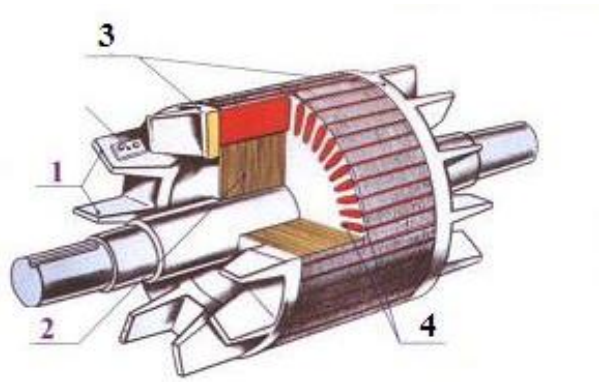

Рисунок 1. Короткозамкнутый ротор асинхронной машины: 1 – вентиляционные лопатки, 2 – магнитный проводник ротора, 3 – кольцо короткого замыкания, 4 – пазы с установленными обмотками.

Сердечник ротора собран из электротехнических стальных кожухов, наружная сторона которых представляет собой цилиндр, образующий пазы. Для уменьшения потерь мощности из-за вихревых токов обе стороны каждого стального кожуха, образующего сердечник ротора, покрыты изоляционным лаком.

В пазы сердечника ротора двигателя с короткозамкнутым ротором помещены алюминиевые или медные стержни (стержни), а их концы закорочены алюминиевыми или медными кольцами. Такой двигатель называется асинхронным двигателем с ротором («клетка Алмахона»).

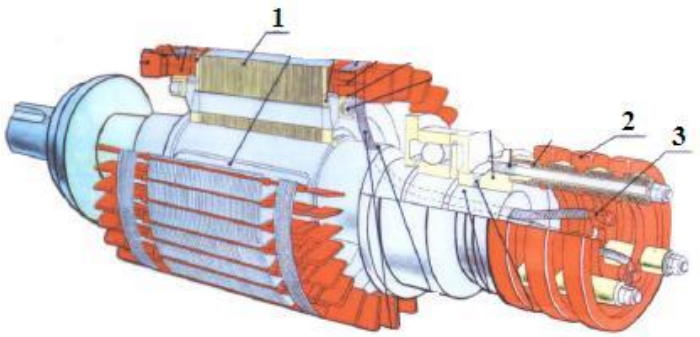

Рисунок 2. Фазовый (контактно-кольцевой) ротор асинхронной машины. 1 — магнитная цепь ротора, 2 — контактные кольца, 3 — соединение концов катушек с контактными кольцами, 4 — щетки, 5 — щеткодержатели, 6 — проводящие кабели.

На пазах вала фазового ротора двигателя, как и на статорной обмотке, установлена трехфазная обмотка. Для уменьшения пускового тока двигателя в цепь обмотки ротора последовательно вводится внешнее сопротивление.

При подаче трехфазного тока на обмотку статора асинхронного двигателя создается вращающееся магнитное поле с частотой $n_1 = 60\ f/p$. Вращающееся магнитное поле пересекает обмотку ротора и создает ЭДС в ее замкнутой обмотке. В результате взаимодействия тока в обмотке ротора и вращающегося магнитного поля в статоре создается вращающийся

электромагнитный момент, в результате которого двигатель начинает вращаться с частотой n_2. Синхронная частота вращения вращающегося магнитного поля ротора n_2 всегда меньше n_1. Если $n_2 = n_1$, то в обмотке ротора не генерируются ток и крутящий момент. Отношение разности частот вращающегося магнитного поля и ротора к синхронной частоте называется скольжением и обозначается буквой S. Следовательно, значение скольжения выражается следующим образом:

$$S=\frac{n_1-n_2}{n_1} \qquad (1.1)$$

Номинальное скольжение, соответствующее номинальной нагрузке асинхронных двигателей нормальной конструкции мощностью до 1÷100 кВт, составляет (1.2).

$$S_n=\frac{n_1-n_n}{n_1}=0{,}01\div0{,}06 \qquad (1.2)$$

В режиме работы двигателя асинхронной машины S = 0÷1 изменяется.

Здесь S = 0 — идеальный режим работы двигателя, т.е. M = 0; он достигается при $n_2 = n_1$. При S = 1 ротор двигателя находится в состоянии покоя, т.е. $n_2 = 0$. Частота вращения асинхронного двигателя определяется следующим образом:

$$n_2 = n_1(1 - S) \qquad (1.3)$$

Механические характеристики асинхронных машин. Механическая характеристика асинхронного двигателя выражается соотношением S=f(M). При построении механической характеристики получается следующее уравнение, удобное для её расчета:

$$M=\frac{2M_{maks}}{\frac{S}{S_{kr}}+\frac{S_{kr}}{S}} \qquad (1.4)$$

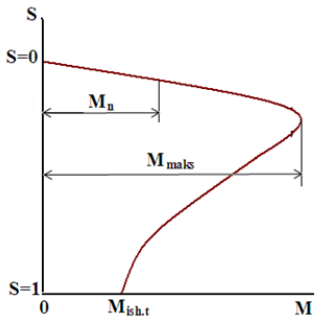

Рисунок 3. Механические характеристики асинхронной машины.

Действительно, согласно механическим характеристикам, скольжение также изменяется с изменением нагрузки. С изменением скольжения автоматически изменяется значение тока I_{2k} и, следовательно, значение крутящего момента. Если нагрузка, то есть значение момента сопротивления M_c, немного превышает значение крутящего момента Mmax, то, согласно механическим характеристикам, частота естественным образом уменьшается. В этом случае крутящий момент двигателя уменьшается, а не увеличивается, и в результате баланс моментов не может быть восстановлен, и двигатель останавливается сам по себе.

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УСЛОВИЯ СИСТЕМАТИЧЕСКОГО ПОДХОДА К УПРАВЛЕНИЮ ЭНЕРГИЕЙ

Аннотация: *Главная цель управления энергией — предоставление альтернативных методов реализации энергосберегающей политики в секторах бизнеса. Для повышения энергоэффективности необходимо не только использовать технические решения, основанные на эффективных машинах, оборудовании и технологиях, но и применять эффективный контроль. Практика республиканских предприятий всегда заключалась в том, что они уделяли больше внимания удовлетворению энергетических потребностей производственного процесса и не обращали внимания на эффективность его передачи и использования.*

Ключевые слова: *Управление энергией, энергетические ресурсы, энергетический потенциал, оптимизация и эффективное управление, энергосберегающая политика, энергопотребление на предприятии.*

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CONDITIONS FOR A SYSTEMATIC APPROACH TO ENERGY MANAGEMENT

Abstract: *The main goal of energy management is to provide alternative methods for implementing energy saving policies in business sectors. To increase energy efficiency, it is necessary not only to use technical solutions based on efficient machines, equipment and technologies, but also to apply good control. The practice of republican enterprises has always been such that they paid more attention to meeting the energy needs of the production process, and did not pay attention to the efficiency of its transmission and use.*

Keywords: *Energy management, energy resources, energy capacity, optimization and effective management, energy saving policy, energy consumption at the enterprise.*

Введение

Энергоменеджмент-это управленческая и техническая деятельность хозяйствующего персонала, направленная на рациональное использование

энергии с учетом социальных, технических, экономических и экологических аспектов.

Энергоменеджмент-это совершенствование и эффективное управление энергетическими ресурсами. Энергосберегающие технологии приобретают все большую популярность в различных отраслях промышленности, энергетике, строительстве, жилищно-коммунальном хозяйстве и сельском хозяйстве.

Можно с уверенностью сказать, кто, сколько и зачем использует гвозди, комбикорм и плиты на предприятии, но никто не может ответить на вопрос, кто и сколько энергии потребляется. Как правило, учет контроля энергопотребления на предприятии ведется по одному электро- или теплосчетчику, чего недостаточно [1].

Управление энергопотреблением включает в себя комплекс мер, направленных на экономию энергетических ресурсов: мониторинг энергопотребления, анализ и разработка энергетических бюджетов, разработка энергетической политики, планирование новых энергосберегающих мероприятий и т. д.

Цели управления энергопотреблением:

- снижение стоимости используемых на предприятии энергетических ресурсов;
- оптимизация производственных процессов с точки зрения энергоэффективности;
- повышение экологического уровня предприятия;
- повышение конкурентоспособности продукции за счет снижения энергопотребления на единицу продукции;
- улучшение рейтинга предприятия и его развития [2].

Управление энергопотреблением (энергоменеджмент) – это управленческая и техническая деятельность работников хозяйствующего субъекта, направленная на рациональное использование энергии с учетом социально-технических, экономических и экологических аспектов.

Главная цель управления энергопотреблением – обеспечение эффективных методов реализации энергосберегающей политики хозяйствующего субъекта. Для повышения энергоэффективности необходимо не только использование технических решений, основанных на передовых машинах, оборудовании и технологиях, но и применение эффективного контроля. Практика предприятий республики всегда заключалась в том, что они уделяли больше внимания удовлетворению энергетических потребностей производственного процесса и не обращали внимания на эффективность его передачи и использования. Можно с уверенностью сказать, кто использует на предприятии гвозди, смешанные корма и доски, сколько и для чего, но никто не может ответить на вопрос, кто и сколько энергии потребляется. Как правило, контрольный расчет энергопотребления на предприятии проводится по одному электро- или теплосчетчику, чего недостаточно [3].

Энергетическая мощность производства — параметр энергопотребления энергией и топливом основных и вспомогательных технологических процессов изготовления продукции, выполнения работ, оказания услуг на основе определенной технологической системы.

Суммарная энергетическая емкость продукта-это параметр энергопотребления и расхода топлива при производстве продукта, включая потребление минералов, транспортировку, переработку и производство сырья, материалов, деталей. Энергосберегающий потенциал — это эффект предлагаемых или реализуемых энергосберегающих мер, выраженный в единицах энергии, изменениях массы (объема) энергоносителей (топлива) или финансовых затратах на них в прогнозе на ближайшие несколько лет [4].

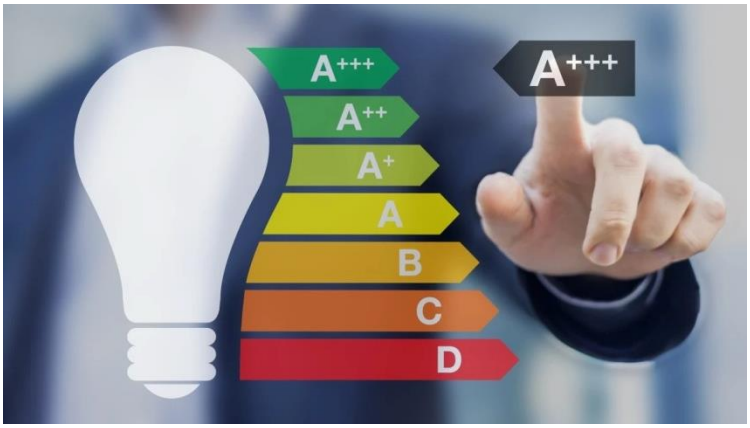

Рисунок 1. Категории энергосбережения.

Управление энергопотреблением — это оптимизация и эффективное управление использованием энергетических ресурсов. Энергосберегающие технологии приобретают все большую популярность в различных отраслях промышленности, энергетики, строительства, жилищно-коммунального хозяйства и сельского хозяйства.

Сравнительное энергопотребление — это энергопотребление на производство единицы продукции определенного типа или класса, основанное на показателях непосредственно существующего производства, линий, технологических устройств, процессов, установленных в цехе энергосчетчиков.

Экономия топливно-энергетических ресурсов — это сокращение потребления топливно-энергетических ресурсов на производство сравнительной продукции, выполнение работ и предоставление услуг заданного качества без нарушения экологических и других ограничений в соответствии с требованиями общества [5,6].

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СТРУКТУРНЫЕ СДВИГИ В ПРОДУКЦИИ БИЗНЕС-СЕГМЕНТОВ КИТАЙСКОЙ ТЕХНОЛОГИЧЕСКОЙ КОМПАНИИ

Аннотация. *Крупные технологические компании, развивающие собственную экосистему, имеют определенные особенности в формировании корпоративного портфеля. Цель исследования: выявление актуальных структурных сдвигов в бизнес-сегментах компании Huawei. Методы исследования: кейс-стади, библиографический, динамических рядов. Результаты анализа позволили охарактеризовать изменения в структуре корпоративного портфеля и установить характер связей внутри экосистемы компании. Выявлена важная интегрирующая роль операционной системы Huawei – Harmony OS.*

Ключевые слова: *продуктовая политика, бизнес-сегменты, структурные сдвиги, корпоративный портфель, компания Huawei.*

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STRUCTURAL SHIFTS IN THE PRODUCTS OF BUSINESS SEGMENTS A CHINESE TECHNOLOGY COMPANY

Abstract. *Large technology companies developing their own ecosystems have specific characteristics when it comes to building their corporate portfolios. The objective of this study was to identify current structural shifts in Huawei's business segments. Research methods included case studies, bibliographic analysis, and time series. The analysis allowed us to characterize changes in the corporate portfolio structure and identify the nature of the connections within the company's ecosystem. The important integrative role of Huawei's operating system, HarmonyOS, was revealed.*

Keywords: *product policy, business segments, structural shifts, corporate portfolio, Huawei.*

Технологические инновации оказывают существенное влияние на развитие множества компаний. Крупные холдинги, развивающие собственную экосистему, находятся в особом положении – их бизнес-сегменты тесно связаны.

Отдельные авторы рассматривают развитие бизнес-сегментов коммерческих организаций с позиций их динамики, особенностей жизненного цикла. Так, В.В. Бурцев исследовал бизнес-сегменты коммерческой организации с позиций формирования добавленной стоимости, глубоко изучил «проблематику цикличности развития бизнес-сегментов» [1].

Л.М. Куприянова исследует методические подходы к оценке «операционных и географических сегментов». Автор рекомендует выделять «функциональные сферы сегментов бизнеса, оценивать состояние внутренней и внешней среды, оценивать показатели деятельности по конкретным сегментам бизнеса для принятия стратегических управленческих решений» [3].

Г.В. Бушмелева, О.В. Солодянкина, А.А. Батов успешно разрабатывают «управленческий инструментарий оценки эффективности результативности бизнес-сегмента» [2].

С.Ю. Курзин исследует проблемы управления маркетингом бизнес-сегмента в условиях цифровой экономики; вопросы формирования и реализации маркетинговой стратегии бизнес-сегментов [4].

В данной статье нами предпринята попытка анализа динамики структуры бизнес-сегментов китайской технологической компании Huawei.

В 2025 году темп прироста совокупной выручки Huawei замедлился до 2,2 процента за год (в 2024 г. прирост составлял 22,4%, год к году).

Пять основных бизнес-сегментов компании развивались с разной скоростью (табл. 1).

Таблица 1.

Доля основных бизнес-сегментов Huawei в формировании выручки компании в 2024-25 гг. (суммы в млрд юаней)

Бизнес-сегменты компании	2024 г.		2025 г.		2025/2024
	млрд юаней	Уд.вес	млрд юаней	Уд.вес	
ИКТ-инфраструктура	365,424	42,4	375,014	42,6	1,026
Потребительский бизнес	339,006	39,3	344,473	39,1	1,016
Облачные технологии	33,325	3,9	32,161	3,7	0,965
Цифровая энергетика	68,607	8,0	77,312	8,8	1,127
Интеллектуальные автомобильные решения	26,158	3,0	45,018	5,1	1,721
Другие	29,552	3,4	6,963	0,8	0,236
Всего	862,072	100	880,941	100	1,022

Источник: рассчитано автором по [5].

Нами выявлена закономерность: наиболее масштабные бизнес-сегменты растут медленнее, чем небольшие – сказывается «эффект высокой базы».

Самый масштабный бизнес-сегмент Huawei – продукты ИКТ инфраструктуры – занимает почти 43 процента всех продаж. Темп прироста в 2025 г. был невысоким – плюс 2,6%.

На втором по значимости месте находятся продукты бизнес-сегмента «потребительский бизнес» – 39,1 процентов совокупной выручки компании (годовой прирост низкий – 1,6%).

Два этих сегмента формируют более 81 процента совокупной выручки компании. Удельный вес всех остальных бизнес-сегментов составляет около 19%. Среди них (по убыванию): цифровая энергетика (8,8%); интеллектуальные автомобильные решения (5,1%); облачные технологии (3,7%).

Совокупная выручка компании за 2025 год возросла на 2,2%, в то же время реализация продуктов бизнес-сегмента «интеллектуальные автомобильные решения» увеличилась на 72 процента, а «цифровой энергетики» – на 12,7%.

Продажи продуктов в сегменте «облачные технологии» за 2025 г. снизились на 3,5% (год к году). Здесь следует учитывать всю экосистему Huawei – операционная система и облачные технологии обеспечивают прирост продаж в других бизнес-сегментах, формируя синергетический эффект.

Важную интегрирующую роль играют облачные сервисы. Huawei Cloud предоставляет более двухсот сервисов, таких как Elastic Cloud Server (ECS), решения на основе искусственного интеллекта, большие данные, контейнеры, отраслевые «стеки» для цифровой трансформации. Он интегрируется с другими сегментами, в том числе – для гибридных облачных и периферийных вычислений.

Операционная система HarmonyOS NEXT, запущенная осенью 2024 года, полностью развернутая на новых устройствах с 2025 года, обособила экосистему Huawei от Android, используя микроядро Hongmeng и поддерживая только «нативные» приложения через Ark Compiler. Этот сдвиг ускорил развитие экосистемы, достигнув более 350 тысяч приложений (к началу 2026 года), и обеспечив работу почти миллиарда устройств в модели «1+8+N» (1 телефон + 8 периферийных устройств + неограниченное количество IoT – Интернет вещей)).

Все новые устройства Huawei с 2025 года — смартфоны (серии Mate 70/X6), планшеты (MatePad Pro), складные устройства (Pocket 2), носимые устройства и ПК — работают под управлением Harmony OS NEXT. Поставки персональных компьютеров на Harmony OS выросли в десять раз, вопреки сокращению мирового рынка ПК.

Выводы

Установлено: бизнес-сегменты Huawei тесно связаны, операционная система и облачные технологии обеспечивают прирост продаж в других бизнес-сегментах компании, формируя синергетический эффект. Выявлена закономерность: наиболее масштабные бизнес-сегменты растут медленнее, чем небольшие – сказывается «эффект высокой базы».

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СТРУКТУРА ПРОДАЖ И ОБОРАЧИВАЕМОСТЬ ТОВАРНЫХ ЗАПАСОВ КРУПНОЙ ТЕХНОЛОГИЧЕСКОЙ КОМПАНИИ

Аннотация. *Современные производственно-технологические компании имеют определенные особенности в формировании продуктового портфеля. Цель исследования: выявление связи между скоростью оборота товарных запасов и структурой продаж в одной из категорий товаров компании Huawei. Методы исследования: кейс-стади, библиографический, динамических рядов. Результаты анализа позволили охарактеризовать изменения в структуре продаж, и установить степень ее влияния оборачиваемость запасов.*

Ключевые слова: *структура продаж, оборачиваемость запасов, структурные сдвиги, компания Huawei*.

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SALES STRUCTURE AND INVENTORY TURNOVER OF A LARGE TECHNOLOGY COMPANY

Abstract. *Modern manufacturing and technology companies have specific characteristics when it comes to product portfolio formation. The objective of this study was to identify the relationship between inventory turnover rate and sales structure in one of Huawei's product categories. Research methods included case studies, bibliographic analysis, and time series analysis. The analysis allowed us to characterize changes in sales structure and determine the extent to which they influence inventory turnover.*

Keywords: *sales structure, inventory turnover, structural shifts, Huawei..*

Структура товарного ассортимента оказывает влияние на многие показатели деятельности организаций. Отдельные авторы рассматривают ассортиментную политику в связи с показателями скорости оборота средств,

вложенных в товарные запасы. Так, А.В. Башарина, И.А. Баев, А.Ф. Черненко обосновали «актуальность повышения рациональности вложений в запасы как способа сокращения потребности в финансовых ресурсах». Авторы выявили ряд недостатков существующих способов оптимизации вложений в запасы в контексте управления оборачиваемостью основных материалов, незавершенного производства, готовой продукции [1].

Т.А. Железова, Е.И. Леоненко исследуют проблемы формирования товарного ассортимента в контексте управления товарными запасами. Авторы утверждают, что «формирование структуры товарного ассортимента организации способствует эффективному управлению товарными запасами, определению их оптимальной величины, ускорению оборачиваемости и, как следствие, – росту оборота, прибыли». Целью управления при этом становится определение оптимальной ассортиментной структуры [2].

А.Г. Мокроносов, Е.В. Долженкова рассматривают алгоритм управления материальными потоками промышленных предприятий в условиях неопределенности, основанный «на мониторинге показателей эффективности, продолжительности производственного цикла, выполнения графика поставок, что позволяет количественно оценить синергетический эффект, возникающий в результате управления изменением внешних и внутренних факторов среды». Такой подход позволяет снизить коммерческие риски, вызванные влиянием эндогенных и экзогенных факторов [3].

М.А. Чаплыгина, Г.А. Польская, Т.А. Зубкова предприняли попытку разработки модифицированного аналитического подхода к анализу оборачиваемости товарных запасов, позволяющего выявить проблемы управления запасами, в контексте анализа издержек обращения, издержкоемкости товарооборота [5].

В данной статье нами предпринята попытка анализа сравнения динамики товарных запасов и продаж по одной товарной категории компании Huawei.

Совокупная выручка компании по группе товаров «Корпоративные сети» в 2025 г. составила 71,3 млрд юаней. В этой группе выделено пять подгрупп товаров (табл. 1).

Таблица 1

Структура продаж и запасов по группе товаров «Корпоративные сети» Huawei в 2024-25 гг.

Подгруппы товаров	Оборачиваемость запасов		Удельный вес в продажах, %% к итогу	
	раз	дней	2024 г.	2025 г.
Сетевые коммутаторы	3,4	108	31,9	30,7
Маршрутизаторы	3,8	95	22,2	23,6
Беспроводная сеть	5,0	73	14,5	14,5
Продукты для сетевой безопасности	5,9	62	13,3	14,2
ПО для сетей	6,8	54	18,1	17,0
Итого	-	-	**100**	**100**

(Рассчитано автором по [4])

Наиболее высокую долю в выручке демонстрируют сетевые коммутаторы – 30,7% (с небольшим снижением к 2024 г.). Второе место занимают маршрутизаторы – 23,6% выручки (с небольшим ростом к 2024 г.).

По скорости оборота, напротив, эти две подгруппы товаров – самые «медленные» (в запасах их доля выше, чем в выручке) – 3,4 и 3.8 оборота за год соответственно.

Среднее по группе значение оборачиваемости запасов в 2025 г. составило 84,1 дня, или 4,34 оборота за год:

*84,145 = [(108*30,7) + (95*23,6)+ (73*14,5) + (62*14,2) + (54*17)] / 100 (1)*

Выводы

Изменение структуры продаж оказывает влияние на показатели оборачиваемости товарных запасов, и одновременно – на потребность компании в рабочем капитале. Чем короче производственно-коммерческий цикл, тем быстрее оборачиваемость средств, вложенных в запасы. Соответственно снижается потребность в рабочем капитале, высвобождаются средства для инвестиций.

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ВЛИЯНИЕ АССОРТИМЕНТНЫХ СДВИГОВ НА ДОХОДЫ ПРОИЗВОДСТВЕННОЙ КОМПАНИИ

Аннотация. *Внутри каждой товарной группы скорость изменения продаж по отдельным товарам неодинакова, соответственно меняется удельный вес артикулов в общей сумме полученных доходов. Разность выручки и себестоимости формирует маржинальный доход, сумма которого изменяется под влиянием ряда факторов. Цель исследования: выявление связи между маржинальным доходом и ассортиментными сдвигами внутри одной группы товаров компании Huawei. Методы исследования: кейс-стади, библиографический, динамических рядов. Результаты анализа позволили установить степень влияния ассортиментных сдвигов на динамику валового дохода компании.*

Ключевые слова: *ассортиментные сдвиги, маржа, маржинальный доход, компания Huawei.*

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PRODUCT SHIFTS IMPACT ON THE MARGIN OF A MANUFACTURING COMPANY

Abstract. *Within each product group, the rate of change in sales for individual products varies, and the relative weight of individual SKUs in total revenue varies accordingly. The difference between revenue and cost determines marginal income, the amount of which fluctuates depending on a number of factors. The objective of this study was to identify the relationship between marginal income and product mix shifts within a single product category at Huawei. The research methods included case studies, bibliographic analysis, and time series analysis. The analysis allowed us to determine the impact of product mix shifts on the company's gross revenue dynamics.*

Keywords: *product mix shifts, margin, marginal income, Huawei.*

Доходы компаний реального сектора экономики формируются под влиянием множества внешних и внутренних факторов. Маржинальный доход производителей товаров рассчитывают, как разность выручки от их реализации и себестоимости. Одним из факторов изменения маржинального дохода компании является внутригрупповой ассортимент продукции, так по каждому артикулу наблюдается свое соотношение цены реализации и себестоимости.

Отдельные авторы рассматривают ассортиментные сдвиги в связи с проблемами формирования маржи, доходов компании. Так, А.Н. Бекетов обоснованно утверждает: «управление ассортиментом, основанное на современных программных аналитических инструментах, позволяет оптимизировать деятельность компании, повысить основные финансовые показатели. Оптимизация ассортимента позволяет получить более высокий валовой доход и маржу» [2].

О.Н. Есина, Н.Н. Терещенко, А.С. Ильина предложили авторскую методику диагностики ассортимента предприятий, применение которой позволяет принимать адекватные управленческие решения по его оптимизации, с целью повышения результативности функционирования субъектов. Авторы обращают особое внимание на «доходность продаж, в рамках диагностики ассортимента, с учетом специфики формирования доходов» в конкретной отрасли [3].

А.С. Басюк, А.В. Антошкина утверждают: «В современных условиях эффективное управление ассортиментом является частью общей стратегии предприятия. Формирование оптимального ассортимента дает возможность эффективно управлять долей маржинального дохода, а также чистой прибылью предприятия» [1].

К.Н. Мишустина исследовала процессы управления товарным ассортиментом, в том числе – на базе результатов «совмещенного ABC- и XYZ- анализа, позволяющего выявить девять групп товаров в зависимости от доли дохода от реализации товара в общей выручке» [4].

В данной статье нами изучены ассортиментные сдвиги внутри одной группы продукции компании Huawei.

Всего по группе товаров «Корпоративные сети» в 2025 г. компания реализовала продукции на сумму 71,3 млрд юаней. В прайс-листе по этой группе выделены пять подгрупп товаров (табл. 1).

Таблица 1.
Уровень маржи по подгруппам товаров «Корпоративные сети» компании Huawei в 2024-25 гг.

Подгруппы товаров	Уровень маржи, %% к выручке	Удельный вес в выручке, %% к итогу	
		2024 г.	2025 г.
Сетевые коммутаторы	17,2	31,9	30,7
Маршрутизаторы	15,5	22,2	23,6
Беспроводная сеть	9,3	14,5	14,5
Продукты для сетевой безопасности	13,2	13,3	14,2
ПО для сетей	8,4	18,1	17
Итого	-	**100**	**100**

(Рассчитано автором по [4])

Наиболее «выгодными» для компании с точки зрения доходности являются сетевые коммутаторы – уровень маржи составляет в среднем 17,2% к обороту. В 2024 г. товары этой подгруппы занимали 31,9; в 2025 г. – 30,7 процентов в выручке.

На втором по доходности месте находятся маршрутизаторы, с маржой 15,5% к выручке. Их доля в продажах повысилась на 1,4 процентных пункта за 2025 год.

Две названные подгруппы занимают более половины совокупной выручки по группе (54%).

Сравнительно низкий уровень маржи по подгруппам «Беспроводная сеть» (9,3%), «программное обеспечение для сетей» (8,4% к выручке) свидетельствует, что компания сознательно занижает отпускные цены на эти товары, стимулируя сбыт.

Нами рассчитан средний уровень маржи по данной группе товаров: в 2024 г. он составил 13,55; в 2025 г. – 13,59 (процентов к обороту). Это означает, что под влиянием ассортиментных сдвигов показатель возрос на 0,04% выручки. Сумма дополнительных доходов компании, полученных за счет влияния этого фактора составила 28,48 млн юаней в год:

*28,48 = (71212 *0,04) / 100* *(1)*

Выводы

Ассортиментные сдвиги оказывают влияние на показатели доходности производственной компании. Ответственным менеджерам следует рекомендовать оценивать влияние этого фактора на средний размер маржи по товарной группе (подгруппе). При больших масштабах производства даже незначительное изменение этого показателя (в рассмотренном кейсе – 0,04 процента к выручке) обеспечивает прирост доходов компании на миллионы юаней.

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ОСОБЕННОСТИ ПРОДУКТОВОГО ПОРТФЕЛЯ HUAWEI -ОБЛАЧНЫЕ ТЕХНОЛОГИИ

Аннотация. *Облачные технологии стремительно развиваются. На глобальном рынке возрастает конкуренция, причем каждый из конкурентов стремится так сформировать свой продуктовый портфель, чтобы максимизировать рыночную долю. Цель исследования: выявление особенностей продуктового портфеля Huawei Cloud в сравнении с основными конкурентами. Методы исследования: кейс-стади, библиографический, сравнения. Результаты анализа позволили оценить структуру ассортимента Huawei Cloud, и выявить преимущества прямых конкурентов.*

Ключевые слова: *облачные технологии, Huawei, продуктовый портфель, конкуренты*.

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FEATURES OF THE HUAWEI CLOUD PRODUCT PORTFOLIO

Abstract. *Cloud technologies are rapidly evolving. Competition in the global market is intensifying, with each competitor seeking to shape their product portfolio to maximize market share. The objective of this study was to identify the unique features of Huawei Cloud's product portfolio compared to its main competitors. Research methods included case studies, bibliographic analysis, and comparisons. The analysis allowed us to evaluate the structure of Huawei Cloud's product portfolio and identify the advantages of its direct competitors.*

Keywords: *cloud technologies, Huawei, product portfolio, competitors..*

Значительный вклад в разработку проблем конкурентоспособности облачных продуктов внесли В.П. Семенов, Р.В. Соколов, И.Л. Андреевский, и другие исследователи.

И.Л. Андреевский и Р.В. Соколов исследовали оценку предпочтений пользователей (ОПП) при выборе облачных программных продуктов Авторы убеждены: «Поскольку критерии выбора ОПП являются расплывчатыми, нечеткими, предлагается аппарат нечетких множеств для оценки предпочтений пользователей» [1].

Далее В.П. Семенов, Р.В. Соколов, И.Л. Андреевский предприняли попытку формирования и решения задачи «нечеткой оценки конкурентоспособности облачных программных продуктов». Авторы обосновали связь нечеткой оценки конкурентоспособности с цепочкой взаимосвязанных предприятий облачной информатизации, предложили «порядок фаззификации исходных данных, вывода нечеткой оценки конкурентоспособности» [4].

И.Л. Андреевский в монографии «Стратегическое планирование деятельности предприятий информатизации по производству облачных программных продуктов» детально рассматривает проблемы стратегического планирования деятельности предприятий по производству облачных программных продуктов, предлагает соответствующие модели и методы [2].

В данной статье нами изучен продуктовый портфель бизнес-сегмента «облачные технологии Huawei» (табл. 1).

Таблица 1.
Категории и продуктовые линейки бизнес-сегмента Huawei Cloud (Huawei облачные технологии)

№	Категории продуктов	Продуктовые линейки
Основная инфраструктура (Core infrastructure)		
1.	**Вычислительные ресурсы (Compute)**	1.1. Elastic Cloud Server (ECS), 1.2. Flexus (упрощенные вычислительные ресурсы нового поколения), 1.3. Dedicated Computing Cluster (DCC), 1.4 Cloud Phone Host (CPH) 1.5. Бессерверная архитектура на уровне функций с FunctionGraph.
2.	**Хранилище (Storage)**	2.1. Object Storage Service (OBS), 2.2. Elastic Volume Service (EVS), 2.3. Cloud Backup and Recovery (CBR) 2.4. Общие файловые сервисы SFS/SFS Turbo
3.	**Сеть (Networking)**	3.1. Virtual Private Cloud (VPC), 3.2. Elastic IP (EIP), 3.3. Elastic Load Balance (ELB), 3.4. Direct Connect для выделенных каналов 3.5. Content Delivery Network (CDN)
Данные и аналитика (Data & analytics)		
4.	**Базы данных (Databases)**	4.1. GaussDB (распределенная реляционная база данных), 4.2. Различные варианты RDS (включая Flexus-версию Huawei

		Cloud Flexus RDS) 4.3. Сервисы, ориентированные на хранилища данных.
5.	**Аналитика и большие данные (Analytics & big data)**	5.1. Data Lake Insight (DLI), 5.2. Cloud Stream Service (CS), 5.3. Data Warehouse Service (DWS) 5.4. Data Lake Visualization (DLV) для потоковой и пакетной аналитики
Искусственный интеллект и интеллектуальные сервисы (AI & intelligent services)		
6.	**Платформа ИИ (AI platform)**	6.1. ModelArts и другие платформы ИИ/машинного обучения для обучения, вывода результатов и MLOps, 6.2. Huawei Cloud Stack для развертывания частных облачных решений, ориентированных на ИИ.
7.	**Продукты, ориентированные на ИИ (AI-oriented products)**	7.1. Сервисы, такие как MetaStudio (создание цифрового контента), 7.2. Инфраструктура, готовая к использованию ИИ (такие как 384-узловые системы CloudMatrix), – позиционируются как факторы, способствующие развитию индустрии ИИ.
8.	**Приложения, промежуточное ПО и инструменты для разработчиков**	8.1. Huawei Cloud ROMA (платформа интеграции/приложений), 8.2. Cloud Service Engine (CSE) 8.3. Другое промежуточное ПО для микросервисов и управления API.
9.	**Разработчики и DevOps:**	9.1. Контейнерные сервисы (Cloud Container Engine CCE, бессерверные контейнеры CCI), 9.2. Репозиторий программного обеспечения для контейнеров (SWR) 9.3. Инструменты для миграции и модернизации
Безопасность, управление и периферийные вычисления (Security, management & edge)		
10.	**Безопасность и соответствие требованиям (Security & compliance)**	10.1. Межсетевой экран веб-приложений (WAF), 10.2 Облачный межсетевой экран (CFW), 10.3. Служба безопасности хоста (HSS), 10.4. Облачный бастион (CBH) 10.5. SecMaster как облачный центр мониторинга безопасности (SOC).
11.	**Управление и контроль (Management & governance)**	11.1. Управление идентификацией и доступом (IAM), 11.2. Служба мониторинга (SMA) 11.3. Инструменты обеспечения прозрачности затрат
12.	**Периферийные вычисления и медиа (Edge & media)**	12.1. Периферийная безопасность (EdgeSec), 12.2. Доставка контента и периферийные вычисления, 12.3. Видео по запросу (VOD), 12.4. Центр обработки медиаданных (MPC) 12.5. Отраслевые видеоориентированные сервисы

(Составлено автором по [3])

Проведенный анализ показал – Huawei Cloud предлагает полный набор сервисов IaaS, PaaS и SaaS, адаптированных для корпоративных рабочих нагрузок, с акцентом на искусственный интеллект, безопасность,

масштабируемость. Продукты Huawei непосредственно конкурируют с другими производителями в области вычислительных ресурсов, хранения данных, аналитики.

Среди основных конкурентов выделяется Alibaba Cloud, которая доминирует в Китае (более трети рынка), имеет сильную интеграцию с электронной коммерцией и предоставляет услуги на основе искусственного интеллекта. Huawei по доле рынка отстает, но быстро растет за счет партнерских отношений.

Другой прямой конкурент – компания AWS – реализует облачные продукты/услуги на всех континентах, имеет развитую экосистему, претендует на лидерство в области ИИ / машинного обучения. Huawei в свою очередь фокусируется на Азии / Ближнем Востоке / Латинской Америке.

Еще один прямой конкурент – Tencent Cloud – сфокусирован на облачных играх / метавселенной, его рыночная доля в Китае составляет 16%. Зато Huawei выделяется гибридным облачным решением для предприятий.

Важный игрок этого рынка – Microsoft Azure располагает самой обширной сетью распространения (более 70 регионов мира), имеет опыт работы с гибридными облачными решениями; преимущественно ориентирован на корпоративный сегмент. Huawei успешно конкурирует с ним на развивающихся рынках.

Выводы

Продуктовый портфель Huawei – облачные технологии, на фоне компаний-конкурентов, отличается достаточной широтой, но ограниченной глубиной.

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ЭЛЕКТРОННОЕ НАУЧНО-ПРАКТИЧЕСКОЕ
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