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- Основной раздел: социально-экономические аспекты развития современного государства;
- Современные технологии управления организацией;
- Актуальные вопросы политики и права;
- Современные науки и образование;
- Информационные и коммуникативные технологии;
- Здоровоохранение в обществе.

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RADIOKIMYOVIY IZOTOPLAR VA RADIOKIMYO ASOSIDA NISHONLI TERAPIYA

Annotatsiya: Ushbu maqolada radiokimyoviy izotoplarning tibbiyotdagi qo'llanilishi, shuningdek, jigar saratoni (gepatosellyular karsinoma) da nishonli terapiya usullari hamma uchun tushunarli yoritiladi. Maqolada radiokimyo asoslari, diagnostika va davolash texnologiyalari, molekulyar mexanizmlari hamda klinik tadqiqotlar misollari keltirilgan. Shuningdek, maqolada theranostika konsepsiyasi molekulyar mexanizmlar, klinik tadqiqotlar natijalari va bemor hayot sifatiga ta'siri tushunarli va ilmiy asosida taqdim etilgan. Shu bilan birga diagnostika va nishonli terapiya afzalliklari, cheklovlari va jigar saratonini individual davolash strategiyalarini shakllantirishdagi rolini ham ko'rsatadi.

Kalit so'zlar: Radiokimyo, nishonli terapiya, jigar saratoni (gepatosellyular karsinoma), diagnostik izotoplar, terapevtik izotoplar, theranostika, PET/CT va SPECT/CT, molekulyar mexanizmlar, klinik tadqiqotlar, personalizatsiyalangan tibbiyot.

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TARGETED THERAPY BASED ON RADIOCHEMICAL ISOTOPES AND RADIOCHEMISTRY

Annotation. The article explains the use of radiochemical isotopes in medicine, specifically in liver cancer (hepatocellular carcinoma), and introduces the methods of targeted therapy based on radiochemistry in an accessible manner.

The article provides examples of clinical research on radiochemistry-based diagnostics, treatment technologies, and molecular mechanisms. It also presents the results of theranostics research and the mechanisms of action on patients. Furthermore, the advantage, limitations, and the role of clinical trials in developing individual treatment strategies based on diagnostics and targeted therapy regimens are shown.

Key words: *radiochemistry, hepatocellular carcinoma, targeted therapy, therapeutic regimen, diagnostics isotopes, theranostics, PET/CT and SPECT/CT, molecular mechanisms, clinical trials, personalized medicine.*

Kirish. Jigar saratoni (gepatosellyular karsinoma, HCC) dunyo bo'yicha saraton o'limlarining eng yuqori uchligiga kiradi. Uning asosiy xususiyatlari kech tashxis qo'yilishi, tez metastaz berishi, jarrohlik imkoniyatlarining cheklanganini va o'simta ichidagi biologik o'zgaruvchanlikdir. Zamonaviy tibbiyotda onkologik kasalliklarni aniqlash va davolashda yuqori aniqlik, xavfsizlik hamda minimal invaziv usullarni qo'llash tobora muhim ahamiyat kasb etmoqda. Shulardan biri-radiokimyoviy izotoplarga asoslangan nishonli terapiya (target therapy) bo'lib, u saraton hujayralarini selektiv tarzda topish, kuzatish va yo'q qilish imkonini beradi. Radiokimyoviy izotoplar organizmda maxsus molekulalar-biomarkerlar bilan bog'lanib, faqat o'zgargan to'qimalarga ta'sir qiladi. Bu esa sog'lom hujayralariga minimal zarar yetqazgan holda, davolash samaradorligini oshiradi.

Radiokimyoviy asoslar. Radiokimyoviy izotoplar-bu radioaktiv atom izotoplari bo'lib, ular o'z yadrosidagi nozik energetik o'zgarishlar orqali radiatsiya chiqaradi. Bu xususiyatlari diagnostika va davolashda keng maqsadlarda ishlatiladi. Radiokimyoviy izotoplarining 2 xil turi farqlanadi:

1. Diagnostik radiokimyoviy izotoplar

Organizmda kasalliklarning aniqlash hujayra faoliyatini baholash maqsadida ishlatiladi. Masalan, ^{18}F -FDG-PET skanerlarda o'sma hujayralarining yuqori glyukoza iste'molini aniqlash, ^{68}Ga -DOTATATE-neyroendokrin o'smalarni aniqlashda ishlatiladi, $^{99\text{m}}\text{Tc}$ -mebrofenin jigar funksiyasini baholash uchun ishlatiladi.

2. Terapevtik radiokimyoviy izotoplar

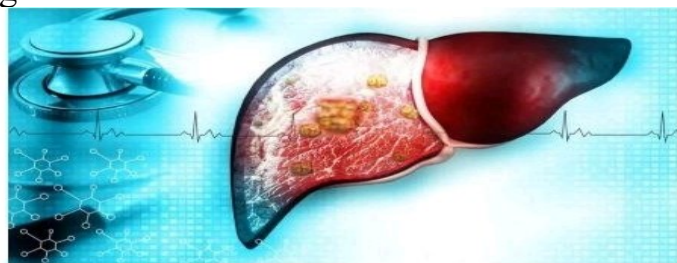
O'sma yoki boshqa kasallik hujayralarini selektiv radiatsiya bilan yo'q qilish maqsadida ishlatiladi. Masalan, ^{90}Y (Yttrium-90) mikrosferalar yordamida jigar saratonini davolashda ishlatiladi (SIRT). ^{177}Lu (Lutetium-177) neyroendokrin o'smalarni maqsadli radiatsiya bilan davolash uchun ishlatiladi.

Nishonli terapiya va jigar saratoni. Jigar saratoni-bu jigar hujayralarining anormal o'sishi va ko'payishi bilan tavsiflanadi saraton turi. Saraton zamonamizning eng xavfli kasalliklari sirasiga kiradi. Jahon Sog'liqni Saqlash tashkiloti statistikasiga ko'ra onkologiya kasallik va o'lim chastotasi bo'yicha dunyoda ikkinchi o'rinda turadi. Birlamchi jigar saratoni esa xatarli o'smalar orasida 7-8-o'rinni egallaydi.

O'zbekistonda aholining jigar saratoni bilan kasallanish darajasi past 1998-yilda kasallanish ko'rsatkich 3,4(har 100ming aholi)ga teng. Jigar saratoni

odamlarni istalgan yoshda zararlaydi, erkaklar ayollarga qaraganda 3-4 marta ko'proq kasallanadi. Gistologik tuzilishiga ko'ra birlamchi jigar saratonining 3 turi farqlanadi.

1. Gepatosellyular
2. xolangiosellyulyar
3. aralash rag



Jigar saratonining belgilari. Birlamchi jigar saratonida biz ko'pincha quyidagi simptomlarni uchratamiz: gepatomegaliya, og'riqlar, vazn yo'qotish, ishtaha pasayishi, holsizlik, tana haroratining ko'tarilishi, assit, sarg'ayish. Ular orasida boshqalardan oldinroq o'ng qovurg'a osti sohasida yoki epigastriyda og'riq paydo bo'ladi, ba'zan o'ng yelka va kurakka tarqaladi, Keyin o'ng qovurg'a osti sohasida og'irlik va siqilish hissi qo'shiladi. Og'riq asta-sekin kuchaydi, ayniqsa kun oxirida va kechalari, ovqatlanish bilan bog'liq bo'lmaydi. O'simta o'sishi bilan ishtaha yo'qoladi, bemor kuch va vazn yo'qotadi va holsizlanadi. 15-20 %bemorlarda ko'ngil aynishi kuzatiladi.

Jigar saratoniga tashxis qo'yish. Birlamchi jigar saratoni tashxislashda oltin, texnetsiy va yod bilan belgilangan birikmalar yordamida radionuklid sintigrafiya jigarda o'simta, parazitlar, kislotalar va xo'ppozni aniqlash imkonini beradi Skenogrammlarda ular radioaktiv preparatlar kontsentratsiyasining keskin pasayishi zonalar ("sovuq o'choqlar ") sifatida ko'rinadi. Maxsus kontrastli rentgeneologik tekshiruv usullari (splenoportografiya, transumbilikal portografiya, anigo va flebografiya)jigarda o'choqli o'zgarishlar mavjudligi va ushbu zonlardagi qon tomirlarining holati haqida muhim diagnostik ma'lumotlarni taqdim etish mumkin. Shuningdek,

- ✓ Laparoskopiya
- ✓ Ultratovush tekshiruvi
- ✓ Abelev-Tatarinov testi

kabi usullar ham keng qo'llaniladi.

Jigar saratonining TNM tizimi bo'yicha xalqaro tasnifi

Tx. Birlamchi o'simalarni aniqlash uchun ma'lumotlar yetarli emas

To. Birlamchi o'simta aniqlanmagan

T1. 2sm gacha bo'lgan yagona o'simta, qon tomirlarga o'tmagan bo'ladi.

T2. 2sm gacha bo'lgan yagona o'simta, qon tomirlarga o'sgan, yoki 2sm gacha bo'lgan bir nechta o'simta, qon tomirlarga o'smagan va jigarning bitta bo'lagida joylashgan bo'ladi.

T3. 2sm dan katta bo'lgan yagona o'simta qon tomirlariga o'sgan, yoki 2sm dan katta bo'lgan bir nechta o'simta, qon tomirlarga o'sgan va jigarning bitta

bo'lagida joylashgan, yoki 2sm dan katta bo'lgan ko'plab o'simtalar, qon tomirlariga o'sgan yoki o'smagan bo'ladi.

T4. Jigarning ikkala bo'lagida ko'plab o'simtalar yoki portal venaning asosiy shoxrlariga o'sgan.

Nx. Mintaqaviy limfa tugunlaridagi metastazlarni aniqlash uchun ma'lumotlar yetarli emas.

No. Mintaqaviy limfa tugunlaridagi metastatik shikastlanish belgilari yo'q.

N1. Mintaqaviy limfa tugunlarida metastazlar mavjud.

Mo. Uzoq metastazlar mavjudligining belgilari yo'q.

Jigar saratoni rivojlantirishga ta'sir qiluvchi omillar

- Virusli hepatitlar: V va S turlari
- Aflatoksin. Aspergillis flavus mog'or zamburug'ining tokini yuqori namlikka ega bo'lgan mintaqalarda, masalan, Afrika mamlakatlarida keng tarqalgan va jigar saratoni xavfini oshiradi.

- Alkogolizm
- Infeksiyalar
- Yog'li jigar
- Parazitlar
- Qandli diabet
- Ortiqcha vazn yoki semirish
- Gemokromatoz kabi jigar kasalliklarida yuzaga kelishi mumkin.

Jigar saratonini davolash choralari. Jigar saratonida samarali tibbiy yordam ko'rsatish tibbiyotning eng qiyin muammosidir. Jarrohlik davolash faqat bitta shikastlanish o'chog'i bo'lganda va o'simtaning chap bo'lakda joylashishida samarali bo'ladi. Shu sababli va boshqa sabablarga ko'ra, radikal operatsiya o'rtacha bemorlarning atigi 5-15 %da amalga oshiriladi.

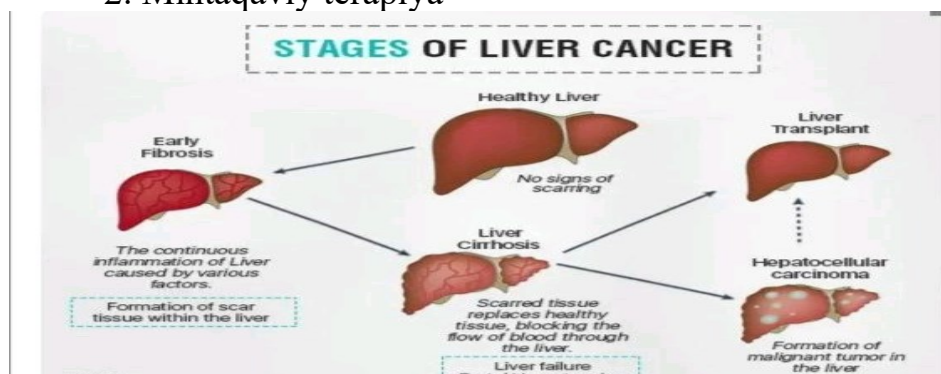
Qo'llaniladigan usullar quyidagilar:

➤ Jarrohlik	➤ Kimyoembolizatsiya
➤ Jigar transplantatsiyasi	➤ Krioablatsiya
➤ Ablasyon	➤ Kimyoterapiya
➤ TACI	➤ Radiokimyoviy terapiya
➤ Maqsadli terapiya yoki	➤ Radiatsiya terapiyasi

immunoterapiya

Jigar saratonida kimyoterapiya qanday ishlaydi. Jigar saratonini kimyoterapiya orqali davolash uchun bu, birinchi navbatda, organizmdagi tez o'sib borayotgan saraton hujayralarini yo'q qilish uchun sitotoksik dorilarni qo'llashni o'z ichiga. Bu to'g'ridan to'g'ri qon oqimiga kiritilishi yoki shaxsning holati va sharoitlariga qarab, jigar arteriyasi infuzioni (HAI) kabi maxsus usuldan foydalanish mumkin. Saraton tananing boshqa hududlariga metastaz berganida, bu strategiyalar samarasiz bo'ladi. Bunday hollarda shifokor muqobil davolash sifatida kimyoterapiyani taklif qiladi. Kimyo terapiya narxi jigar saratoni sikli uchun 850 \$ dan 2000 \$ gacha bo'lishi mumkin. Kimyoterapiya 3 ta aniq usul bilan olishlari mumkin:

1. Tizimli kimyoterapiya
2. Mintaqaviy terapiya



3. Jigar arteriyasi infuzioni (HAI)

Tizimli kimyoterapiya preparatlari

- ✓ Doksorubitsin
- ✓ Sisplatin
- ✓ 5-fluorourasil (5-Fu)
- ✓ Oksaliplatin
- ✓ Guritsitabin
- ✓ Kaptsitabin

Maqsadli terapiya va immunoterapiyada qo'llaniladigan preparatlar:(ko'pincha kimyo bilan birgalikda)

- ✓ Sarafenib (ko'pincha ilg'or HCC da qo'llaniladigan maqsadli agent)
- ✓ Lenvatinib
- ✓ Regorafenib
- ✓ Nivolumab va Atezoli zumab (immun nazorat punkti ingibitorlar).

Jigar saratonida Radiatsiya terapiyasi. Radiatsiya terapiyasi jigar saratonini davolashda zamonaviy va yuqori samarali usullardan biridir . U o'sma hujayralarini aniq nishonga olib, sog'lom to'qimalarga zarar yetkazmasdan yuqori dozada nurlantirish imkonini beradi. Operatsiya qilib bo'lmaydigan yoki murakkab joylashgan o'smalarda radiatsiya terapiyasi o'smani kichraytirib, bemorning umr davomiyligi va hayot sifatini sezilarli yaxshilaydi. Shuningdek,selektiv ichki radiatsion terapiya (Y-90) va SBRT kabi texnologiyalar jigar saratonida eng ishonchli, xavfsizlik va klinik samaradorligi yuqori usullar sifatida qo'llanmoqda. Radiatsiya terapiyasining kimyoterapiya, nishonli terapiya va radio izotoplar bilan kombinatsiyasini esa davolash samaradorligini yanada oshiradi. Shu bois,jigar saratonining erta va kech bosqichlarida radiatsiya terapiyasi klinik amaliyotda muhim o'rin tutadi.

Radiatsiya terapiyasida qo'llaniladigan radiokimyoviy izotoplar

1. Yttriy-90(Y-90)-radiatsiya terapiyasida eng asosiy izotop.

Ko'p o'choqli yoki katta o'smalarda

2. Holmiy-166(Ho-166) mikrosferalar

Jigar ichidagi metastatik va birlamchi o'smalarda

3. Rhenium-188(Re-188)-radioembolizatsiya uchun izotop

Jigar o'smalarini ichki nurlantirish uchun

4. I-131 Lipiodol

Radioaktiv lipiodol jigar arteriyasi orqali o'smaga yetqaziladi.

Xulosa. Radioizotoplar o'sma hujayralariga bevosita ta'sir etib, ularni ichkaridan nurlantiradi, nishonli terapiya esa saraton hujayralaridagi maxsus retseptorlarga bog'lanib, sog'lom to'qimalarni asrash imkonini beradi. Ushbu ikki usulning qo'shma qo'llanilishi saratonni nazorat qilish, o'sma hajmini kamaytirish va bemorlarning hayot sifatini yaxshilashda katta natija beradi. Shunday qilib, radiokimyoviy izotoplar va nishonli terapiya bugungi kunda saraton kasalligini davolashda eng istiqbolli, ishonchli va klinik jihatdan samarali yondashuvlardan biri hisoblanadi.

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QASHQADARYO VILOYATIDAGI SHIFOBAXSH BULOQLAR VA ULARNING XUSUSIYATLARI

Annotatsiya: Mamlakatimiz hududidagi yer osti boyliklari milliy iqtisodiyotimizning asosini tashkil etish bilan birgalikda, jamiyatda yashovchi insonlar salomatligi uchun ham ahamiyatli resurslardan hisoblanadi. Yer ostidan chiquvchi suvlarning shifobaxsh xususiyatari insonlarning faol hayot tarzini kechirishida muhim omillardan biri bo'lib qolmoqda. Mazkur maqolada Qashqadaryo viloyatidagi shifobaxsh buloqlar va ularning qaysi kasalliklarni davolash xususiyatlariga ega ekanligi, ulardan foydalanish bo'yicha taklif va xulosalar ishlab chiqilgan.

Kalit so'zlar: shifobaxsh suvlar, kurort maskanlar, Kamolbuloq, Xo'jayipak, Qo'tirbuloq, Oqsuv.

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HEALING SPRINGS AND THEIR PROPERTIES IN THE KASHKADARYA REGION

Annotation: the underground resources in the territory of our country, together with the formation of the basis of our national economy, are also considered to be of significant resources for the health of people living in society. The healing properties of the waters that flow out of the underground remain one of the important factors in the survival of an active human lifestyle. In this article, suggestions and conclusions have been developed about the healing springs of the Kashkadarya region and what diseases they have healing properties, their use.

Keywords: Healing Waters, Resort lodges, immature, Boshipak, Scarecrow, lame.

O'zbekiston Respublikasining 1993-yil 6-maydagi 837-XII-sonli "Suv va suvdan foydalanish to'g'risida" gi Qonuni qabul qilingan bo'lib, mazkur qonunning XII bobida "Suv obyektlaridan davolash, kurort va sog'lomlashtirish maqsadlarida foydalanish" tartibi belgilab qo'yilgan. Ushbu bobning 44-moddasida "Belgilangan tartibda shifobaxsh suvlar qatoriga kiritilgan suv obyektlaridan, avvalo, davolash va kurort maqsadlarida foydalaniladi" deb yozib qo'yilgan.

Mamlakatimizda shifobaxshlik xususiyatiga ega bo'lgan buloqlar soni juda ko'pchilikni tashkil qiladi. Garchand shifobaxsh buloqlar soni ko'p bo'lsada, ularning davolash xususiyatlari o'xshash bo'lishi mumkin. Bunday yer osti suvlarining to'yinishidagi minerallar tarkibi o'xshash yoki bir-biriga yaqin bo'ladi.

Qashqadaryo viloyatida joylashgan shifobaxsh buloqlarning aksariyati davolash xususiyati o'xshash bo'lib, hattoki ularning nomlari xam bir-biriga yaqin.

Qashqadaryo viloyatida joylashgan shifobaxsh buloqlarning asosiy qismi viloyatning tog'li tumanlari (Kitob, Shahrisabz, Qamashi, Dehqonobod) ga to'g'ri keladi (1-jadval). Mazkur buloqlarning asosiy qismi dengiz sathidan 850 m dan boshlanadi. Ularga Xo'jayipak, Kamolbuloq, Qo'tirbuloq, Oqsuv kabi buloqlarni keltirish mumkin.

Qashqadaryodagi buloqlar haqida ma'lumot

№	Buloqlar nomi	Geografik koordinatasi	Joylashgan o'rni
1	Mironqulsoy	39°21'41.8"sh.k, 66°35'21.9"shq.u.	Kitob tumani
2	Qorabuloq	39°16'32"sh.k, 67°7'46.5"shq.u.	Kitob tumani
3	Qaynarbuloq	39°14'15.7" sh.k, 66°54'52.7" shq.u.	Kitob tumani
4	Roxatbuloq	39°16'40.6"sh.k, 66°55'6.7"shq.u	Kitob tumani
5	Hazrati Beshir	39°16'26.0"sh.k, 67°06'29.0"shq.u.	Kitob tumani
6	Tuyaboshi	39°11'55.2"sh.k, 67°10'48.2"shq.u.	Kitob tumani
7	Qo'shchinor	39°12'07.9"sh.k, 67°09'55.1"shq.u.	Kitob tumani
8	Oqsuv shamoli	39°05'55.3"sh.k, 66°44'38.3"shq.u	Shaxrisabz tumani
9	Miraki	39°02'01.6"sh.k, 67°07'00.9"shq.u.	Shaxrisabz tumani
10	Chashmabuloq	39°06'49.9"sh.k, 67°30'49.2"shq.u.	Shaxrisabz tumani
11	Garob	39°06'49.9"sh.k, 67°30'49.2"shq.u	Shaxrisabz tumani
12	Suvtushar	38°56'60.0"sh.k, 67°20'28.0"shq.u.	Shaxrisabz tumani
13	Zarmast	38°45'46.4"sh.k, 67°07'46.5"shq.u.	Yakkabog'tuani
14	Qaynarbuloq	38°36'43.6"sh.k, 67°10'22.7"shq.u.	Dehqonobod tumani
15	Qamchinbuloq	38°36'43.6"sh.k, 67°10'22.7"shq.u.	Dehqonobod tumani
16	Beshbuloq	38°30'50.6"sh.k, 66°40'00.7"shq.u.	Dehqonobod tumani
17	Anorbuloq	38°25'59.1"sh.k, 66°38'55.9"shq.u.	Dehqonobod tumani
18	Oqsuv	38°26'44.4"sh.k, 66°31'21.6"shq.u.	Dehqonobod tumani
19	Qorabuloq	38°11'54.8"sh.k, 66°32'34.8"shq.u.	Dehqonobod tumani
20	Xo'jayipak	38°02'20.0"sh.k, 66°23'20.6"shq.u.	Dehqonobod tumani

21	Vodozobor	38°41'01.4"sh.k, 66°20'12.2"shq.u.	G'uzor tumani
22	Qashqadaryo sohili	38°53'14.8"sh.k, 65°49'12.3"shq.u	Qarshi shahri

Qashqadaryo viloyatidagi buloqlarini tarkibiga ko'ra quyidagi guruhlarga bo'lish mumkin:

1. *Gidrokarbonatli buloqlar:* Mironqulsoy, Roxatbuloq, Hazrati Beshir, Tuyaboshi, Qo'shchinor, Chashmabuloq, Suvtushar, Zarmast, Vodozobor;

2. *Sulfatli buloqlar:* Qashqadaryo sohili, Xo'jaipak, Qorabuloq (Dehqonobod), Oqsuv, Anorbuloq, Beshbuloq, Qamchinbuloq, Qaynarbuloq (Dehqonobod), Garob, Miraki, Oqsuv shamoli, Qaynarbuloq (Kitob), Qorabuloq (Kitob).

Kamolbuloq shifobaxsh suvli bulog'i Qashqadaryo viloyati Dehqonobod tumanida dengiz sathidan 1020 m balandlikda Karashina MFY hududidagi Dehqonobod soyligida joylashgan. Geografik koordinatasi 38°21'43.6" sh.k, 66°40'14.2" shq.u ga teng. Bulog suvi tarkibi asosini biokarbonat (HCO_3), magniy (Mg^{2+}), sulfat (SO_4), natriy (Na), kalsiy (Ca^{2+}) elementlari tashkil etadi. Biokarbonat siydikni ishqorlashtiradi, siydik kislotasi va oksalat toshlariga qarshi foydali hisoblanadi. Magniy oksalat toshlarini kamaytirishga yordam bersa, sulfat siydikda kalsiy darajasini pasaytiradi, natriy ayrim holatlarda siydik hajmini oshirishga yordam beradi. Mazkur suv buyrak toshini tushurishga yordam beradi.

Xo'jayipak shifobaxsh suvi Dehqonobod tumani Nasos MFY hududida joylashgan. Bulog suvini shifobaxshligi xilma-xil bo'lib, hududdan chiqayotgan ma'danli suv va unga yondosh ko'z, tish, gijja kasalliklarini davolash uchun chiqayotgan suvlar tashkil etadi. Mazkur hududga may-avgust oylarida odamlar tashrifi ko'payadi. Shuningdek ushbu joydagi shifobaxsh balchiq tana a'zolarimizdagi turli shamollash kasalliklaridan forug' bo'lishimizga yordam beradi.

Xo'jaipok bulog'i Qashqadaryo viloyatida Dehqonobod tumani markazidan 35 km janubdagi Qirshaksoy vodiysida joylashgan bo'lib, bulog dengiz sathidan 850 m balandlikda joylashgan¹. Bulog suvi ohakli jinslarga boy qatlamlar orasidan chiqib turadi. Bulog chiquvchi joy diametri 15 m bo'lib, chuqurligi 2,5 m ga teng. Bulogning suv sarfi 45 l/s ni tashkil etadi. Bulog suvi tarkibida vodorod sulfid (H_2S -20 mg/l), tuz (60 mg/l), ishqorlar (pH-8,2) va natriy xlorid kabi minerallar bor. Mazkur bulog suvi tarkibida vodorod sulfid miqdori ko'p bo'lganligi uchun shifokor ruxsatisiz foydalanish tavsiya etilmaydi.

Xo'jayipak shifobaxsh bulog'i dengiz sathidan 900 m balandlikda joylashgan bo'lib, bu yerda keluvchi odamlar uchun milliy o'tovlar dam olib xordiq chiqarishimizda yordam bersa, shifobaxsh suvli vannalar va balchiqli chuqurchalar muolaja olishimizga yordam beradi.

¹ Ковалев Ю.С., Калабугин Л.А "Сирли" булоқлар. Тошкент. Меҳнат 1987-й. 74 бет.

Qo'tirbuloq shifobaxsh suvli bulog'i Kitob tumani Qaynarbulog MFY, Qaynar qishlog'ida dengiz sathidan 1070 m balandlikda hamda 39°15'41.8" shimoliy kenglikda va 66°54'41.9" sharqiy uzoqlikda joylashgan. Bulog suvi negizida Mingchinor sanatoriyasi faoliyat yuritmoqda. Mazkur shifobaxsh suv teri kasalliklari, har xil toshmalarni davolashda foydalidir. Suvning tarkibi vodorod sulfid (H_2S -yallig'lanishga qarshi, teri yangilanishini tezlashtiradi, ekzema, psoriaz, dermatit uchun foydali), radon (Rn-tashqi muolajalar uchun ishlatiladi (vannalar); immunitetni tartibga soladi, allergik teri kasalliklarida qo'llanadi), sulfat (SO_4), selen (Se), rux (Zn), magniy (Mg^2), kalsiy (Ca^2), natriy (Na), karbonat (CO_3), yod (I), brom (Br) kabi elementlarga boy. Mazkur suvlarni ishlatishdan oldin shifokor ruxsatini olish maqsadga muvofiqdir.

Oqsuv bulog'i Qashqadaryo viloyati Dehqonobod tumanida joylashgan. Oqsuv bulog'i suvining shifobaxsh xususiyatlari ko'p bo'lib, asosan hazm qilish tizimi kasalliklari (oshqozon, ichak muammolari), teri kasalliklari (dermatit, ekzema va boshqa yallig'lanishlar), nerv tizimi kasalliklari (stress, bosh og'rig'i, asabiy zo'riqish), buyrak va siydik yo'llari kasalliklari, qon aylanish tizimi muammolari kasalliklarida foydalaniladi.

Qashqadaryo viloyatida shifobaxsh buloqlar negizida tashkil qilingan sanatoriya va dam olish muasasalari ham mavjud bo'lib, ular ko'pchilikni tashkil etmaydi. Sanatoriya va kurort maskanlarning tashkil qilinishi shifobaxsh buloqlardan foydalanuvchilar sonining oshishi bilan birga tibbiy turizmning viloyat hududida rivojlanishiga ijobiy ta'sir ko'rsatadi. Mazkur hududlarni tashkil qilish orqali hududlarda ishsizlar qatlamining kamayishiga hamda xizmat ko'rsatish tarmoqlarining ko'payishiga erishish mumkin.

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ANTIBIOTIKLAR VA ULARNING MIKROBLARDA REZISTENTLIK (CHIDAMLILIK) HOSIL QILISHI

***Annotatsiya:** Ushbu mavzuda antibiotiklarning mikroorganizmlarga qarshi asosiy farmakologik ta'sir mexanizmlari hamda mikroblarda rezistentlik (chidamlilik) shakllanishining biokimyoviy va genetik asoslari yoritiladi. Antibiotiklar bakterial hujayra devori sintezini, oqsil translatsiyasini, nuklein kislotalar replikatsiyasini yoki metabolik fermentlarni nishonga olib, mikrobninng yashash va ko'payish jarayonlarini izdan chiqaradi. Shu bilan birga, mikroblar o'z genomidagi mutatsiyalar, plazmidlar orqali gen almashinuvi, efflyuks nasoslari faollashuvi, target-saytni o'zgartirish, fermentlar ishlab chiqarilishi (masalan β -laktamazalar) kabi mexanizmlar yordamida antibiotiklarga nisbatan chidamlilik hosil qiladi. Rezistentlikning ortishi global sog'liqni saqlash uchun jiddiy xavf bo'lib, davolash samaradorligini pasaytiradi, infeksiyon kasalliklarning davomiyligi, og'irligi va mortalitetini oshiradi. Shuning uchun antibiotiklarni oqilona qo'llash, antimikrob stewardship strategiyalari va yangi farmakologik molekulalarni yaratish ushbu muammoni bartaraf etishda asosiy yo'nalishlardan hisoblanadi.*

***Kalit so'zlar:** Antibiotiklar, rezistentlik, antimikrob ta'sir, mikroblar chidamliligi, efflyuks nasoslari.*

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ANTIBIOTICS AND THEIR RESISTANCE IN MICROBES

Annotation: *This topic covers the main pharmacological mechanisms of action of antibiotics against microorganisms and the biochemical and genetic basis of the formation of resistance in microbes. Antibiotics disrupt the processes of survival and reproduction of microbes by targeting bacterial cell wall synthesis, protein translation, nucleic acid replication or metabolic enzymes. At the same time, microbes develop resistance to antibiotics using mechanisms such as mutations in their genome, gene exchange through plasmids, activation of efflux pumps, target site modification, and enzyme production (for example, β -lactamases). The rise of resistance is a serious threat to global health, reducing treatment effectiveness and increasing the duration, severity and mortality of infectious diseases. Therefore, the rational use of antibiotics, antimicrobial stewardship strategies and the development of new pharmacological molecules are key areas to address this problem.*

Keywords: *Antibiotics, resistance, antimicrobial effect, microbial resistance, efflux pumps.*

1. Antibiotiklarning mikroorganizmlarga ta'sir qilish mexanizmlari

Antibiotiklar mikroorganizmlar hayot faoliyatini turli bosqichlarda izdan chiqaruvchi, biologik yoki kimyoviy tabiatga ega bo'lgan antimikrob moddalardir. Ularning farmakodinamik ta'siri tasnif jihatidan ikki asosiy yo'nalishga bo'linadi: bakteriostatik (o'sishni to'xtatuvchi) va bakteritsid (o'ldiruvchi) ta'sirlar. Ularning qaysi birini ko'proq namoyon qilishi dori turiga, dozasi, mikroorganizmlarning turi va ularning sezuvchanlik potensialiga bog'liq. Antibiotiklarning asosiy vazifasi — mikroorganizmlarning hayot uchun zarur bo'lgan metabolik yo'llarini va strukturaviy komponentlarini nishonga olish hamda ularda qaytarilmas funksional buzilishlar hosil qilishdir. [1]

Antibiotiklar bir necha asosiy “nishon tizimlari”ga ta'sir qiladi:

- Hujayra devori sintezi — β -laktam antibiotiklar (penitsillinlar, sefalosporinlar, karbapenemlar) transpeptidaza fermentlarini ingibitsiya qiladi va peptidoglikan qatlamining shakllanishini to'xtatadi. Bu esa osmotik barqarorlikning buzilishiga, natijada bakteriya hujayrasining yorilishiga olib keladi.

- Oqsil biosintezi — makrolidlar, tetratsiklinlar, aminoglikozidlar ribosomal 30S va 50S subbirliklariga bog'lanib, translatsiya bosqichlarini bloklaydi. Shu orqali bakteriyada yangi oqsillar paydo bo'lmaydi, bu esa o'sish va ko'payish jarayonini to'xtatadi.

- DNK replikatsiyasi va RNK transkripsiyasi — ftorxinolonlar DNK giraza/topoizomeraza IV ni, rifampisin RNK polimerazasini inhibe qiladi. Bu nuklein kislotalarining sintezini to'xtatadi va mikroorganizmlar genetik axborotini uzluksiz takrorlab ishlatish imkonini yo'q qiladi. [2]

- Metabolik fermentlar bloklanishi — sulfonamidlar va trimetoprim folat sintezi zanjiriga ta'sir qilib, nuklein kislotalar va oqsillar sintezi uchun zarur prekursorlarni kamaytiradi. Bu bakteriyalar uchun energetik va biosintetik resurslarning tugashiga olib keladi.

•Membrana strukturasiga ta'sir — polimiksinlar gram-manfiy bakteriyalarda membrana fosfolipidlari bilan bog'lanib, membrananing o'tkazuvchanligini oshiradi va hujayra ichidagi komponentlarning tashqariga chiqib ketishiga sabab bo'ladi.

Mazkur mexanizmlar orqali antibiotiklar bakteriyalarni hayotiy siklining eng nozik uchastkalarida "uradi". Shu bois ular klinik amaliyotda o'tkir va surunkali infeksiyon kasalliklarda, shuningdek sepsis, pnevmoniya, meningit, osteomiyelit kabi og'ir holatlarda asosiy davolovchi dori vositalaridan biri hisoblanadi. Shu bilan birga, ushbu mexanizmlar aynan shu nuqtalarda chidamlilik rivojlanishiga sabab bo'luvchi potensial "bosim markazlari" hamdir — ya'ni mikroblar aynan shu nishonlarga qarshi moslashish mexanizmlarini yaratadi, bu esa rezistentlikni qo'zg'atadi. .[4]

2. Mikroblarda rezistentlik shakllanishining molekulyar va genetik asoslari

Mikroorganizmlarda antibiotiklarga nisbatan rezistentlik — bu tasodifiy yoki maqsadli moslashuv mexanizmi emas, balki uzluksiz evolyutsion jarayon bo'lib, mikroblar o'z genetik apparatini o'zgartirishi yoki tashqi manbalardan rezistentlik determinantlarini olish orqali himoya strategiyalarini shakllantiradi. Antibiotiklar bilan uzoq yoki noto'g'ri kontakt paytida bakteriya populyatsiyasida "selektiv bosim" kuchayadi: sezgir (susceptible) hujayralar nobud bo'ladi, rezistent variantlar esa imkoniyatga ega bo'lib, ko'payishni davom ettiradi. Shu tariqa, antibiotik "filtr" vazifasini bajaradi va asta-sekin rezistent populyatsiya ustunlikka erishadi. .[3]

Rezistentlikning molekulyar asoslari bir necha mexanizmlarga tayanadi:

- Genetik mutatsiyalar — bakteriyaning o'z genomida sodir bo'lgan nuqta mutatsiyalar oqibatida nishon fermentlar yoki strukturalar konfiguratsiyasi o'zgaradi (masalan DNK girazada mutatsiya → ftorxinolonlarga chidamlilik).

- Horizontal gen transferi — bakteriyalar plazmidlar, transpozonlar va bakteriofaglar orqali rezistentlik genlarini bir-biriga uzatadi. Ayniqsa R-plazmidlar klinik jihatdan eng xavfli manbadir.

- Efflyuks nasoslari — antibiotik molekulasi hujayra ichiga kirgandan so'ng uni faol ravishda tashqariga chiqarib yuboruvchi transport oqsillarining ortiqcha ekspressiyasi.

- Enzimatik inaktivatsiya — bakteriya muayyan fermentni sintez qilishi natijasida antibiotikni kimyoviy parchalab yoki modifikatsiyalab uni faolsizlantiradi. Eng mashhur misol β -laktamazalar bo'lib, ular penitsillin va sefalosporinlarni parchalaydi.

- Target-sayt o'zgarishi — antibiotik bog'lanadigan ribosoma, transpeptidaza yoki polimeraza strukturasiga o'zgarib, binding affinity kamayadi. .[5]

Rezistentlik evolyutsiyasining yana bir muhim jihati — molekulyar "narx" mexanizmi: ayrim rezistentlik determinantlarini saqlash mikroorganizmlar uchun metabolik jihatdan qimmatga tushadi, lekin antibiotik mavjud bo'lgan muhitda bu "narx" o'zini oqlaydi va omon qolishga imkon beradi. Boshqa tomondan, antibiotik yo'qligida ayrim rezistent shakllar populyatsiyadan yo'qolib ketishi ham mumkin

— bu esa selektiv bosimni pasaytirishning epidemiologik ahamiyatini yanada oshiradi.

Shu tariqa, rezistentlik mikrobiologiya va klinik tibbiyotning kesishgan nuqtasida turuvchi murakkab genetik-molekulyar jarayon bo‘lib, uning shakllanishi nafaqat mikroblarning individual xususiyati, balki tibbiyot tizimi, farmatsevtika amaliyoti va dori qo‘llash madaniyatining umumiy global ko‘rinishidir.

3. Antibiotiklar rezistentligini oldini olish va oqilona qo‘llash strategiyalari

Antibiotiklar mikroblarda rezistentlik shakllanishining asosiy stimul faktorlaridan biri — noto‘g‘ri, keraksiz va nazoratsiz qo‘llanishidir. Shu sababli antibiotiklar bilan bog‘liq global muammoni bartaraf etishda eng muhim tamoyil — oqilona antibiotik terapiyasi (antimicrobial stewardship) hisoblanadi. Stewardship — bu nafaqat dori tanlash, balki infeksiyani tasdiqlash, dori dozasi, davomiyligi, kombinatsiyasi va monitoring mexanizmlari bilan bog‘liq kompleks boshqaruv strategiyalaridir. Har bir antibiotik klinik amaliyotga kirgan har bir dozasi deyarli populyatsion selektiv bosimni oshiradi, demak antibiotik — infeksiya tasdiqlanmaguncha “havola tarzida” ishlatilmasligi shart. [6]

Rezistentlikni oldini olishning asosiy choralari quyidagilarni o‘z ichiga oladi:

- antibiotiklarni faqat mikrobiologik asoslangan indikatsiya bilan buyurish;
- etiologik agentni aniqlash uchun bakteriologik ekinlar va antibiogrammalarni qo‘llash;
- iloji boricha tor spektrli preparatlarga ustuvorlik berish;
- minimal samarali dozani (optimal therapeutic window) qo‘llash;
- davolash muddatini ortiqcha cho‘zmaslik;
- profilaktik antibiotikoterapiyani faqat haqiqiy ko‘rsatmalar bo‘lsa amalga oshirish (operatsiyadan oldi va ayrim immunosuppressiv holatlar).

Shuningdek global miqyosdagi tavsiyalar ichida:

- yangi molekulalar va yangi ta‘sir mexanizmlarini o‘rganish;
- bakteriofaglar, probiotiklar va anti-virulens preparatlarni rivojlantirish;
- dori kombinatsiyalarini ilmiy asosda qo‘llash. [7]

Bundan tashqari, antibiotiklardan tashqaridagi profilaktika strategiyalari ham rezistentlik tarqalishini cheklashda o‘ta muhim: sanitariya-gigiyena qoidalariga rioya qilish, vaktsinalar bilan immunoprofilaktika, kasalxonada infeksiya nazorati, nozokomial o‘choqlarni vaqtida aniqlash va cheklash. [8]

Xulosa

Antibiotiklar infeksiyon kasalliklarni davolashda inqilob yasagan, zamonaviy tibbiyotning eng muhim terapevtik vositalaridan biridir. Biroq ularning noto‘g‘ri va me‘yordan tashqari qo‘llanilishi natijasida mikroorganizmlarda rezistentlikning tez sur‘atlarda ortishi jahon miqyosida jiddiy epidemiologik va klinik xavf omili sifatida shakllanmoqda. Rezistentlik — bu oddiy moslashuv emas, balki genetik mutatsiyalar, plazmidlar orqali gen almashinuvi, efflyuks nasoslari faollashuvi va target-sayt o‘zgarishlari kabi murakkab molekulyar mexanizmlarga asoslangan evolyutsion jarayon bo‘lib, mikroblar populyatsiyasida antibiotiklarga chidamli variantlarning tanlab saqlanib qolishiga olib keladi

Shu sababli antibiotiklar bilan bog‘liq terapiya oddiy klinik amaliyot emas, balki boshqaruvga muhtoj bo‘lgan strategik jarayondir. Antibiotiklardan oqilona foydalanish, tor spektrli preparatlarga ustuvorlik berish, antibiogramma asosida dori tanlash, davolash kursini shifokor tavsiyasiga qat‘iy mos holda olib borish, profilaktik qo‘llashni cheklash — rezistentlikning kengayib ketishiga qarshi eng samarali yondashuvdir. Bundan tashqari, infeksiya nazorati, sanitariya-gigiyena, immunizatsiya va yangi antimikrob dori sinflarini yaratish mikrobiologik xavfsizlikni ta‘minlash yo‘lida asosiy omillar hisoblanadi.

Demak, antibiotiklar bilan ishlash — bu faqat bemor sog‘lig‘i uchun mas‘uliyat emas, balki kelajak avlodlar infeksiyalarga qarshi samarali kurash olib bora olishi uchun global javobgarlikdir.

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THE DEVELOPMENT OF THE TEXTILE INDUSTRY IN THE FERGANA VALLEY

Abstract. This study investigates the growth trajectory and current state of the textile industry in Uzbekistan's Fergana Valley, focusing on the Andijan, Namangan, and Fergana regions. Using the IMRAD framework, the paper combines statistical data analysis, qualitative interviews with industry stakeholders, and literature review to explore production increases, employment trends, and export performance between 2020 and 2024. The results emphasize the role of government policy, technological innovation, and workforce development in facilitating industrial expansion. However, the industry faces challenges such as raw material supply disruptions and infrastructural bottlenecks. The study concludes with strategic recommendations aimed at sustainable development and global market competitiveness.

Keywords: Textile industry, Fergana Valley, Uzbekistan, industrial development, export growth, government policy, IMRAD

INTRODUCTION

The textile industry has historically been a backbone of Uzbekistan's economy and continues to play a pivotal role in the country's industrial diversification. The Fergana Valley – comprising Andijan, Namangan, and Fergana provinces – is recognized as one of the leading textile production hubs in the nation. The region benefits from its strategic geographic location, a skilled labor force, favorable agro-climatic conditions ideal for cotton cultivation, and established transport infrastructure connecting it with both domestic and international markets.

In recent years, Uzbekistan's government has implemented several strategic reforms aimed at modernizing the textile sector, increasing export capacity, and attracting foreign and domestic investments. These reforms include tax incentives, subsidies, infrastructure development, and the promotion of public-private partnerships. Despite this, the sector faces obstacles such as raw material inconsistencies, energy supply issues, and the challenge of meeting international quality and certification standards.

This study provides a detailed analysis of the textile industry's development in the Fergana Valley through the lens of the IMRAD framework—offering a systematic approach to understanding the methods used, results obtained, and implications for future growth.

METHODS

The research methodology for this study involved a multi-method approach: Statistical data spanning from 2020 to 2024 were collected from the State Statistics Committee of Uzbekistan, regional economic departments, and textile industry reports. Variables included production volumes, export revenues,

employment statistics, and investment figures. Statistical tools were employed to analyze growth trends and regional comparisons.

Semi-structured interviews were conducted with over 20 stakeholders, including factory managers, policymakers, and vocational education experts within the Fergana Valley's textile industry. These interviews provided insights into operational challenges, investment climates, workforce development, and future outlooks.

A comprehensive review of scholarly articles, government policy documents, and industry analyses was undertaken to contextualize findings within broader economic and industrial trends at both national and international levels.

The study compared performance indicators across Andijan, Namangan, and Fergana to highlight intra-valley disparities and unique regional strengths.

RESULTS

In recent years, Uzbekistan has prioritized the modernization and expansion of its textile industry as a central component of its economic development strategy. The Fergana Valley – comprising the regions of Andijan, Namangan, and Fergana – has become a key center for textile manufacturing and export activities. A combination of government support measures, foreign direct investment, and the adoption of advanced technologies has significantly accelerated industrial growth in the area. This section analyzes the extent and impact of textile production expansion in the Fergana Valley between 2020 and 2024, with particular attention to increased production volumes, export performance, and improvements in technological infrastructure.

Between 2020 and 2024, the textile production capacity in the Fergana Valley grew markedly:

- In **Andijan**, the establishment of 45 new textile enterprises increased annual yarn production to approximately 150,000 tons by 2024, representing a 35% increase over four years.

- **Namangan's** textile sector demonstrated remarkable export performance, with revenues surpassing \$500 million in 2024, driven by both raw material processing and finished garment manufacturing.

- In the **Fergana** region, more than 20 new production units have been equipped with state-of-the-art machinery imported primarily from Germany, Turkey, and China, enhancing productivity and product quality.

The rapid expansion of the textile industry in the Fergana Valley has had a substantial impact on regional employment dynamics and social development. By 2024, the sector employed over 120,000 individuals, accounting for nearly 18% of the region's total workforce. A key characteristic of this employment structure is the significant participation of women, who constitute approximately 55% of the textile labor force — highlighting the industry's contribution to gender equality and women's economic empowerment.

Furthermore, partnerships with vocational and technical education institutions have supported the entry of young professionals into the sector, ensuring a consistent supply of skilled labor. These positive employment trends have

contributed to poverty reduction, decreased unemployment, and overall improvements in the standard of living across the valley. As a result, the textile industry has become not only a driver of industrial growth but also a cornerstone of inclusive and sustainable socio-economic progress in the region.

Export market diversification has become a strategic priority for the textile sector in the Fergana Valley, aimed at strengthening economic resilience and enhancing global competitiveness. Textile products from the region are predominantly exported to Russia and other CIS countries, which remain key markets for both raw cotton and semi-processed textile materials.

Meanwhile, expanding trade relations with China and Turkey have created new avenues for exporting finished garments, facilitated by improved logistics infrastructure and favorable bilateral trade agreements. The European Union has also emerged as a promising market, where compliance with international quality standards and certification protocols is increasingly vital for sustained market access. As a result of these focused efforts, total textile exports from the Fergana Valley reached approximately \$1.2 billion in 2024, reflecting a 25% increase compared to 2020.

The accelerated growth of the textile industry in the Fergana Valley can be attributed to several interrelated factors:

Uzbekistan's government has played a critical role by introducing incentives such as:

- Tax holidays for new textile firms.
- Subsidized credit facilities.
- Infrastructure investments, including energy supply stabilization and logistics improvements.

These measures have lowered operational costs and enhanced the attractiveness of the region for investors.

The expansion of textile vocational colleges and training centers has produced a technically competent workforce. These educational institutions collaborate closely with industry to tailor curricula to market needs, reducing skill gaps and improving labor productivity.

The integration of modern machinery and automation has improved production efficiency and product quality. Importing equipment from technologically advanced countries has allowed factories to increase competitiveness in global markets.

Despite the sector's substantial progress, the textile industry in the Fergana Valley continues to face several structural and operational challenges. A key issue is the unreliable supply of raw cotton, largely influenced by climate variability and inefficiencies in both agricultural production and logistics chains.

Moreover, infrastructure deficits—such as intermittent energy shortages and underdeveloped transportation systems—frequently interrupt production cycles and hinder operational efficiency. The industry also struggles to fully comply with global market standards, particularly in obtaining internationally recognized quality certifications and meeting environmental sustainability requirements. Addressing

these challenges will necessitate a coordinated, multi-sectoral effort involving government agencies, private enterprises, and educational institutions to implement systemic reforms and strengthen institutional capacity.

CONCLUSION

The textile industry in Uzbekistan's Fergana Valley has experienced robust and sustained growth, underpinned by proactive government support, targeted investment incentives, and advancements in production technology. This growth has been further reinforced by the strategic development of human capital through vocational training and workforce integration initiatives. As a result, the region has positioned itself as a vital contributor to Uzbekistan's industrial diversification and a rising player in the global textile supply chain.

However, to maintain this momentum, a long-term commitment to sustainable development is imperative. Prioritizing innovation in textile design, digitalization of production processes, and modernization of industrial infrastructure will be essential in enhancing competitiveness. In parallel, addressing supply-side vulnerabilities — particularly the stability and quality of cotton fiber — remains a key prerequisite for production efficiency. Moreover, meeting international quality, labor, and environmental standards is crucial for improving access to high-value export markets. Ultimately, expanding trade partnerships and diversifying export destinations will be critical for ensuring the sector's resilience and long-term global integration.

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TARBIYAVIY JARAYONDA MAHALLA VA MAKTAB HAMKORLIGINING RAQAMLASHTIRILGAN BOSHQARUV TIZIMI

Annotatsiya: Ushbu maqolada tarbiyaviy jarayonda maktab va mahalla hamkorligini samarali boshqarish uchun raqamlashtirilgan tizimlarni joriy etish imkoniyatlari o'rganiladi. Tadqiqotda elektron monitoring, ma'lumotlar bazasi, onlayn platformalar va digital vositalar yordamida tarbiyaviy jarayonlarni rejalashtirish, nazorat qilish va tahlil qilish usullari tahlil qilindi. Maqola maktab rahbarlari, pedagoglar va mahalla faollari uchun raqamlashtirilgan boshqaruv tizimlarini tatbiq etish bo'yicha amaliy tavsiyalarni beradi va tarbiyaviy jarayon samaradorligini oshirishga yo'naltirilgan.

Kalit so'zlar: raqamlashtirilgan boshqaruv, maktab–mahalla hamkorligi, tarbiyaviy jarayon, digital monitoring, onlayn platforma.

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DIGITAL MANAGEMENT SYSTEM FOR NEIGHBORHOOD AND SCHOOL COOPERATION IN THE EDUCATIONAL PROCESS

Abstract: This article explores the implementation of digital management systems to enhance school–community cooperation in the educational process. The study analyzes methods for planning, monitoring, and evaluating educational activities using electronic monitoring, databases, online platforms, and digital tools. The article provides practical recommendations for school administrators, teachers, and community activists to improve the effectiveness of the educational process.

Keywords: digital management, school–community cooperation, educational process, digital monitoring, online platform.

Kirish

Zamonaviy ta'lim jarayonida maktab va mahalla institutlari o'rtasidagi hamkorlik ta'lim va tarbiyaning samaradorligini oshirishda muhim omil hisoblanadi. An'anaviy tarzda amalga oshirilgan hamkorlik ko'pincha qo'lda yuritiladigan reja, monitoring va hisobot tizimlariga asoslangan bo'ladi, bu esa jarayonning samaradorligini kamaytiradi va ma'lumotlar tahlilini murakkablashtiradi.

Raqamlashtirilgan boshqaruv tizimlari esa maktab va mahalla hamkorligini elektron platformalar, onlayn monitoring, ma'lumotlar bazasi va digital vositalar

yordamida tashkil etish imkonini beradi. Bunday tizimlar tarbiyaviy jarayonlarni rejalashtirish, nazorat qilish, natijalarni tahlil qilish va samaradorlikni oshirishga xizmat qiladi.

Maqola maqsadi – tarbiyaviy jarayonda maktab va mahalla hamkorligini raqamlashtirilgan boshqaruv tizimi orqali samarali tashkil etish imkoniyatlarini oʻrganish va amaliy tavsiyalar ishlab chiqishdan iborat. Tadqiqot natijalari maktab rahbarlari, pedagoglar va mahalla faollari uchun integratsiyalashgan raqamli boshqaruv tizimlarini tatbiq etishda ilmiy asos boʻlib xizmat qiladi.

Mavzuga oid adabiyotlar sharhi

Maktab va mahalla hamkorligi tarbiyaviy jarayonda uzoq yillardan beri tadqiq etilib kelmoqda. Epstein (2002) maktab–oila–jamiyat hamkorligining samaradorligini oshirishda tizimli yondashuvning ahamiyatini taʼkidlaydi. Xalqaro tadqiqotlar (OECD, 2020; UNESCO, 2020) taʼkidlaganidek, raqamlashtirilgan monitoring va onlayn platformalar taʼlim jarayonini samarali boshqarish va natijalarni tahlil qilish imkonini beradi.

Digital texnologiyalarni taʼlim va tarbiyada qoʻllash boʻyicha Brunner (1996) va Vygotskiy (1983) yondashuvlari pedagogik jarayonni optimallashtirish va oʻquvchilarning ijtimoiy faoliyatini rivojlantirishga asos boʻlib xizmat qiladi. Shuningdek, Steinberg (2017) va Skelton & Francis (2014) tadqiqotlari yoshlar tarbiyasida texnologiyalardan foydalanish, onlayn monitoring va interaktiv platformalar orqali pedagogik jarayonni samarali boshqarish imkoniyatlarini koʻrsatadi.

Oʻzbek tadqiqotchilari ham maktab va mahalla hamkorligini rivojlantirish, tarbiyaviy jarayonni raqamlashtirish va maʼlumotlar bazasi asosida boshqarish masalalarini oʻrganishgan. Usmonova (2020) elektron tizimlar yordamida maktab va mahalla hamkorligini monitoring qilish va tarbiyaviy jarayonni optimallashtirishning amaliy jihatlarini tahlil qilgan. Rasulova (2021) esa mahalla institutining tarbiyaviy jarayondagi rolini raqamlashtirilgan boshqaruv vositalari orqali kuchaytirish mumkinligini qayd etadi.

Shu bilan birga, Zamirbekova (2019) raqamli platformalar, onlayn monitoring va elektron maʼlumotlar bazasi yordamida tarbiyaviy jarayonni rejalashtirish va nazorat qilishning samaradorligini tadqiq qilgan. Tadqiqotlar shuni koʻrsatadiki, raqamlashtirilgan boshqaruv tizimlari pedagoglar, rahbarlar va mahalla faollari uchun vaqtni tejash, resurslarni samarali taqsimlash va tarbiyaviy jarayonni tizimli tashkil etish imkonini beradi.

Umuman olganda, adabiyotlar tahlili shuni koʻrsatadiki, maktab va mahalla hamkorligini raqamlashtirilgan boshqaruv tizimlari orqali tashkil etish tarbiyaviy jarayon samaradorligini oshirish, maʼlumotlarni tezkor tahlil qilish va qarorlar qabul qilishni optimallashtirishga xizmat qiladi.

Tadqiqot metodologiyasi

Ushbu tadqiqotning maqsadi – tarbiyaviy jarayonda maktab va mahalla hamkorligini raqamlashtirilgan boshqaruv tizimi orqali samarali tashkil etish va uning samaradorligini baholashdir. Tadqiqot obyekti sifatida umumiy oʻrta taʼlim maktablari va mahalla institutlari tanlandi, predmet esa raqamli boshqaruv tizimlari

yordamida tarbiyaviy jarayonlarni rejalashtirish, nazorat qilish va tahlil qilish metodlari hisoblanadi.

Tadqiqotda raqamlashtirilgan yondashuv asosiy o‘rinni egallaydi, bu esa an’anaviy qo‘lda yuritiladigan jarayonlardan farq qiladi. Raqamlashtirilgan boshqaruv tizimi quyidagi komponentlardan iborat:

Elektron platforma: tarbiyaviy jarayonlarni rejalashtirish, dars va tadbirlarni kuzatish imkonini beradi.

Ma’lumotlar bazasi: maktab va mahalla faoliyatiga oid ma’lumotlarni tizimli saqlash va tezkor tahlil qilish imkonini yaratadi.

Onlayn monitoring: tarbiyaviy tadbirlarning samaradorligini real vaqt rejimida kuzatish.

Interaktiv kommunikatsiya vositalari: pedagoglar, ota-onalar va mahalla faollari o‘rtasida tezkor axborot almashish.

Empirik metodlar tadqiqotning raqamlashtirilgan yondashuvga moslashgan holda quyidagicha tashkil etildi:

So‘rovnoma: maktab rahbarlari, pedagoglar va mahalla faollari orasida raqamlashtirilgan boshqaruv tizimi haqida malaka va tajribani aniqlash.

Kuzatuv: elektron platforma va monitoring vositalari orqali tarbiyaviy jarayonlarni kuzatish, tizimning amaliy samaradorligini baholash.

Intervyu: pedagoglar va mahalla faollari bilan raqamlashtirilgan boshqaruv tizimi orqali tarbiyaviy jarayonlarni boshqarish bo‘yicha suhbatlar.

Hujjatli tahlil: raqamli tizimlar orqali yuritilgan tarbiyaviy reja va hisobotlarni tahlil qilish.

Ushbu metodologiya an’anaviy usullar bilan farq qiladigan, raqamlashtirilgan boshqaruv tizimlarini qo‘llashga qaratilgan kombinatsion yondashuvni aks ettiradi va tarbiyaviy jarayonlarni samarali boshqarish, monitoring va tahlil qilish imkonini yaratadi.

Tahlil va natijalar

Tadqiqot davomida maktab rahbarlari, pedagoglar va mahalla faollari ishtirokida raqamlashtirilgan boshqaruv tizimlari yordamida tarbiyaviy jarayonlar tahlil qilindi. Ma’lumotlar so‘rovnoma, kuzatuv, intervyu va hujjatli tahlil orqali to‘plandi.

So‘rovnoma natijalari shuni ko‘rsatdiki, respondentlarning 75% elektron platformalar va onlayn monitoring orqali tarbiyaviy jarayonlarni boshqarishning samaradorligini yuqori deb baholagan. Shu bilan birga, 60% pedagoglar ma’lumotlar bazasi orqali rejalashtirish va nazorat qilish jarayonining osonlashganini bildirgan.

Kuzatuv natijalari raqamlashtirilgan boshqaruv tizimlarining tarbiyaviy tadbirlarni vaqtida rejalashtirish, amalga oshirish va monitoring qilish imkonini berishini ko‘rsatdi. Tizim yordamida pedagoglar va mahalla faollari o‘rtasidagi axborot almashish tezlashdi va xatoliklar kamaydi.

Intervyu natijalari shuni ko‘rsatdiki, pedagoglar va mahalla faollari raqamlashtirilgan tizimlarni qo‘llash orqali tarbiyaviy jarayonni tizimli boshqarish va samaradorligini oshirish imkoniyatiga ega bo‘lgan. Ularning fikriga ko‘ra,

elektron monitoring va ma'lumotlar bazasi yordamida jarayonni tezkor baholash va kerakli chora-tadbirlarni amalga oshirish mumkin.

Hujjatli tahlil esa maktab va mahalla tomonidan joriy etilgan raqamlashtirilgan boshqaruv tizimlari tarbiyaviy reja va hisobotlarni tizimli yuritishga, jarayonni optimallashtirishga va pedagogik hamkorlikni kuchaytirishga xizmat qilayotganini ko'rsatdi.

Natijalar shuni tasdiqladiki, raqamlashtirilgan boshqaruv tizimlarini joriy etish maktab va mahalla hamkorligini samarali tashkil etish, tarbiyaviy jarayonni tizimli nazorat qilish va pedagogik qarorlar qabul qilishni optimallashtirish imkonini beradi.

Xulosa va takliflar

Tadqiqot natijalari shuni ko'rsatdiki, raqamlashtirilgan boshqaruv tizimlarini tarbiyaviy jarayonda joriy etish maktab va mahalla hamkorligini samarali tashkil etish, tarbiyaviy jarayonlarni tizimli boshqarish va monitoring qilish imkoniyatini oshiradi. Elektron platformalar, ma'lumotlar bazasi va onlayn monitoring pedagoglar va mahalla faollari o'rtasidagi axborot almashishni tezlashtiradi, xatoliklarni kamaytiradi va rejalashtirish jarayonini optimallashtiradi.

Tadqiqot asosida quyidagi tavsiyalar ishlab chiqildi:

Elektron platformalarni joriy etish: maktab va mahalla tomonidan tarbiyaviy jarayonlarni rejalashtirish va nazorat qilish uchun yagona onlayn tizim yaratish.

Ma'lumotlar bazasini rivojlantirish: pedagoglar, ota-onalar va mahalla faollari faoliyatini tizimli qayd etish va natijalarni tezkor tahlil qilish imkonini beruvchi bazani shakllantirish.

Onlayn monitoring tizimini qo'llash: tarbiyaviy tadbirlarning samaradorligini real vaqt rejimida kuzatish va kerakli chora-tadbirlarni tezkor amalga oshirish.

Axborot almashish va kommunikatsiya vositalarini integratsiya qilish: maktab, mahalla va ota-onalar o'rtasida tezkor va samarali axborot almashishni ta'minlash.

Raqamli tizimdan foydalangan holda pedagoglarni qo'llab-quvvatlash: pedagoglar uchun treninglar va metodik qo'llanmalarni ishlab chiqish, tizimni samarali qo'llash bo'yicha maslahatlar berish.

Ushbu tavsiyalarni amalga oshirish maktab va mahalla hamkorligini mustahkamlash, tarbiyaviy jarayonning samaradorligini oshirish va pedagogik qarorlarni optimallashtirishga xizmat qiladi. Shu bilan birga, raqamlashtirilgan boshqaruv tizimlari tarbiyaviy jarayonni tizimli va sifatli tashkil etish imkonini beradi.

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5–7-SINF O‘QUVCHI QIZLARIDA KONFLIKTLARNING OLDINI OLISH TEXNOLOGIYALARI

Annotatsiya: Ushbu maqolada 5–7-sinf o‘quvchi qizlarida konfliktlarning oldini olish va ijtimoiy muammolarni bartaraf etish texnologiyalari tahlil qilinadi. Tadqiqotda pedagogik metodlar, psixologik yondashuvlar va maktabdagi tarbiyaviy mashg‘ulotlar orqali yosh qizlar orasida nizolarni kamaytirish usullari ko‘rib chiqildi. Maqolada konfliktlarni aniqlash, ularni oldini olish, murosa va ijtimoiy ko‘nikmalarni shakllantirishga qaratilgan amaliy tavsiyalar berilgan. Tadqiqot natijalari maktab pedagoglari va ota-onalar uchun qizlarning ijtimoiy va emotsional barqarorligini oshirishda samarali vosita sifatida xizmat qiladi.

Kalit so‘zlar: konfliktlarni oldini olish, 5–7-sinf qizlari, ijtimoiy ko‘nikmalar, tarbiyaviy texnologiyalar, maktab–oilahamkorligi.

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CONFLICT PREVENTION TECHNOLOGIES FOR GIRLS IN GRADES 5–7

Abstract: This article analyzes technologies for preventing conflicts and addressing social problems among 5th–7th grade girls. The study examines pedagogical methods, psychological approaches, and school-based educational activities aimed at reducing conflicts among students. Practical recommendations are provided for identifying conflicts, preventing them, and developing compromise and social skills. The findings serve as an effective tool for teachers and parents to enhance the social and emotional resilience of girls.

Keywords: conflict prevention, 5th–7th grade girls, social skills, educational technologies, school–family–community cooperation.

Kirish

5–7-sinf o‘quvchi qizlar tarbiyasi pedagogik va psixologik jihatdan muhim bosqichlardan biridir. Shu yosh davrida qizlar shaxsiyati shakllanadi, ijtimoiy ko‘nikmalar rivojlanadi va do‘stlar bilan munosabatlar muhim ahamiyat kasb etadi. Shu bilan birga, ushbu davrda o‘zaro tushunmovchiliklar, nizolar va konfliktlar ham tez-tez uchrab turadi. Agar konfliktlar vaqtida to‘g‘ri boshqarilmasa, ular qizlarning o‘ziga bo‘lgan ishonchi, ijtimoiy faolligi va maktabdagi ta‘lim jarayoniga ta‘sir qilishi mumkin.

Zamonaviy pedagogik adabiyotlarda 5–7-sinf qizlarida konfliktlarni oldini olish va ijtimoiy ko‘nikmalarni shakllantirish texnologiyalari alohida o‘rganiladi. Ushbu texnologiyalar psixologik treninglar, guruh ichidagi o‘yinlar, murosa va muloqot ko‘nikmalarini rivojlantirish metodikalarini o‘z ichiga oladi. Shu asosda maktab, oila va mahalla hamkorligida konfliktlarni aniqlash, ularni bartaraf etish va qizlarni ijtimoiy jihatdan faol shaxs sifatida tarbiyalash mexanizmlari ishlab chiqiladi.

Maqola maqsadi – 5–7-sinf qizlarida konfliktlarning oldini olish texnologiyalarini tahlil qilish va ularni tarbiyaviy jarayonda qo‘llash bo‘yicha tavsiyalar ishlab chiqishdir. Tadqiqot natijalari maktab pedagoglari, psixologlar va ota-onalar uchun qizlarning ijtimoiy va emotsional barqarorligini oshirishda samarali vosita sifatida xizmat qiladi.

Mavzuga oid adabiyotlar sharhi

Konfliktlarni oldini olish va ijtimoiy ko‘nikmalarni shakllantirish masalalari pedagogika va psixologiya adabiyotlarida keng yoritilgan. Jahon tadqiqotchilari qizlarning o‘zaro munosabatlaridagi nizolarni boshqarish va kamaytirishda pedagogik va psixologik yondashuvlarni muhim deb hisoblaydilar. Johnson va Johnson (2000) konfliktlarni hal etish va hamkorlik ko‘nikmalarini rivojlantirish bo‘yicha interaktiv o‘quv metodlarini ishlab chiqqan. Ularning tadqiqotlariga ko‘ra, ijtimoiy ko‘nikmalarni shakllantirish va murosa texnologiyalari maktabdagi nizolarni sezilarli darajada kamaytiradi.

Shuningdek, Deutsch (2011) konfliktlarni ijtimoiy va psixologik jarayon sifatida tahlil qilib, ularni oldini olish va hal etishning muhim metodlarini tavsiya qiladi. Tadqiqotlar shuni ko‘rsatadiki, yosh qizlar uchun moslashtirilgan treninglar, guruh ishlari va rolli o‘yinlar ularning ijtimoiy va kommunikativ ko‘nikmalarini rivojlantiradi hamda nizolarga konstruktiv yondashishni o‘rgatadi.

O‘zbek tadqiqotchilari ham maktabdagi konfliktlarni boshqarish va ijtimoiy ko‘nikmalarni shakllantirishni o‘rganishgan. Xolmo‘minova (2021) qizlarning 5–7-sinf davrida o‘zaro tushunmovchiliklar va kichik nizolarni murosa va muloqot usullari orqali bartaraf etish imkoniyatlarini tahlil qilgan. Usmonova (2020) esa maktab–oilahamkorligi doirasida konfliktlarni aniqlash va oldini olish mexanizmlarini ishlab chiqishning amaliy ahamiyatini ko‘rsatadi.

Shuningdek, Zamirbekova (2019) yosh qizlarda konfliktlarni boshqarish bo‘yicha pedagogik texnologiyalarni sinovdan o‘tkazib, ularning samaradorligini tasdiqlagan. Tadqiqotlarda psixologik treninglar, guruh ishlari, murosaga asoslangan mashg‘ulotlar va jamoaviy loyihalar qizlarda ijtimoiy faollik va murosa ko‘nikmalarini rivojlantirishda samarali vosita sifatida namoyon bo‘lgan.

Shu bilan birga, xalqaro tadqiqotlar ham konfliktlarni oldini olish texnologiyalarining yosh qizlar tarbiyasida ahamiyatini tasdiqlaydi. Skelton & Francis (2014) va OECD (2020) hisobotlarida yosh qizlar uchun moslashtirilgan ijtimoiy va psixologik treninglar, shuningdek, maktabdagi guruh ishlari va jamoaviy loyihalar ularning ijtimoiy ko‘nikmalarini rivojlantirish va nizolarni kamaytirishda samarali ekanligi qayd etilgan.

Umuman olganda, adabiyotlar tahlili shuni ko'rsatadiki, 5–7-sinf qizlarida konfliktlarni oldini olish texnologiyalari psixologik, pedagogik va ijtimoiy yondashuvlarni birlashtirishi lozim. Shu tarzda ular qizlarning o'zaro munosabatlarini barqarorlashtiradi, ijtimoiy va kommunikativ ko'nikmalarini oshiradi hamda maktabdagi ijtimoiy muhitni ijobiy tomonga o'zgartirishga yordam beradi.

Tadqiqot metodologiyasi

Ushbu tadqiqotning maqsadi – 5–7-sinf o'quvchi qizlarida konfliktlarning oldini olish texnologiyalarini aniqlash va ularni tarbiyaviy jarayonda samarali qo'llash usullarini ishlab chiqishdir. Tadqiqot obyekti sifatida maktabdagi qizlar, predmet sifatida ularning konfliktlarni boshqarish va oldini olish ko'nikmalari tanlandi.

Tadqiqot nazariy va empirik usullarga asoslangan. Nazariy metodlar doirasida ilg'or pedagogik va psixologik adabiyotlar, xalqaro va mahalliy tadqiqotlar tahlil qilindi. Shu asosda konfliktlarni aniqlash, oldini olish va ijtimoiy ko'nikmalarni shakllantirish mexanizmlari ishlab chiqildi.

Empirik metodlar quyidagilarni o'z ichiga oladi:

So'rovnoma: 5–7-sinf qizlari orasida konfliktlarga munosabat, nizolarni hal qilish va murosa ko'nikmalari darajasi aniqlash uchun o'tkazildi.

Kuzatuv: sinf va maktabdagi tarbiyaviy mashg'ulotlar, guruh ishlari va to'garaklarda qizlarning ijtimoiy va konfliktli vaziyatlardagi faolligi kuzatildi.

Intervyu: pedagoglar, sinf rahbarlari va ota-onalar bilan qizlarning konfliktlarni boshqarish tajribasi muhokama qilindi.

Hujjatli tahlil: maktab va mahalla tomonidan tashkil etilgan tarbiyaviy tadbirlar, treninglar va dasturlar tahlil qilindi.

Eksperiment sifatida sinov sinflari tanlab, ularda konfliktlarni oldini olish texnologiyalari – psixologik treninglar, guruh ishlari, rolli o'yinlar va murosaga asoslangan mashg'ulotlar joriy etildi. Tadqiqot davomida qizlarning ijtimoiy ko'nikmalari, murosa va muloqot ko'nikmalari, shuningdek, konflikt holatlariga munosabatlari o'lchandi.

Ushbu metodologiya kombinatsion yondashuvga asoslangan bo'lib, nazariy va amaliy metodlarni uyg'un qo'llash orqali qizlarning konfliktlarni boshqarish ko'nikmalari va ijtimoiy faolligini oshirishga imkon berdi.

Tahlil va natijalar

Tadqiqot davomida 5–7-sinf qizlari, ularning pedagoglari va ota-onalari ishtirokida konfliktlarni boshqarish va oldini olish bo'yicha ma'lumotlar yig'ildi. Ma'lumotlar so'rovnoma, kuzatuv, intervyu va hujjatli tahlil orqali to'plandi.

So'rovnoma natijalari shuni ko'rsatdiki, qizlarning 70% maktabdagi o'zaro munosabatlarda kichik nizolarni hal qilishda muvaffaqiyatli, 20% esa pedagoglarning yordamiga muhtoj, qolgan 10% o'zaro tushunmovchiliklarni boshqarishda qiyinchiliklarga duch keladi. Shu bilan birga, qizlarning 65% ijtimoiy ko'nikmalarni rivojlantirish va murosaga erishishda guruh ishlaridan foydalanganini bildirgan.

Kuzatuv natijalari qizlarning sinfdagi va to'garakdagi faolligi hamda murosa va muloqot ko'nikmalarini shakllantirishga qaratilgan mashg'ulotlarda qatnashishini ko'rsatdi. Rolli o'yinlar va guruh ishlari orqali konfliktlar konstruktiv yo'l bilan hal qilinib, qizlar orasidagi nizolar kamaydi.

Intervyu natijalari esa pedagoglar va ota-onalarning konfliktlarni boshqarish metodlaridan foydalanganida ijobiy o'zgarishlarni qayd etganini ko'rsatdi. Pedagoglar ma'lum qildiki, psixologik treninglar, murosaga asoslangan mashg'ulotlar va guruh ishlari qizlarning o'zaro tushunmovchiliklarni hal qilish ko'nikmalarini sezilarli darajada oshiradi.

Hujjatli tahlil maktab va mahalla tomonidan tashkil etilgan tarbiyaviy tadbirlar va dasturlar qizlarning ijtimoiy ko'nikmalarini rivojlantirish, konflikt holatlarini kamaytirish va jamoadagi faol ishtirokini rag'batlantirishga xizmat qilayotganini ko'rsatdi.

Natijalar shuni tasdiqladiki, konfliktlarni oldini olish texnologiyalarini sistematik joriy etish qizlarning ijtimoiy faolligini oshirish, ularning murosa va kommunikativ ko'nikmalarini rivojlantirish, shuningdek, sinf va maktab muhitini ijobiy tomonga o'zgartirishga yordam beradi.

Xulosa va takliflar

Tadqiqot natijalari shuni ko'rsatdiki, 5–7-sinf qizlarida konfliktlarni oldini olish texnologiyalari ularning ijtimoiy ko'nikmalarini rivojlantirish, murosa va muloqot qobiliyatlarini oshirish hamda maktabdagi o'zaro munosabatlarni barqarorlashtirishda samarali vosita sifatida namoyon bo'ladi. Ushbu yosh davrida qizlar psixologik va ijtimoiy jihatdan sezgir bo'lgani sababli, pedagogik yondashuvlar va psixologik treninglar ularning konfliktlarni boshqarish ko'nikmalarini shakllantirishda muhim rol o'ynaydi.

Tadqiqot natijalariga asoslanib, quyidagi tavsiyalar ishlab chiqildi:

Psixologik va pedagogik treninglar: maktabda qizlar uchun konfliktlarni hal qilish va murosaga erishish bo'yicha treninglar muntazam o'tkazilishi lozim.

Guruh ishlari va rolli o'yinlar: qizlarning ijtimoiy ko'nikmalarini rivojlantirish, murosa va muloqot ko'nikmalarini oshirish uchun guruh ishlari va rolli o'yinlardan faol foydalanish.

Maktab–oilā–mahalla hamkorligi: ota-onalar va mahalla institutlarini qizlarning konfliktlarni boshqarish jarayoniga jalb qilish, ularning psixologik va ijtimoiy qo'llab-quvvatlashini ta'minlash.

Monitoring va baholash: qizlarning ijtimoiy va murosa ko'nikmalarini baholash, konflikt holatlarini kuzatish va pedagogik strategiyalarni moslashtirish tizimini joriy etish.

Motivatsiya va rag'batlantirish: qizlarni konstruktiv munosabatlar va murosaga erishishga rag'batlantirish, ularning ijtimoiy faolligini oshirish uchun maktab ichida mukofotlash tizimini yaratish.

Shu tavsiyalarni amalga oshirish orqali qizlar o'zaro munosabatlarda konstruktiv yondashuvni o'rganadi, ijtimoiy va kommunikativ ko'nikmalarini rivojlantiradi hamda maktabdagi psixologik muhit barqaror bo'ladi. Shu bilan birga,

ularning ijtimoiy faolligi va o'ziga bo'lgan ishonchi oshadi, bu esa kelajakda barkamol va jamiyatga foydali shaxs sifatida shakllanishiga zamin yaratadi.

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KORPORATIV TANGLIKNING IQTISODIY VA HUQUQIY OQIBATLARI: O'ZBEKISTON VA XALQARO TAJRIBA

***Annotatsiya:** Ushbu ish korporativ boshqaruvda keng uchraydigan dedlok (korporativ tanglik) hodisasining mohiyati, kelib chiqish sabablari va uning korporatsiyalar faoliyatiga ko'rsatadigan moliyaviy, huquqiy hamda operatsion ta'sirini tahlil qiladi. Tadqiqotda dedlokning bevosita va bilvosita moliyaviy zarar turlari yoritilib, korporatsiya uchun eng dolzarb xavf — boshqaruv organlarining falajlanishi oqibatida qaror qabul qilinmasligi ekanligi asoslab beriladi. Ishda Milan Apellyatsiya sudi hamda "Smith v. Atlantic Properties, Inc." kabi xalqaro sud amaliyotlari misolida dedlokning real oqibatlari, xususan, soliq jarimalari, investitsiya oqimining to'xtashi, aktivlar qadrsizlanishi va korporatsiya tugatilishigacha olib borishi mumkinligi huquqiy tahlil qilinadi. Shuningdek, O'zbekiston Respublikasi qonunchiligi doirasida dedlok yuzaga kelish ehtimolini oshiruvchi boshqaruv mexanizmlari va ularni bartaraf etishning milliy-huquqiy vositalari ko'rib chiqiladi. Tadqiqot yakunida dedlokning korporativ boshqaruv sifatiga ta'siri umumlashtirilib, korporatsiyalarda barqaror boshqaruvni ta'minlash uchun ushbu hodisani oldini olish bo'yicha taklif va xulosalar beriladi*

***Kalit so'zlar:** Dedlok, korporativ tanglik, korporativ boshqaruv, aksiyadorlar nizosi, veto huquqi, teng ovoz, boshqaruv falaji, moliyaviy zararlar, bevosita zarar, bilvosita zarar, korporativ inqiroz, likvidatsiya, korporativ nizolar, sud amaliyoti, Smith v. Atlantic Properties, Milan Apellyatsiya sudi, investitsiya xavfi, korporativ huquq, aksiyadorlik jamiyati, O'zbekiston korporativ qonunchiligi.*

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ECONOMIC AND LEGAL CONSEQUENCES OF CORPORATE CRISIS: UZBEKISTAN'S EXPERIENCE AND INTERNATIONAL PRACTICE

***Abstract:** This work analyzes the nature, causes and financial, legal and operational impact of the phenomenon of deadlock (corporate crisis) that is common in corporate governance. The study highlights the direct and indirect types of financial damage caused by deadlock, and argues that the most pressing risk for a corporation is the failure to make decisions due to the paralysis of management bodies. The work analyzes the real consequences of deadlock, in particular, tax penalties, cessation of investment flows, asset depreciation and the possibility of*

leading to the liquidation of the corporation, using the example of the Milan Court of Appeal and international judicial practices such as Smith v. Atlantic Properties, Inc. . The work also examines the management mechanisms that increase the likelihood of deadlock within the framework of the legislation of the Republic of Uzbekistan and national legal means of eliminating them. At the end of the study, the impact of deadlock on the quality of corporate governance is summarized, and proposals and conclusions are given on preventing this phenomenon in order to ensure sustainable management in corporations.

Keywords: *Deadlock, corporate deadlock, corporate governance, shareholder dispute, veto right, equal voting, management paralysis, financial losses, direct loss, indirect loss, corporate crisis, liquidation, corporate disputes, case law, Smith v. Atlantic Properties, Milan Court of Appeal, investment risk, corporate law, joint-stock company, Uzbekistan corporate legislation.*

Kirish

Korporativ munosabatlar rivojlanayotgan bugungi kunda, u orqali kelib chiqadigan muammo hamda kamchiliklarni bartarf etish ham ahamiyatli bo'lib qolmoqda. Korporativ munosabatlarda ta'sischi asosan sheriklikka asoslangan holda o'z bizneslarini yuritishni maqsad qiladilar. Biroq, aynan shu omil ular o'rtasida keyinchalik turli tushunmovchiliklar va qarama-qarshiliklar kelib chiqishiga sabab bo'ladi. Shuning uchun ham bejizga xalqimiz "sheriklik oshiga it boqmas" deb aytishmaydi. Ana shunday muammolardan biri bu dedlokdir. Ushbu jumlaning o'zbek tiliga korporativ tanglik ko'rinishida tarjima qilish maqsadga muvofiq hisoblanadi. Muhim qarorlar qabul qilish imkonini yo'qolib, rahbarlar o'rtasida fikr-mulohazalar qarama-qarshi yo'nalishlarga ketgan, hissiy kuchlanish oshgan va operatsion jarayonlar to'xtab qolgan vaziyatni tasavvur qiling — bu sizning kompaniyangizning istiqboli xavf ostida ekanligini anglatadi. Bu korporativ deadlock deb ataladigan hodisa bo'lib, u hatto eng muvaffaqiyatli tashkilotlarni ham inqirozga olib kelishi va strategik rivojlanish o'rniga boshqaruv tikanishiga aylantirishi mumkin. Korporativ tanglik shunchaki kelishmovchilikdan ko'proq narsani anglatadi - bu biznes subyektining mavjudligiga tahdid solishi mumkin bo'lgan asosiy boshqaruv muvaffaqiyatsizligini anglatadi. Muvaffaqiyatsizlik teng yoki blokirovka qiluvchi ovoz berish huquqiga ega aksiyadorlar yoki direktorlar muhim biznes qarorlari bo'yicha kelishuvga erisha olmaganlarida yuzaga keladi, bu esa oxir-oqibat biznesning qadrsizlanishiga yoki tugatilishiga olib kelishi mumkin bo'lgan operatsion falajni keltirib chiqaradi². Bundan tashqari Oddiy "teng ovoz" bo'yicha kelib chiqadigan boshi berk holat (deadlock) — bu tarafdor va qarshi ovozlar teng bo'lganda va hech kimda hal qiluvchi ovoz bo'lmaganda yuzaga keladi. Bu holat direktorlar kengashi yoki aksiyadorlar darajasida sodir bo'lishi mumkin bo'lsa-da, oxir-oqibat eng muhim daraja — bu aksiyadorlar darajasidir,

² Corporate Deadlock Resolution Mechanisms: Safeguarding Business Continuity Through Strategic Governance Planning [Blake Turley](#). Jul 23, 2025

chunki nazorat paketiga ega aksiyador har doim kengash tarkibini o'zgartirish imkoniyatiga ega bo'ladi.

Bir nechta aksiyadorlar ishtirokidagi turli holatlar boshi berk vaziyatga olib kelishi mumkin, biroq bu yerda kompaniyada ikkita aksiyador bo'lib, har biri bitta toifadagi oddiy aksiyalarning 50 foiziga egalik qiladigan eng sodda holat ko'rib chiqiladi³. Bunda bir tarafda boshqaruv bo'yicha ustun mavqe bo'lmaydi. Ikki tomon teng deb hisoblanadi. Muhim qarorlarni esa faqatgina ikkalasining roziligi olingandagina hal qilish mumkin.

Ushbu jarayon vujudga kelganda qarorlar qabul qilish amalda imkonsiz holatga keladi. Bu turli xildagi muammolarga sabab bo'ladi. Quyida vujudga kelishi mumkin bo'lgan moliyaviy muammolarni ko'rib chiqamiz.

Korporatsiyada zarur bo'lgan qarorlarning o'z vaqtida qabul qilinmasligi natijada mazkur korporatsiya moliyaviy jihatdan yo'qotishlarga uchrashi mumkin. Ularni shartli ravishda bevosita va bilvosita moliyaviy yo'qotishlar toifasiga ajratishimiz mumkin. Bevosita moliyaviy yo'qotishlar: daromadlarning yo'qolishi, qo'shimcha xarajatlarning oshishi va korporatsiya aksiyalari qiymatining pasayishi kabilarda namoyon bo'lsa, Bilvosita moliyaviy ta'sirlar: Reputatsion zararlar, kadrlar bilan bog'liq muammolar hamda tashqi investitsiya jalb qilish bilan bog'liq muammolardir.

Dedlok sharoitida bevosita moliyaviy zarar — bu korporatsiyada qaror qabul qilish to'xtab qolishi natijasida **darhol yuzaga keladigan, aniq pul ko'rinishida ifodalanuvchi yo'qotishlardir**. Dedlok (deadlock) — aksiyadorlar, direktorlar kengashi yoki boshqaruv organlari o'rtasidagi kelishmovchilik tufayli korporativ boshqaruvning falaj holatga kelishi. Bu juda og'ir natijalarga olib kelihi mumkin: yangi shartnomalar tuzilmay qoladi, mavjud mijozlar bilan ishlash sekinlashadi, ishlab chiqarish yoki xizmat ko'rsatish jarayoni to'xtaydi. Natijada korporatsiya avtomatik ravishda ishdan chiqadi. Chunki, yuqoridagi holatlar korporatsiyaning normal faoliyatini cheklaydi. Natijada korporatsiya nafaqat o'z kontragentlari oldida majburiyatlari bajarolasligi balki, soliq yoki shunga o'xshash boshqa ma'muriy xarakterdagi nizolarga ham sabab bo'ladi.

Bunday holatda avtomatik ravishda korporatsiya operatsion xarajatlar vujudga keladi. Ya'ni, korporatsiya moliyaviy holatini o'rganish uchun audit yo'llanishi mumkin, kelishmovchiliklarni hal qilish uchun mediator yoki advokatlar jalb qilinishi mumkin. Bular ham qo'shimcha xarajatlarga sabab bo'ladi. Chunki, korporatsiya normal faoliyati davomida moliyaviy holat idan chiqmasa, auditor yo'llash uchun ehtiyoj mavjud bo'lmaydi. Bu kabi xarajatlar fonida daromad yoki ulish olishi lozim bo'lgan shaxslar bunda mahrum bo'lishi yoki oladigan foydasi miqdori kamayishi mumkin. Aynan shunga o'xshash holat bo'yicha Milan Apellyatsiya sudining keysini ko'rib chiqamiz.

Milan apellyatsiya sudi qarorida, 2484-modda, 1-qism, Italiya Fuqarolik kodeksining 2-bandida (korporativ maqsadga erishishning imkonsizligi) va 3-

³ CORPORATE & COMMERCIAL ALERT. Unlocking stalemates: Solutions for shareholder deadlocks. David Thompson, Muzammil Ahmed and Peter-Wallace Mathebula. ©2024 13545/JUN

bandida (aksiyadorlar yig'ilishining faoliyat yurita olmasligi) nazarda tutilgan asoslar bo'yicha, aksiyadorlik jamiyatining tugatilishi va likvidatsiyasi shartlari mavjudligini aniqladi. Bu qaror shunga qaramay qabul qilindiki, aksiyadorlar yig'ilishi rasmiy jihatdan hamon faol edi hamda kompaniyaning yillik moliyaviy hisobotlarini tasdiqlab kelayotgan edi.

Direktorlardan biri tomonidan berilgan shikoyat asosida, Milan apellyatsiya sudi Milan biznes sudi qarorini bekor qildi. Biznes sudi kompaniya tugatilishiga asoslar mavjud emas deb hisoblagan edi, quyidagi dalillarga tayanib:

1. Kompaniyaning faoliyat sohasi juda keng bo'lib, uch yillik raqobatga qarshi bitim amal qilgan bo'lsa-da, faoliyatning katta qismi mazkur cheklovdan ta'sirlanmagan. Sud fikricha, biznes uzluksizligi yo'qotilgan holatda direktorlar 2086-modda asosida biznes "inqirozini" bartaraf etishga oid mexanizmlarni qo'llashlari mumkin edi.

2. Yillik hisobotlarning muntazam tasdiqlanishi aksiyadorlar yig'ilishida dedlok yo'qligini anglatishi hamda A va B toifa aksiyadorlar o'rtasidagi kelishmovchiliklar sud orqali hal etilishi mumkinligi ta'kidlangan.

Apellyatsiya sudining pozitsiyasi

Biroq apellyatsiya sudi boshqa xulosaga keldi. Sudning fikricha, baholash abstrakt tarzda emas, balki **kompaniyaning real operatsion, iqtisodiy-moliyaviy va ishlab chiqarish muhitini hisobga olgan holda** o'tkazilishi lozim.

Sud kompaniya dedlokda ekanini va biznes yuritish yoki bozorga qayta pozitsiyalash bo'yicha real istiqbollar mavjud emasligini ko'rsatuvchi quyidagi asosiy omillarni qayd etdi:

- boshqaruv kengashi darajasida ham, aksiyadorlar yig'ilishida ham mavjud bo'lgan **o'zaro veto holati**, bu esa na biznes faoliyatini rejalashtirishga, na kompaniyani tugatish to'g'risida qaror qabul qilishga imkon bergan; real holatda kompaniya boshqaruvi allaqachon falaj bo'lgan;

- boshqaruv kengashining **korporativ rivojlanish strategiyasi yoki yangi biznes-reja ishlab chiqa olmasligi**;

- turli toifadagi aksiyadorlar o'rtasidagi yuqori darajadagi manfaatlar to'qnashuvi sababli aksiyadorlar yig'ilishining **kompaniya faoliyatini yuritish uchun zarur qarorlarni qabul qila olmasligi**;

- tasdiqlangan moliyaviy hisobotlar aslida **"likvidatsiya balansi"** xarakteriga ega bo'lib, unda:

- daromadlar nol;
- xarajalar esa boshqaruv kengashiga to'lanadigan haq (boshqaruv amalida faol bo'lmasa ham);
- yuridik va notarial xizmatlar;
- administrativ va soliq maslahati;
- auditorlar hay'ati uchun to'lovlar bilan bog'liq bo'lgan sezilarli xarajatlarni o'z ichiga olgan.

Sudning yakuniy bahosi

Shu sharoitlarda kompaniyaning iqtisodiy-moliyaviy holati **muzlagan va qayta tiklanmaydigan** deb topildi. Shuningdek, biznes "inqirozi" rasmiy

belgilanmaganligi sababli, Italiya Inqiroz kodeksidagi mexanizmlarni qo'llashning imkoni bo'lmagan.

Shu munosabat bilan, Milan apellyatsiya sudi kompaniyani **tugatilgan deb e'lon qildi va likvidator tayinladi.**⁴

Ma'lumki, foyda olishni maqsad qilgan korporatsiyalarda uning moliyaviy holati orqali reputatsiyasi ya'ni obro'si belgilanadi. Hozirgi kunda O'zbekiston Respublikasida ham korporatsiya shartnoma tuzishda eng avval kotragent haqida ochiq ma'lumotlar portallari orqali ma'lumotlar to'playd. Bular uning ustav kapitali miqdori bo'yicha, insofsiz ijrochilarning yagona reysterida turishi yoki yo'qligi to'g'risida yoki korporatsiya bilan qanday sud ishlari ko'rilganligi to'g'risidagi ma'lumotlardan iborat bo'lishi mumkin. Agar ushbu ma'lumotlarda tushunmovchiliklar yoki yangi ochilgan iqtisodiy sud ishlari mavjud bo'lgan holatda ular bilan shartnoma imzolash rad etilishi mumkin. Aynan shunga o'xshash holat investitsiya jalb qilish bilan bo'lgan holatda ham kuzatilishi mumkin. Bunda investorlar bitimdan voz kechadi, moliyalashtirish rejasi buzilishi kabi oqibatlarga olib klishi mumkin. Bu yangi faoliyat boshlayotgan korporatsiyalarda jiddiy talofat yetkazadi. Buni **Smith v. Atlantic Properties, Inc.** keysi misolida ko'rish mumkin: 1951 yilda Dr. Louis Wolfson Norwooddagi yer maydonini sotib olib, uni boshqarish uchun Atlantic Properties Inc. korporatsiyasini tashkil ettiradi. U uch nafar sherigiga 25% ulushdan beradi va korporatsiya ustaviga 80% ovoz talab qilinadigan maxsus qoidani kiritadi. Bu qoidaga ko'ra, har bir aksiyador korporativ qarorlarni veto qilish huquqiga ega edi.

Yillar davomida Dr. Wolfson va qolgan aksiyadorlar o'rtasida jiddiy kelishmovchiliklar yuzaga keladi. Wolfson daromadlarni ta'mirlashga yo'naltirishni xohlar, qolgan aksiyadorlar esa dividendlar e'lon qilishni istar edi. Wolfsonning qat'iy veto pozitsiyasi natijasida korporatsiya foydalarini taqsimlamaydi va bu harakat Internal Revenue Service tomonidan "keraksiz daromad to'plash" uchun bir necha yil davomida katta miqdorda jarimalar solinishiga olib keladi.

Aksiyadorlar Wolfsonni sudga beradi. Sud uning o'z vakolatlarini adolatsiz va korporatsiya manfaatlariga zid tarzda ishlatganini aniqlaydi. Natijada Wolfson korporatsiya to'lagan jarimalar va yuridik xarajatlarni qoplashga majbur qilinadi. Sud korporatsiya direktorlariga kelgusida "oqilona dividend siyosati" yuritish bo'yicha ko'rsatmalar beradi.

Ushbu ish aksiyadorning veto huquqidan shaxsiy manfaati uchun foydalanishi fiduciary duty — "eng yuqori darajadagi halollik va sadoqat" tamoyilining buzilishi ekanini ko'rsatadi.⁵

⁴ Deadlock situation a lack of business activities result in the liquidation of a company even if the shareholders meeting . <https://www.rplt.it/en>

⁵ Smith v. Atlantic Properties, Inc. 12 Mass. App. Ct. 201 (1981) 422 N.E.2d 798 PAUL T. SMITH & others vs. ATLANTIC PROPERTIES, INC. & another. Appeals Court of Massachusetts, Suffolk. April 10, 1981. July 6, 1981. Present: HALE, C.J., CUTTER, & BROWN, JJ. Albert F. Cullen, Jr. (David D. Patterson with him) for Louis E. Wolfson. Jeffrey M. Smith for the plaintiffs.

Xulosa qilib aytadigan bo'lsak, "Korporativ qaror qabul qilish jarayonlarida yuzaga keladigan to'siq — ya'ni "dedlok" muammosi — ayniqsa yopiq (close) korporatsiyalar uchun mavjud bo'lgan huquqiy yechimlar ko'pincha yetarli emasligini ko'rsatadi. Aksiyadorlar yoki direktorlar o'rtasida kelib chiqadigan nizolarni ko'pchilik ovozi tamoyili orqali hal qilishni nazarda tutadigan odatiy qonunlarida, shu bilan birga, ustav yoki nizomlar orqali quyidagilarga ruxsat beriladi:

1. qarama-qarshi guruhlar o'rtasida ovoz berish huquqlari yoki direktorlar sonining teng bo'linishi;
2. minoritar aksiyadorlarga veto vakolatlarini berish;
3. aksiyadorlar yoki direktorlar qarorlarini qabul qilish uchun yuqori ovoz talablarini belgilash.

Aksiyadorlar kelishuvida ana shu mexanizmlarning mavjudligi korporativ dedlok yuzaga kelishi ehtimolini sezilarli darajada oshiradi."⁶. Bundan chiqish mexanizmlari qonunchilikda belgilanmasa, muammolar oqimi davom etaveradi.

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⁶ Deadlock in a close corporation: a suggestion for protecting a dissident, co-equal shareholder/ Duke law journal Vol. 1972:653

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ALEKSANDR BYORNS HISOBOTLARIDA XIVA ROSSIYA ZIDIYATLARI

***Annotatsiya.** Ushbu maqolada XIX asrning 30–40-yillarida Xiva xonligi va Rossiya imperiyasi o'rtasidagi keskinlik va mojarolar britaniyalik diplomat va razvedkachisi Aleksandr Byornsning 1837-yilda Britaniya Hindistoni ma'muriyatiga yuborgan hisoboti asosida tahlil qilinadi.*

***Kalit so'zlar:** Aleksandr Byorns, Xiva xonligi, Rossiya imperiyasi, Markaziy Osiyo, Kaspiy dengizi, rus asirlari, harbiy istehkom, savdo siyosati, diplomatik munosabatlar, tarixiy manbalar.*

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CONFLICTS BETWEEN KHIVA AND RUSSIA IN THE ACCOUNTS OF ALEXANDER BURNES

***Abstract.** This article analyzes the tensions and conflicts between the Khiva Khanate and the Russian Empire in the 1830s and 1840s, based on a report sent by British diplomat and intelligence officer Alexander Burnes to the British Indian administration in 1837.*

***Keywords:** Alexander Burnes, Khiva Khanate, Russian Empire, Central Asia, Caspian Sea, Russian captives, military fortifications, trade policy, diplomatic relations, historical sources.*

XIX asr birinchi yarmida Xiva xonligi va Rossiya imperiyasi o'rtasidagi munosabatlar Markaziy Osiyoda geosiyosiy muvozanatning muhim elementi bo'lgan. Aleksandr Byornsning kuzatuvlari ushbu jarayonlarning bevosita guvohlik qilgan manbasi sifatida alohida ahamiyatga ega. Maqolada Byorns bergan ma'lumotlar boshqa tarixiy manbalar bilan taqqoslanib, ularning ilmiy ishonchliligi aniqlanadi.

Aleksandr Byorns 1837-yil 20-oktabrda "Rossiyaning Markaziy Osiyodagi, ayniqsa, Xiva va Hiratga nisbatan nuqtai nazarlari va istiqbollari" nomli Britaniyaning Kalkutta shahridagi Hindiston hukumati kotibi, Fort-Uillyam, janob V. X. Maknaxtenga yuborgan hisobotining 5- xatboshida quydagilarni qayd etadi:

1835-yilda Rossiya hukumati, xivaliklarning chegarani buzish va qilayotgan "tajovuzlariga" chek qo'ya olmagan uchun, ilgari qo'llagan choralardan ham qattiqroq choralar ko'rishga qaror qildi. Ular Kaspiy dengizining sharqiy sohilida,

Astraxon qarshisidagi Mang‘ishloq yaqinidagi bir joyni egallab, qo‘ltiqdagi qo‘nish joyiga qarovchi bir qal’a qurdilar va hozirgacha uni egallab turibdilar. Taxmin qilish mumkinki, bu qadam Xiva hukmdori Olloquli xonni juda g‘azablantirdi, u bunga qattiq norozilik bildirdi; bu yerda muvaffaqiyatga erisha olmagach, avvalgidan ham ko‘proq talonchilar yuborib, qasos olish bilan tahdid qildi. U, shuningdek, Buxoro amiri va Qo‘qon xoniga murojaat qilib, o‘z mamlakati bo‘ylab sodir etilayotgan adolatsiz bosqin haqida shikoyat qildi va agar o‘z vaqtida qarshilik ko‘rsatilmasa, ertangi kuni bu dushman ularning o‘zlariga ham zarar yetkazishi mumkinligini aytib, yordam so‘radi. Ular bu talabning adolatlilikini tan olishdi, lekin hech qanday yordam yubormadilar.[1]

Yuqoridagi ma’lumotni boshqa tarixiy manbalarda ham uchratishimiz mumkin. Xususan 1819-yilda rus hukumati tomonida Xivaga yuborilgan armiya zobiti N.Muravyov ham «Путешествие в Хиву» asarida Kaspiy bo‘yidagi rus harbiy punktlarining Xiva tomonidan “zararli harakat” sifatida ko‘rilganini tasdiqlaydi. [2]

Herman Vamberi ham “Travels in Central Asia” asarida Xiva Kaspiy dengiziga yaqin joyda mustahkam rus istehkomlaridan doimiy ravishda xavotirlanganini yozadi. [3]

Shuningdek mahalliy tarixchilardan Muhammad Yusufbek Bobojonbek o‘g‘li Bayoniy Xiva xonlari Rossiya bilan chegaradagi nizolarni “o‘z mustaqilligiga tahdid” sifatida ko‘rganligi hamda Rossiyaning qo‘shni davlatlar ichki ishlariga aralashuvini keskin tanqid qiladi. [4]

Yuqoridagi manbalarning barchasida Rossiyaning Kaspiy bo‘yida istehkom qurishi Xiva–Rossiya ziddiyatining asosiy sabablaridan biri sifatida tasvirlangan.

Hisobotning 6-xatboshida Xivadagi rus asirlari haqida yozadi: Ruslar Kaspiyning sharqiy sohilida o‘zlarini mustahkamlaganlaridan so‘ng, Astraxondan to‘rtta kichik kemada bir guruh odam, mish-mishlarga ko‘ra, ov qilish (shikar) uchun, lekin ehtimol yuzaga kelishi mumkin bo‘lgan vaziyatni aniqlash maqsadida kelishdi. Ularning harakatlari haqidagi ma’lumot Urganch xoniga yetgach, u talonchilik (Allaman) ekspeditsiyasini yuborib, ularning barchasini (taxminan 120 kishi, ulardan ikkitasi yuqori martabali kishilar edi) asir oldi. Hammasi Urganchga olib kelindi; so‘z etilayotgan ikkita shaxs xon tomonidan ushlab qolindi, qolganlari qul sifatida sotildi; ulardan ba’zilari Buxoro va Qo‘qonga yuborilgan va men Samarqand atrofidan bir kishini uchratganman, u ularning bir guruhini ayrim otlar evaziga almashganligini bilardi! Imperator bunday harakatlarga qarshi darhol norozilik bildirdi va asirlarni qaytarib berishni talab qildi, ammo xon ularni topshirishdan bosh tortdi va ruslar uning mamlakati hududiga zo‘ravonlik bilan qal’a qurganliklarini, shu sababli u o‘z tahdidiga binoan qasos olib, ushbu guruhni ushlab qolganini aytdi. [5]

XVIII asr oxiri – XIX asr o‘rtalariga tegishli, rasmiy hujjatlar, diplomatik yozishmalar, chegaraviy hisobotlar, harbiy ekspeditsiya ma’lumotlari to‘plami bo‘lgan, Orenburg chegarasi ekspeditsiyasi ish faoliyati davomida tuzilgan rasmiy harbiy-ma’muriy hisobotlar, turli yillarda bir nechta rus harbiy xizmatchilari, elchilar va chegaradosh idora amaldorlari tomonidan yozilgan “Записки

Оренбургской экспедиции” архив to‘plamida ham 1836–1839-yillarda Xiva tomonidan 300 dan ortiq rus fuqarolarining asirga olinishi qayd etilgan. [6]

Ogahiy “Zubdat ut-tavorix” asarida bu voqealarni Xiva manfaatlariga zarar yetkazgan tashqi siyosiy bosimlar bilan bog‘laydi. Xon Olloquli asirlarni Rossiya bilan muzokara vositasi sifatida ko‘rganini yozadi.[7]

Yuqoridagi manbalardan ko‘rinib turibdiki, rus asirlari bir qancha muddat XIVada saqlangan va qul bozorlarida sotilgan, rus asirlaridan esa Xiva hukumati o‘z manfaatlari yo‘lida foydlangan.

Ushbu hisobotning 7-xatboshida esa yarmakarlar va savdo hamkorligi haqida yozadi. Vaziyat shu holatda davom etdi, to Imperator Nikolay o‘tgan yili iyul oyida shaxsan Nijniy Novgoroddagi yirik yarmarkaga tashrif buyurmaguncha. Uning birinchi harakatlaridan biri Markaziy Osiyo savdogarlarining hammasini o‘z huzuriga chaqirib, o‘zlarining manfaatlarini qanday rag‘batlantirish mumkinligi haqida fikr bildirishlarini so‘rash edi. O‘ta og‘ir bojlari masalasi ko‘tarilgach, u tergov chog‘ida darhol bojlarni sezilarli darajada (ba’zilarining aytishicha, butun miqdorning to‘rtidan bir qadar) qisqartirishni buyurdi. U bu haqda Buxoro amiri va Qo‘qon xoniga sovg‘alar va do‘stona xatlar yuborib xabar berdi. Bu paytda Imperator Buxoro va Kobuldan kelgan savdogarlarni juda muloyimlik va iltifot bilan kutib oldi, ularning tashabbuskorligi uchun ularni maqtadi va yarmarkada ular hisobiga imtiyozlar berilganini aytdi. Bunday imtiyozlarning berilganligi haqidagi fakt, men ko‘rayotganimdek, Frankfurter Gazetida ham tilga olingan. Biroq, Urganchdan kelgan savdogarlarga butunlay boshqacha munosabat ko‘rsatildi. Hazratlari ularning hammasini (jami 46 kishi, ulardan ba’zilar ancha boy va Rossiyada uzoq vaqt savdo qilgan kishilar) ushlab qolish va ularning molidunyoqlarini hukumat amaldorlari tomonidan musodara qilishni buyurdilar. Savdogarlar bunday harakatlarga norozilik bildirdilar va ularning Xiva xoni ishlarida ishtirok etmasliklarini, shuning uchun ham javobgarlik tortilmasligini aytishdi. Imperator ularning iltimoslariga e’tibor bermadi va ularni Moskvaga yuborishni buyurdi. [8]

“Kichik Osiyo va Eronning otasi” deb atalgan mashhur ingliz olimi, Britaniya sharqshunosi, diplomat, ellinist, va tarixchi Ser Henry Creswicke Rawlinson (1810–1895) 1843-yil, Londonda nashr etilgan “Notes on Central Asia” asarida Rossiya Markaziy Osiyo bozorlarini to‘liq nazorat qilishni maqsad qilgani aytiladi, hamda yarmarka siyosati Rossiyaning iqtisodiy ta’sir vositasi sifatida ko‘rsatiladi. [9]

Herman Vamberi esa, Xiva, Buxoro va Qo‘qonning Rossiyadan iqtisodiy jihatdan qaram bo‘lib borayotgani ta’riflangan. Rossiya mahalliy hukmdorlarni bo‘ysundirish uchun savdo-siyosiy bosimdan faol foydalanayotganini qayd etgan. [10].

Muhammad Yusuf Bayoniy va Muhamad Rizo Ogahiy o‘z asarlarida rus savdogarlariga imtiyozlar berilishi mahalliy iqtisodiy mustaqillikka xavf sifatida baholanganlar. [11]

Byorns aytgan siyosiy-harbiy bosim boshqa tarixiy manbalarda ham to‘liq tasdiqlanadi. Rossiya iqtisodiy bosim orqali Markaziy Osiyoda o‘z ta’sirini kuchaytirib borgan

Hisobotning 8-xatbshida esa ikki davlat o'rtasidagi diplomatic aloqalarga to'xtaladi. Bu voqealar haqidagi xabar Xivaga etib borishi bilan, Xon Buxoro va Qo'qon hukmdorlariga yana elchi yuborib, yordam va maslahat so'radi. Ular yaqinda berilgan imtiyozlardan keyin aralashishga istaksiz edilar, lekin ruslarning savdogarlarga nisbatan qattiq harakatini hisobga olgan holda, Buxoro amiri ushlab qolinganlarni ozod qilish va ularning mol-mulkini qaytarish uchun muzokaralar olib borish maqsadida Imperatorga vakil yuborishga rozi bo'ldi. Buxorodan yangi kelgan karvon shu yerda elchi hali qaytmaganligi, lekin ruslar savdogarlarni qaytarishni rad etganliklari va, aslida, ularni Sibirga jo'natib bo'lganliklari haqida xabar olib keldi. Bu xabar Turkistonda juda norozilik bilan qarshilandi va hozircha o'sha mamlakat bilan Rossiya o'rtasidagi barcha savdoni to'xtatishga olib keladi. Hatto Qo'qon, Buxoro va Xiva hukmdorlari ittifoq tuzib, Orenburg, Qozon, Troitsk va Irbit yo'nalishida yoki o'z mamlakatlarining bevosita shimolidagi joylarda ruslar va ularning mol-mulkini ushlab qolish choralarini ko'rishlari mumkinligi aytilmoqda. Biroq, Rossiyaning Turkistondagi maqsadlariga erishish istagi meni shunga ishontirmoqdaiki, u ushbu kichik musulmon davlatlarining g'azabini pasaytirish yo'llarini izlaydi, ammo nizoning tabiatidan kelib chiqqan holda, bu juda qiyin bo'ladi, chunki avval Urganch xonini tinchlantirish kerak; u Rossiyaga olib boradigan katta karvon yo'lini nazorat qiladi, u rus savdogarlarining Buxoroga kelishining oldini oldi va shuningdek, musulmon savdogarlarining Rossiyaga o'tishiga to'sqinlik qila oladi. Ehtimol, Xivaning o'rnini Rossiya imperatorini bu ashaddiy adolatsiz choralarga undagan. Biroq, bu Forsni ham tinchlantiradi, chunki uning minglab fuqarolari Xivada qul qilingan, shuning uchun ushbu kichik davlatga qarshi qilingan har qanday harakat Tehron hukumati uchun quvonchli bo'lishi kerak; bu holda ikkalasining maqsadlari ham bir xil, Shohning hazratlari, shuningdek, cho'lga harbiy ekspeditsiya yuborishni o'ziga ma'qul ko'rmasligi mumkin va savdogarlarni ushlab qolish xonning manfaatlariga tegishli bo'lgani uchun unga ta'sir qilish vositasi bo'lishi mumkin.[12]

Bayoniy "Shajarayi Xorazmshohiy" asarida xonliklarning o'zaro ittifoqlari vaqtinchalik va siyosiy vaziyatga qarab bo'lganligi, Qo'qon va Buxoro ko'pincha Xivaga yordam berishdan tiyilganligini qayd etgan. [13] Herman Vamberi esa, Markaziy Osiyo xonliklari hamisha o'z manfaatini birinchi o'ringa qo'yganligi, Xiva-Buxoro o'rtasida ko'p hollarda ishonchsizlik bo'lganligini qayd etgan.[14]

Byorns ta'riflaganidek, Xiva boshqa xonliklardan yordam ololmagan bu tarixiy manbalarda ham tasdiqlangan. Xiva xonligining Rossiya bilan mojarolari XIX asrning markaziy siyosiy voqealaridan biri bo'lib, keyinchalik Rossiyaning 1873-yil Xivani zabt etishiga olib borgan.

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CHO'LLANISH TUSHUNCHASI VA UNGA BERILGAN TARIFLAR TO'G'RISIDA

Annotatsiya. Maqolada cho'llanish jarayoni, uning keltirib chiqaruvchi sabablar va oqibatlari, olimlar tomonidan cho'llanishga berilgan turli tariflar o'rganilgan. Budan tashqari, tadqiqot ishida cho'llanish va qurg'oqchilikka qarshi kurashish bo'yicha innovatsion loyihalarni ishlab chiqarishni keng targ'ib qilish, mahalliy aholining cho'llanish va qurg'oqchilikka qarshi kurashish bo'yicha xabardorligini oshirish, hamda yerlardan barqaror foydalanishni amalga oshirish dasturlarini ishlab chiqib va amaliyotda qo'llashni kabi muammolar tadqiq qilingan.

Tayanch tushunchalar. arid, cho'llashish, degradatsiya, ko'lam, yaylov, ekosistema, geosistema, eroziya, ekologik qochoq, ekotizim, intensiv, gumus.

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ON THE CONCEPT OF DESERTIFICATION AND THE DEFINITIONS GIVEN TO IT

Abstract: The article examines the process of desertification, its causes and consequences, as well as the various tariffs charged by scientists for desertification. In addition, the research work explored issues such as the widespread promotion of innovative projects to combat desertification and drought, raising awareness of the local population about combating desertification and drought, as well as the development and practical application of programs for the introduction of sustainable land use. Basic concepts. drought, desertification, degradation, scale, grazing, ecosystem, geosystem, erosion, ecological desertion, ecosystem, intensive, humus.

Key words: drought, desertification, degradation, scale, pastures, ecosystem, geosystem, erosion, ecological desertion, ecosystem, intensive,

Kirish. Cho'llanish - geografik va ekologik jarayon bo'lib, quruq va yarim quruq hududlarda tuproqning yemirilishi va unumdorligining yo'qolishi, ulardagi organik hayotning barcha shakllari yomonlashadi va natijada tabiiy-iqtisodiy imkoniyatlarning pasayib ketishiga sabab bo'ladi. Bu jarayon inson faoliyati va

iqlim o'zgarishlari ta'sirida yuzaga keladi va cho'l hududlarining kengayishiga olib keladi. Cho'llanish tabiiy va antropogen (inson faoliyati) omillar ta'siri natijasida paydo bo'ladi. Eng asosiy omillar qatoriga o'rmonlarning kesilishi, iqlim o'zgarishi, noto'g'ri sug'orish, chorvachilikning ko'payishi va boshqalar kiradi. Oqibatda cho'llanish ta'sirida qishloq xo'jaligi ekin maydonlari va yaylovlar yomonlashadi, bu esa qishloq xo'jaligi va ekotizimlarga salbiy ta'sir ko'rsatadi.

Hozirgi vaqtda insoniyat oldida turgan yirik ekologik, ijtimoiy va iqtisodiy muammolardan biri - cho'llanish jarayonidir. Ushbu jarayonni keltirib chiqaruvchi asosiy omillardan biri bu aholi sonining uzluksiz ko'payib borishi va texnik taraqqiyot cho'llanishni ko'lami bo'yicha kengayishi va jadallashishiga ta'sir ko'rsatuvchi asosiy omil hisoblanadi. Albatta bu joyning relyef tuzilishi bilan bevosita bog'liqdir. Cho'llanish jarayoni deyarli barcha qit'alarda, ko'proq Afrika, Osiyo, Avstraliya va Janubiy Amerikaning qurg'oqchil iqlimli hududlarda kuzatiladi.

Asosiy qism. Bu jarayon tekisliklarda tog' va tog' oldi hududlarda turlicha ko'rinishda namoyon bo'ladi. Chunki ushbu hududlarga atmosfera yog'inlarining tushishi va ulardan aholining foydalanish darajasi va iqlim elementlarining ham ta'siri doirasi va ko'lami xar hil bo'ladi. Tekislik hududlaridagi yerlardan dehqonchilikda (sug'orma) foydalanilsa, tog' va tog' oldi hududlaridagi yerlardan asosan dehqonchilik (obikor), yaylov xo'jaligida, tog' kon sanoati va boshqa maqsadlarda foydalaniladi. Shuning uchun bugungi kunda asosiy antropogen yuk tog' va tog' oldi hududlariga tushmoqda. Respublikamizning uncha katta bo'lmagan janubiy-sharqiy qismi tog' va tog' oldi qismlaridan iborat bo'lsada foydalanish darajasiga ko'ra yuqori o'rinda turadi. Natijada yillar davomida rejasiz foydalanish oqibatida salbiy oqibatlarga olib kelmoqda.

Respublikamizda yuz berayotgan cho'llanish jarayoni uni oldini olish va unga qarshi chora-tadbirlar ishlab chiqish nafaqat tadqiqotchilar balki davlat ahamiyatiga ega bo'lgan muammolardan biridir. O'zbekiston Respublikasini yanada rivojlantirish bo'yicha Harakatlar strategiyasida¹ "odamlarning ekologik xavfsiz muhitda yashashini ta'minlash" va atrof-tabiiy muhit, aholi salomatligi va genofondiga ziyon yetkazadigan ekologik muammolarni oldini olish" yuzasidan muhim vazifalar belgilab berilgan. Shuningdek, O'zbekiston Respublikasi Prezidentining "O'zbekiston Respublikasida cho'llanish va qurg'oqchilikka qarshi kurashish bo'yicha ishlar samaradorligini oshirish chora-tadbirlari to'g'risidagi" 2019 yil 22 fevraldagi PK-4204 sonli qarori, O'zbekiston Respublikasi Prezidentining 2019 yil 20 maydagi 538-son "Yaylovlar to'g'risidagi" qonuni va mazkur faoliyatga tegishli boshqa me'yoriy-huquqiy xujjatlarda belgilangan vazifalarni amalga oshirishda tabiiy geografik tadqiqotlar olib borish va ularni amaliyotga tadbiiq qilish ishlarini amalga oshirish zarurligini ko'rsatmoqda.

Bugungi kungacha cho'llanish uning kelib chiqishi sabablari, oqibatlari oldini olish choralari to'g'risida ilmiy maqolalar, loyihalar, ilmiy tadqiqot ishlari olib borilgan va olib borilmoqda. Ammo ularning barchasi maqola va dissertatsiyalar ko'rinishida qog'ozlarda qolib ketmoqda. Cho'llanish jarayoni bir - ikki oy yoki bir - ikki yil davomida yuz beradigan tabiiy geografik jarayon emas.

Tabiatda bunday tabiiy geografik jarayonning yuz berishi uchun ma'lum bir vaqt va davr kerak bo'ladi. Albatta ushbu davrda bo'layotgan hodisani uzluksiz monitoringini olib borish orqali natijani ko'rish mumkin.

Tadqiqotchilar ma'lumotlariga ko'ra cho'llanish jarayoniga bugungi kunda tabiiy va antropogen omillar ta'sir ko'rsatmoqda. O'rganilayotgan hududga qarab bu ikki omil va ularning indikatorlari turlicha ta'sir ko'rsatadi. Tabiiy omillardan asosan shamol, yog'in miqdori asosiy indikatorlar hisoblansa, antropogen omillarga aholi sonining ortishi bilan bog'liq tog'li hududlarda chorva mollari sonining ortishi, dehqonchilik va boshqalar.

Cho'llanish nafaqat, shu jarayon yuz berayotgan hududlarga ta'sir qiladi, balki boshqa hududlarda ham suv resurlarining, biologik xilma-xillikning pasayishiga va iqlimning o'zgarishiga olib keladi. Bu esa dunyoning ko'pgina hududlarida oziq-ovqat mahsulotlari narxlarining oshishiga, bozor iqtisodi mexanizmlarining buzilishiga, ijtimoiy va siyosiy voqeylikning oshishiga sabab bo'ladi.

Cho'llanish o'zi nima? Olimlar cho'llanish jarayoniga qanday ta'riflar bergan. Cho'llanish jarayoni deganda, arid mintaqalarda landshaftlarning ya'ni ekosistemalarning yemirilishiga olib keluvchi tabiiy geografik va antropogen omillarning yig'indisi, organik hayot formalarining degradatsiyalashuvi va bu hududlarda tabiiy-iqtisodiy potensialning pasayib ketishi nazarda tutiladi. Bunday hududlarda aholining yashash darajasiga, sog'ligiga katta ta'sir ko'rsatadi, oqibatda aholining asosiy qismining majburiy migratsiyasiga olib keladi.

Cho'llanish atamasiga berilgan ta'riflar tuzilishi bo'yicha turlicha ko'rinishda bo'lishiga qaramasdan ularning mazmuni bir-birlariga yaqin. Respublikamiz va xorijlik bir qator olimlar tomonidan cho'llanish bo'yicha tadqiqot ishlari olib borilgan va o'rganilgan hududga nisbatan cho'llanishga turlicha ta'rif berilgan.

Jumladan, S.B.Abbosov Cho'llanish bu - atrof muhitdagi hosildor yerlar hosilining kamayishi, degradatsiyalanishi iqlim quruqlashishi, cho'l hududlarning kengayishidir. Umumiy ta'rif beradigan bo'lsak ekosistemalar muvozanatining buzilishidir.

L.A.Alibekov Cho'llanish qurg'oqchil zonalar tabiiy muhit degradatsiyasining kompleks jarayonlari bo'lib, unga tabiiy o'simliklarning yo'qotilishi, tuproqdagi suv va shamol eroziyasi tuproq sho'rlanishi va gumusning kamayish provardida tabiiy ekotizimda biologik mahsuldorlikning kamayishidir.

U.Q. Nazarov cho'llanish landshaft ekotizimlarining kambag'allashuvi, ya'ni ularning biologik mahsuldorligining pasayishidir. Unda tuproqlarning sho'rlanishi ortadi, suv va shamol eroziyasi kuchayadi.

BMTning cho'llanishga qarshi kurashish Konvensiyasi cho'llanish bo'yicha bajarilgan tadqiqotlar va berilgan ta'riflarni umumlashtirib cho'llanishni quyidagicha ta'riflaydi. "Cho'llanish deb - turli omillar, shu jumladan iqlim o'zgarishi va inson faoliyati ta'sirida arid, semiarid va subgumid regionlarda yerlar degradatsiyasiga" aytiladi. Bu ta'rifda yerlar so'zining ma'nosiga tuproqlar mahalliy suv resurslari, yer yuzasi, o'simliklar qoplami (yoki qishloq xo'jalik ekinlari) kiradi.

Dregne (1976) "cho'llanishga arid, semigumid va ba'zi subgumid rayonlarda inson faoliyati va qurg'oqchilikning birga ta'siri tufayli ekosistemalarda ro'y berayotgan jarayondir. Bu jarayon tufayli ekosistemalarda o'simliklar hosildorligi kamayadi, biomassa makro va mikrofaunalar va floralar o'zgaradi, tuproq qoplaminig yemirilishi kuchayadi, aholining ish bilan band bo'lishiga xavf tug'iladi" deb ta'rif beradi.

Le Houerou H.N (1972) cho'llanishi – inson faoliyati bilan bevosita bog'liq bo'lib, iqlim o'zgarishining ta'siri kam degan fikrni bildiradi. Uning yozishicha cho'llanish demografik bosimning yoki yukning oqibati bo'lib u chorva mollarning ko'p boqilishi, qumoq tuproqli yerlarda dehqonchilikda antropogen yukning oshishi, daraxtlarning o'tin uchun qirqib yuborilishi, dehqonchilikda mehanizatsiyalashgan ishlovning kengayib borishi bilan bog'liq deb tushuntiradi.

B.G.Rozanov va I.S. Zonn (1980) cho'llanishga quyidagi ta'rifni beradi. "Cho'llanish - quruq o'lkalarda o'simlik va tuproq qoplaminig qayta tiklanmaydigan darajada o'zgarishi bo'lib, u hududning yanada aridlanishi va biologik mahsuldorlikning kamayishiga olib keladi, natijada eksterimal holatlarda hududning biosfera potentsiali to'liq buzilib uni cho'lga aylantiradi."

Ularda cho'llanish arid, semiarid va qurg'oqchil subgumid regionlarda inson faoliyati va tabiiy omillar ta'sirida hosil bo'layotgan jarayondir deb ta'riflashadi. So'zsiz, cho'llanish jarayoniga tabiiy sharoitning, ayniqsa arid iqlimning ta'siri katta. Arid iqlim sharoitida hosil bo'lgan cho'llanish tez namoyon bo'ladi va ularning tabiiy holda tiklanishiga ancha vaqt ketadi. Namgarchilik yetarli bo'lgan sharoitda cho'llanish jarayonining jadallashuvi inson xo'jalik faoliyati bilan bog'liq. Shu jihatdan Le Houerou H.N (1972) cho'llanish demografik bosimning oqibatidir deb ta'kidlagani juda o'rindir. Albatta bu ta'riflar barchasi to'g'ri berilgan, chunki har bir ta'rifning asosida o'simlik qoplaminig kambag'allashuvi bilan bevosita bog'liqdir.

Dunyo miqyosining asosiy qismida ham cho'llanishning jadal rivojlanib borishiga aholi sonining uzluksiz ko'payishi va shunga bog'liq holda landshaftlarga antropogen yukning oshib borishi bilan bog'liq jarayon sabab qilib ko'rsatilmoqda. YUNEP ma'lumoti bo'yicha antropogen ta'sir tufayli hosil bo'lgan saxrolar hozirda 9 mln. kv.km. dan oshdi va har yili qishloq xo'jaligida ishlatilayotgan yerlarning 7 mln. gektari cho'llanishga uchramoqda.

Arid hududlar dunyoda quruqlikning 30% maydonini egallaydi, shu hududlarda 145 mln. gektar sug'oriladigan, 170 mln. gektar haydaladigan bahorikor yerlar, hamda 3,6 mlrd gektar yaylovlar mavjud. Ushbu hududlarda yashaydigan aholi soni 860 mln dan ortiq bo'lib, u dunyo aholisining qariyb 15% ni tashkil qiladi. Cho'llanish jarayoni jadal rivojlanayotgan dunyoning yirik arid hududlaridan biri Markaziy Osiyodagi davlatlar hisoblanib, bu yerda 70 mln dan ortiq aholi yashaydi. Aholining uzluksiz ko'payib borishi va tabiiy resurslardan intensiv foydalanish tufayli bu hududda nafaqat tekisliklarda, balki tog'larda ham cho'llanish kuchayib borayotganligi yaqqol namoyon bo'lmoqda.

Jahon miqyosida arid iqlimli hududlarda ekologik vaziyatning keskinlashib borishi, landshaftlarga ekologik yukni me'yorlashtirishni, monitoring ishlarini

uzluksiz amalga oshirib borishni, cho'llanishga qarshi ilg'or texnologiyalarni qo'llashni, yaylov kadastrini ishlab chiqishni, turli tabiiy jarayonlarni aks ettiruvchi va bashoratlovchi mavzuli kartalarni tuzishni vaqt taqozo etmoqda.

Xulosa. Respublikamizda ham cho'llanish jarayoni tekislikdan balandlik qarab tobora o'sib borayotganligini hammamizga ayon jarayondir. Tog' va tog' oldi hududlarida ro'y berayotgan cho'llanish jarayonining ko'lami, intensivligi shuni ko'rsatmoqdaki, agarda bu jarayonni sekinlashtirish, oldini olish, to'xtatish tadbirlari ishlab chiqilmasa bir necha o'n yillar ichida tog' landshaftlarining katta qismi yalong'och qoya toshli cho'llarga aylanadi va buning ekologik oqibati juda xavfli bo'ladi. Bu o'ta dolzarb ekologik muammo uchun cho'llanish dinamikasini miqdoriy baholaydigan dala eksperimental ishlari olib borish, yangi aerokosmik, geoinformatsion, kartografik va boshqa zamonaviy metodlardan foydalangan holda cho'llanishni oldini olish bo'yicha kompleks tizimli yondashish zarur.

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TARBIYAVIY JARAYONNI RAQAMLI TA'LIM BILAN INTEGRATSIYA QILISHNING ZAMONAVIY YONDASHUVLARI (MDH MAMLAKATLARI TAJRIBASI ASOSIDA)

Annotatsiya. Ushbu maqolada raqamli ta'lim tizimi bilan tarbiyaviy jarayonni integratsiya qilishning zamonaviy yondashuvlari yoritilgan. Raqamli resurslar, multimedia vositalari, sun'iy intellekt, virtual muhitlar va gamifikatsiya orqali ma'naviy-axloqiy tarbiya samaradorligini oshirish bo'yicha MDH mamlakatlari tajribasi tahlil qilingan. Raqamli tarbiya modeli o'quvchilarda raqamli madaniyat, mas'uliyat, axloqiy xulq-atvor va ijtimoiy kompetensiyalarni shakllantirishga xizmat qilishi asoslab berilgan.

Kalit so'zlar: raqamli ta'lim, tarbiya, digital tarbiya, axloqiy kompetensiya, raqamli madaniyat, MDH tajribasi, gamifikatsiya, multimediya resurslari, sun'iy intellekt, raqamli pedagogika.

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MODERN APPROACHES TO INTEGRATING THE EDUCATIONAL (UPBRINGING) PROCESS WITH DIGITAL LEARNING (BASED ON THE EXPERIENCE OF CIS COUNTRIES)

Annotation. This article examines modern approaches to integrating the educational (moral upbringing) process with the digital learning system. The study analyzes CIS countries' experience in using digital resources, multimedia tools, artificial intelligence, virtual environments, and gamification to enhance the effectiveness of moral and ethical education. It is justified that the digital upbringing model contributes to the development of digital culture, responsibility, ethical behavior, and social competencies among learners.

Keywords: *digital education, upbringing, digital upbringing, moral competence, digital culture, CIS experience, gamification, multimedia resources, artificial intelligence, digital pedagogy.*

Kirish. Bugungi raqamli transformatsiya sharoitida tarbiya jarayonini an'anaviy metodlar bilan tashkil etish yetarli emas. MDH mamlakatlarining ta'lim tizimida raqamli pedagogika tez rivojlanar ekan, tarbiya jarayonini raqamli muhitga moslashtirish zaruratga aylandi. Yangi raqamli vositalar o'quvchilarda ijtimoiy mas'uliyat, axloqiy qarashlar, madaniy ong va shaxsiy fazilatlarni shakllantirishda samarali vosita bo'lib xizmat qilmoqda.

Raqamli transformatsiya jarayonlari tobora jadallashar ekan, ta'lim tizimida tarbiyaviy jarayonni modernizatsiya qilish muhim pedagogik vazifaga aylanmoqda. Raqamli ta'lim vositalari, multimedia texnologiyalari, sun'iy intellekt va gamifikatsiya elementlari o'quvchilarda nafaqat bilim, balki ma'naviy-axloqiy fazilatlarni shakllantirishda ham yuqori samaradorlik ko'rsatmoqda. Zamonaviy pedagogika fanida tarbiya jarayonining raqamli muhitga moslashtirilishi "digital pedagogy", "edutech-based moral education", "virtual upbringing ecosystem" kabi tushunchalar bilan izohlanadi. Raqamli ta'lim nafaqat bilim berish, balki o'quvchilarda ijtimoiy-madaniy kompetensiyalar, axloqiy qarashlar va ma'naviy qadriyatlarni shakllantirishga xizmat qilishi zarurligi ta'kidlanadi.

TPACK, SAMR va DigCompEdu kabi yondashuvlar tarbiyaviy jarayonni ham integratsiyalash imkonini beradi. Xususan, TPACK modeli texnologiya–pedagogika–kontent uyg'unligini ta'minlab, tarbiyaviy mavzularni raqamli shaklda samarali yetkazish uchun nazariy asos bo'lib xizmat qiladi.

MDH mamlakatlari tajribasi shuni ko'rsatadiki, raqamli tarbiya modeli o'quvchilarning raqamli madaniyatini, mas'uliyatli onlayn xulq-atvorini, ijtimoiy faolligini hamda media savodxonligini rivojlantirishga keng sharoit yaratadi. MDH davlatlari ta'lim tizimida so'nggi yillarda raqamli tarbiya konsepsiyasi alohida yo'nalish sifatida shakllanmoqda. Masalan:

Rossiya — "Tsifrovaya shkola", "Kiberbezopasnost dlya detey", "Raqamli madaniyat" modullari orqali maktab o'quvchilarida etik onlayn xulq-atvor, mas'uliyat va ijtimoiy faollikni rivojlantirishga e'tibor qaratadi.

Qozog'iston — "BilimLand", "Onlayn Mektep", "Qamal Online Safety" kabi platformalarda tarbiyaviy kontentni multimedia shaklida taqdim yetadi.

O'zbekiston — "ZiyoNet", "EduMarket", "Madaniyat.uz", "OneID ta'lim ekotizimi" orqali raqamli tarbiya mavzularini interaktiv darslar, videolektsiyalar va virtual treninglar asosida joriy etmoqda.

Ta'lim jarayonini raqamlashtirish tarbiya sifatini oshirish uchun qulay imkoniyatlar taqdim etadi: o'quvchi shaxsiga yo'naltirilgan individual yondashuv, real va virtual muhitlarda axloqiy-ijtimoiy vaziyatlarni modellashtirish, interaktiv muloqotning kuchayishi, ota-ona-maktab hamkorligining kengayishi, tarbiyaviy kontentning oson va tizimli tarqatilishi shular jumlasidandir. Raqamli resurslar yordamida berilgan axloqiy-ijtimoiy vazifalar o'quvchilarning mustaqil fikrlashi,

ijtimoiy faolligi, mas'uliyatlilik, hamkorlik va empatiya kabi fazilatlarni shakllantirishga xizmat qiladi.

Shu bilan birga, raqamli tarbiya jarayonida yuzaga kelishi mumkin bo'lgan raqamli qaramlik, nojo'ya kontent, onlayn xavfsizlik muammolari ham o'z vaqtida bartaraf etilishi lozim. Buning uchun MDH mamlakatlari o'rtasida yagona raqamli tarbiyaviy platforma yaratish, o'qituvchilarni raqamli pedagogika bo'yicha muntazam tayyorlash, oilalarda raqamli madaniyatni yuksaltirish bo'yicha qo'llanmalar ishlab chiqish muhim ahamiyatga ega.

Umuman olganda, tarbiyaviy jarayonni raqamli ta'lim bilan integratsiya qilish — kelajak avlodning ma'naviy va intellektual rivoji uchun strategik zaruratdir. Zamonaviy raqamli texnologiyalar yordamida tarbiyaviy jarayonni yangi bosqichga ko'tarish, o'quvchilarning shaxsiy va ijtimoiy kompetensiyalarini kompleks rivojlantirish mumkin. Bu esa nafaqat ta'lim tizimining sifat darajasini oshiradi, balki jamiyatning raqamli va ma'naviy taraqqiyotiga keng hissa qo'shadi.

1. Raqamli ta'lim sharoitida tarbiyaning yangi paradigmasi

Raqamli ta'lim faqat bilim berish emas, balki o'quvchilarda raqamli madaniyat, raqamli mas'uliyat, media savodxonlik, axloqiy me'yorlarga rioya qilish kabi fazilatlarni shakllantirishda muhim rol o'ynaydi. Bu jarayonda quyidagi tamoyillar asos bo'ladi:

- tarbiya va ta'limning integratsiyasi;
- raqamli identifikatsiya va onlayn etika madaniyati;
- xavfsiz internet tamoyillariga o'rgatish.

2. Raqamli vositalar orqali tarbiyaviy jarayonni tashkil etish

2.1. Multimedia kontentlar

Interaktiv videolar, raqamli hikoyalar, virtual sahnalar axloqiy g'oyalarni chuqurroq anglashga yordam beradi.

2.2. Sun'iy intellekt asosidagi tarbiya

AI asosida yaratilgan tahlil vositalari o'quvchining raqamli xulq-atvori va ijtimoiy kompetensiyalarini baholashga imkon beradi. AI o'quvchi psixotipiga mos tarbiyaviy tavsiyalar beradi, individual rivojlanish trayektoriyasini yaratadi, ijtimoiy-emotsional holatni monitoring qiladi.

2.3. Gamifikatsiya

Badge, reyting, rag'batlantiruvchi o'yin topshiriqlari orqali halollik, hamkorlik, mas'uliyat kabi fazilatlar mustahkamlanadi. Ball to'plash, reytinglar, virtual mukofotlar orqali mas'uliyat, odob, hamkorlik, halollik kabi sifatlar mustahkamlanadi. Gamifikatsiya o'quvchini jarayonning faol ishtirokchisiga aylantiradi.

3. MDH mamlakatlari tajribasi

- Rossiya: "Цифровая среда воспитания" loyihasi;
- Qozog'iston: BilimLand platformasidagi tarbiyaviy bloklar;
- O'zbekiston: Ziyonet, Kundalik orqali ma'naviy-axloqiy kontent.

4. Oila-maktab-jamiyat uchligi va raqamli tarbiya ekotizimi

Raqamli zamonda tarbiya jarayonining asosiy subyektlari bo'lgan oila, maktab va jamiyat o'zaro raqamli aloqadorlik asosida faoliyat yuritadi. Onlayn

monitoring tizimlari, ota-onalar platformalari, “Raqamli kundalik”, elektron portfoliolar va ota-ona uchun mas’uliyatli raqamli foydalanish bo’yicha metodik qo‘llanmalar ushbu hamkorlikni mustahkamlaydi.

Bunday ekotizimning afzalliklari: o‘quvchi faoliyatining shaffof nazorati, tarbiyaviy natijalarning real vaqt rejimida kuzatilishi, ota-onaning tarbiyadagi ishtiroki kuchayishi, jamiyatning ijtimoiy mas’uliyatini oshiruvchi raqamli loyihalarning ko‘payishi.

5. Raqamli tarbiya jarayonida yuzaga keladigan xavflar va ularni bartaraf etish mexanizmlari

Raqamli tarbiyaning ijobiy imkoniyatlari bilan bir qatorda quyidagi xavflar ham mavjud: internetga qaramlik, kiberbulling, yolg‘on axborot (feyk news), shaxsiy ma’lumotlarning himoyalansizligi, agressiv o‘yinlarning ta’siri.

MDH davlatlari buni oldini olish uchun Raqamli xavfsizlik standartlari, bolalar uchun internet filtrlari, onlayn psixologik yordam platformalari, AI asosidagi xavf monitoring tizimlarini joriy etmoqda. Bu esa tarbiyaviy jarayonning barqaror va xavfsiz bo‘lishini ta’minlaydi.

Xulosa. Raqamli ta’lim bilan tarbiya jarayonini integratsiya qilish — zamonaviy pedagogikaning asosiy talabidir. Texnologiyalar o‘quvchilarning ma’naviy-axloqiy rivojlanishini yangi bosqichga ko‘tarmoqda va MDH davlatlari bu jarayonda muhim tajriba to‘plamoqda. Raqamli ta’lim tarbiyaviy jarayonni yangi bosqichga ko‘tarib, o‘quvchilarni ma’naviy va axloqiy jihatdan kamolotga yetkazishda samarali vosita bo‘lib xizmat qiladi. Interaktiv platformalar, multimodal resurslar va hamkorlikka asoslangan raqamli ekotizim tarbiyaviy faoliyatni yanada mazmunli qiladi. Eng muhim jihat — raqamli tarbiya jarayonida oila, maktab va mahalla hamkorligini mustahkamlashdir.

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THE POLITICAL AND ECONOMIC FUNCTIONS OF JOURNALISM

Abstract. *Journalism plays a fundamental role in the political and economic development of modern societies. As a social institution, journalism mediates between state structures, economic actors, and the public sphere. This article examines the political and economic functions of journalism through the lenses of communication theory, democratic governance, media economics, and public interest obligations. The analysis identifies journalism as a key mechanism of political accountability, public deliberation, economic information distribution, and market regulation. Findings demonstrate that journalism functions not only as a channel of information but also as a powerful institution shaping political behavior, economic decision-making, and societal development.*

Keywords: *political accountability, democratic governance, public deliberation, media economics, market regulation, information dissemination.*

Introduction. Journalism is widely recognized as one of the essential pillars of democratic society. As a fundamental communicative institution, journalism ensures the continuous circulation of verified information, fosters collective understanding, and sustains the mechanisms through which democratic governance operates. Its political and economic functions extend far beyond the mere act of news reporting; rather, journalism serves as a complex system of social mediation that connects governmental institutions, economic actors, and citizens. In its political dimension, journalism informs citizens about public affairs, monitors centers of political authority, facilitates political participation, and contributes to the formation of public opinion. At the economic level, it disseminates market-relevant information, shapes investor and consumer behavior, influences financial stability, and operates as an independent sector within the broader creative and information economy. In this sense, journalism simultaneously functions as both a democratic safeguard and an economic engine.

Main part. In the context of accelerating global digitalization, rapid technological advancements, and deep structural transformations in media markets, understanding journalism's multidimensional roles becomes increasingly important. Digital media ecosystems—characterized by high-speed information flows, platform-based content distribution, algorithmic news selection, and user-generated content—have significantly expanded the reach and impact of journalism.

At the same time, these changes have introduced new challenges related to misinformation, political polarization, media commercialization, and the economic sustainability of traditional news organizations. The interplay between political functions such as transparency, accountability, and civic engagement, and economic functions such as market analysis, financial reporting, and advertising-driven revenue systems, has grown ever more complex.

Therefore, a comprehensive scientific analysis of journalism's political and economic functions is crucial for understanding its contemporary relevance. This study aims to examine journalism not merely as a news production activity, but as a multidimensional institution that structurally influences governance, economic development, and societal progress. By exploring journalism through theoretical frameworks of political communication, media economics, the public sphere, and democratic theory, the research highlights how journalism sustains democratic life, impacts social behavior, and shapes economic dynamics. Additionally, attention is given to how digital transformations redefine journalistic practices, alter media consumption patterns, and reshape the interaction between media systems and socio-political institutions. Ultimately, this analysis underscores the continuing importance of journalism as a stabilizing, informative, and regulatory force in modern societies.

The primary political function of journalism is to provide accurate, relevant, and timely information. Informed citizens are able to evaluate public policies, political candidates, and governance practices. Without this function, democratic processes cannot function effectively. Journalism acts as a watchdog over institutions of power. Investigative reporting exposes corruption, abuse of power, mismanagement, and violations of public trust. This function strengthens transparency, legal oversight, and the rule of law.

Media platforms enable public deliberation by hosting discussions, debates, and diverse viewpoints. Journalism mediates between political elites and the public, encouraging pluralism and ideological balance.

Journalism plays a role in shaping political culture, civic values, and citizen identities. Through news content, editorials, and political analysis, individuals form attitudes toward governance, democracy, and civic engagement.

Media can mobilize citizens during elections, referendums, and public campaigns. Journalism disseminates political messages, encourages participation, and influences collective political actions.

Journalism provides essential information about markets, trade, industries, prices, and economic policies. This function supports informed decision-making for businesses, investors, and consumers.

Media as an Economic Industry

Journalism itself operates within economic systems:

- It generates revenue through advertising, subscriptions, and digital platforms.
- It creates employment in newsrooms, production, and distribution.
- It contributes to national GDP as part of the creative industries.

Economic journalism monitors corporate behavior, financial institutions, and economic policy implementation. Investigative business journalism exposes fraud, monopolistic practices, and market manipulation. Through explanatory articles and economic analyses, journalism improves public understanding of financial issues. This enhances economic literacy and promotes smarter financial decisions among citizens.

Conclusion

Journalism is a multifaceted institution that performs critical political and economic functions in modern society. Politically, it informs citizens, enhances transparency, shapes political behavior, and supports democratic governance. Economically, it facilitates market transparency, drives consumer behavior, operates as part of the economic system, and contributes to financial literacy. Understanding these functions is essential for creating informed policies, strengthening democratic institutions, and ensuring the long-term sustainability of media systems.

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PRAGMATIC DIMENSIONS OF PREVENTIVE COMMUNICATION: A LINGUO-CULTURAL PERSPECTIVE

Annotation. *This article explores the pragmatic and cultural dimensions of preventive communication in human interaction. Rooted in the framework of speech act theory and socio-pragmatics, preventive communication is defined as a strategic linguistic mechanism intended to avoid potential misunderstanding, conflict, or harm before they arise. The study highlights how preventive utterances, such as warnings, advice, and cautious recommendations, operate across different cultures as reflections of social values, politeness conventions, and collective responsibility. By examining preventive communication through the lens of linguo-cultural theory, the article demonstrates how language functions as a moral and social tool, maintaining harmony and balance in interpersonal and intercultural relations. The author also discusses the pedagogical implications of teaching preventive pragmatics in foreign language education.*

Keywords: *preventive communication, pragmatics, socio-pragmatic competence, politeness, culture, warning, linguistic behavior, communicative ethics*

Language is not merely a code or a system of grammar and vocabulary. It is a living, dynamic manifestation of human consciousness, shaped by cultural traditions and social experience. Every linguistic community encodes within its language a set of values and worldviews that guide behavior and communication. From this perspective, the study of language cannot be separated from the study of culture. Each utterance carries traces of social relationships, emotional attitudes, and moral expectations. Within this complex network of meanings, preventive communication occupies a unique place as a tool of social protection and interpersonal responsibility[1.3].

Preventive communication refers to speech acts that aim to prevent undesirable consequences or social discomfort before they occur. It may take the form of warnings (“Be careful!”), advice (“You should check that again”), or suggestions (“It would be better to wait”). The essence of preventive communication lies not in control or command, but in care — a proactive linguistic expression of empathy and foresight. The speaker assumes moral responsibility for guiding another person toward safety, correctness, or social harmony. Such expressions of linguistic precaution are deeply rooted in the moral and pragmatic fabric of every society[2].

The theoretical foundation of preventive communication is found in speech act theory, introduced by J.L. Austin and developed by John Searle. Austin

famously argued that to speak is to perform an action. Every utterance has not only a literal meaning but also a performative function: it can promise, warn, advise, apologize, or forbid. In this framework, preventive speech acts belong to the category of directives — utterances designed to influence the hearer's behavior. Yet their uniqueness lies in their temporal orientation: they are not reactive, but anticipatory. While most directives (such as commands or requests) seek an immediate response, preventive acts project into the future, aiming to shape outcomes before events unfold[3.4].

From a socio-pragmatic standpoint, preventive communication is inherently relational. It relies on shared understanding, cultural norms, and contextual sensitivity. The same preventive intention may be expressed differently across languages depending on politeness strategies, power dynamics, and communicative traditions. For example, in Anglo-American communication, explicit warnings such as “Don't touch that” or “Watch your step” are common and accepted, as directness is associated with clarity and efficiency. In contrast, in East Asian cultures, where indirectness preserves social harmony, similar meanings may be conveyed through subtle hints or nonverbal cues. Thus, preventive communication is not a universal formula, but a culturally shaped practice balancing clarity with respect[2.5].

The importance of preventive communication becomes especially evident in cultures that place high value on community and interpersonal harmony. In Uzbek society, for instance, language is deeply intertwined with ethical principles of respect (*hurmat*), care (*e'tibor*), and restraint (*odob*). Preventive expressions often appear in soft, indirect forms: “Yaxshisi, shoshilmang” (“Better not hurry”), or “Ehtiyot bo'ling, sovuq” (“Be careful, it's cold”). Such utterances serve both as linguistic acts and moral gestures — they express genuine concern while reinforcing social cohesion. The speaker's tone, choice of words, and level of formality all reflect the relational distance and cultural expectations of politeness.

Preventive communication also performs vital psychological and emotional functions. It regulates interactional dynamics, reduces uncertainty, and signals empathy. By uttering a preventive statement, the speaker acknowledges potential risk and implicitly protects the hearer from error, embarrassment, or harm. This communicative foresight strengthens trust between interlocutors. Moreover, preventive language often carries an emotional undertone of affection or solidarity. Parents advising their children, teachers guiding students, or colleagues warning each other about possible mistakes—all engage in preventive communication as a form of social care.

Cross-cultural studies of pragmatics reveal that the perception of preventive speech acts varies significantly across societies. What is seen as thoughtful advice in one culture may be interpreted as interference or criticism in another. For example, in collectivist cultures, offering unsolicited advice is often viewed as a sign of care and moral duty. In contrast, in individualistic cultures, it may be perceived as an intrusion into personal autonomy. Therefore, understanding preventive communication requires not only linguistic analysis but also cultural empathy — the ability to interpret intentions through the value systems of others.

One of the challenges in intercultural communication arises from the lack of socio-pragmatic competence — the ability to use language appropriately in context. Foreign language learners often acquire grammatical proficiency but fail to grasp the subtle pragmatics of prevention, politeness, or indirectness. A learner might say, “Don’t do that” in a situation that requires a gentler form, such as “You might want to be careful.” Such differences, though small linguistically, can have major social consequences. Misjudging politeness levels or failing to anticipate how advice will be received can cause misunderstanding, discomfort, or offense. Hence, the teaching of language pragmatics — including preventive communication — is crucial for developing effective intercultural communicators[6].

Empirical research supports this need. Studies of English as a Second Language (ESL) learners show that exposure to authentic communicative contexts significantly enhances pragmatic sensitivity. Learners who engage in real-life interactions become more adept at choosing culturally appropriate forms of preventive language. Conversely, traditional grammar-based instruction fails to develop this dimension of competence. Effective language education should therefore include explicit instruction on pragmatic norms — explaining not only *what* is correct but *why* certain forms are preferred in specific contexts[7.8].

Another important finding from recent sociolinguistic studies is that preventive communication is highly dependent on credibility and relational authority. During the COVID-19 pandemic, preventive language became central to public discourse: “Wear a mask,” “Keep distance,” “Stay at home.” The effectiveness of these directives varied across countries depending on public trust in authorities and alignment with cultural beliefs. Where collectivist values emphasized mutual protection, preventive messages were readily accepted. In societies with strong individualist tendencies, the same messages were often resisted as perceived constraints on freedom. This global case illustrates how deeply preventive speech is tied to cultural psychology and social trust.

Preventive communication also plays a crucial role in professional fields such as medicine, education, and diplomacy. In healthcare, for example, preventive advice must be conveyed with a balance of authority and empathy. A doctor’s warning — “You need to reduce salt intake” — must sound neither harsh nor dismissive, but caring and credible. In diplomacy, preventive communication underlies conflict resolution and negotiation, allowing parties to anticipate problems and express disagreement politely. Similarly, in education, teachers use preventive discourse to guide students’ behavior without damaging motivation or confidence: “You might want to revise that section” instead of “This is wrong.”

The ethics of preventive communication reveal the moral dimension of language use. By advising or warning, a speaker takes responsibility for another person’s well-being. This act of care implies mutual dependence and social accountability. The absence of preventive language, on the other hand, may be interpreted as indifference or negligence. Thus, preventive communication bridges the domains of pragmatics and ethics, linking linguistic form to moral intent. As the

philosopher Paul Ricoeur suggested, language is a medium through which human responsibility is articulated and shared.

Despite its importance, preventive communication remains underexplored in mainstream pragmatics. Much research focuses on reactive forms—apologies, compliments, or requests—while preventive acts, which precede interactional trouble, receive less attention. Future studies could investigate how preventive strategies evolve in digital communication, where tone and context are often lost. Online discourse, for instance, lacks the nonverbal cues that soften preventive messages in face-to-face interaction. This sometimes leads to misinterpretation of warnings as aggression or sarcasm. Understanding the pragmatics of prevention in virtual environments is an emerging area of great relevance.

In addition to interpersonal dynamics, preventive communication contributes to the larger project of linguo-cultural stability. By transmitting norms of caution, politeness, and foresight, it reinforces collective values across generations. Proverbs and idioms in many languages reflect this cultural wisdom: “Better safe than sorry” (English), “Old habit saves you from new trouble” (Uzbek), or “Precaution is better than cure” (Latin). These expressions embody universal human awareness of vulnerability and the need for cooperation. In this sense, preventive communication represents an ancient yet continually renewed aspect of linguistic civilization.

To strengthen this domain in applied linguistics, educators should integrate pragmatic training into language curricula. Classroom practices might include role-play scenarios, video analysis, or reflective discussions on cross-cultural communication breakdowns. Students should learn not only to form grammatically correct sentences but also to evaluate their appropriateness within cultural contexts. For example, understanding when a direct warning is necessary versus when a suggestion is preferable cultivates linguistic maturity and intercultural intelligence. Such training ultimately supports the broader educational goal of fostering empathy and mutual respect through language.

The integration of preventive communication into intercultural pedagogy aligns with the principles of collaborative pragmatics — an approach that treats language learning as a social and cooperative process. In this framework, learners co-construct meaning, negotiate politeness, and explore cultural contrasts in real interactions. The teacher’s role is to facilitate awareness rather than impose rules, guiding students toward flexible, context-sensitive communication. This participatory model reflects the natural use of preventive acts in life: dialogue, adaptation, and empathy.

In conclusion, preventive communication exemplifies the intersection of pragmatics, culture, and ethics. It demonstrates how language serves as both a cognitive and moral instrument — shaping behavior, preserving harmony, and expressing care. Through preventive speech acts, individuals enact their cultural identity while participating in a shared human project of understanding and coexistence. As global communication becomes increasingly complex, the ability to anticipate misunderstanding, express precaution tactfully, and balance clarity with courtesy is more vital than ever.

To study and teach preventive communication, therefore, is to cultivate not only linguistic competence but moral sensitivity — a skill essential for living together in a diverse, interconnected world.

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BANK SEKTORIDA RAQAMLASHTIRISH JARAYONIDA KIBERXAVFSIZLIK XATARLARINI ANIQLASH VA BAHOLASH USULLARI

Abstract: *This article analyzes methods for detecting, monitoring, and effectively evaluating cybersecurity risks emerging as a result of the accelerated digitization in the banking sector. The expansion of digital payment systems, the increase in the use of electronic banking services, and the large-scale processing of customer data are heightening the risk of cyberattacks. The article reveals the advantages of early detection of these risks, evaluating risks based on criteria, and real-time monitoring using advanced technologies (SIEM, AI, ML). As a result, the importance of a comprehensive approach, modern protection models, and risk assessment algorithms in ensuring information security in the banking system is substantiated.*

Keywords: *digitization, banking sector, cybersecurity, risk assessment, SIEM, artificial intelligence, monitoring, financial risks, data protection, digital banking services.*

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METHODS FOR IDENTIFYING AND ASSESSING CYBERSECURITY RISKS IN THE PROCESS OF DIGITALIZATION IN THE BANKING SECTOR

Annotatsiya: *Ushbu maqolada bank sektorida raqamlashtirishning jadallashuvi natijasida yuzaga kelayotgan kiberxavfsizlik xatarlarini aniqlash, monitoring qilish va samarali baholash usullari tahlil qilinadi. Raqamli to'lov tizimlarining kengayishi, elektron bank xizmatlaridan foydalanishning ko'payishi, mijoz ma'lumotlarining katta hajmda qayta ishlanishi kiberhujumlarning xavfini oshirmoqda. Maqolada ushbu xatarlarni erta aniqlash, xavfni mezonlar asosida baholash, ilg'or texnologiyalar (SIEM, AI, ML) yordamida real vaqt rejimida monitoring qilishning afzalliklari ochib berilgan. Natijada bank tizimida axborot xavfsizligini ta'minlashda kompleks yondashuv, zamonaviy himoya modellari hamda xatarlarni baholash algoritmlarining ahamiyati asoslab berilgan.*

Kalit so'zlar: *raqamlashtirish, bank sektori, kiberxavfsizlik, xatarlarni baholash, SIEM, sun'iy intellekt, monitoring, moliyaviy xavflar, ma'lumotlarni himoyalash, raqamli bank xizmatlari.*

Kirish: So‘nggi yillarda global moliya tizimida raqamlashtirish jarayonlari keng ko‘lamda rivojlanib, bank sektorida xizmat ko‘rsatishning elektron shakllari ustuvor yo‘nalishga aylanmoqda. Internet-banking, mobil ilovalar orqali hisob-kitoblar, masofaviy kreditlash, raqamli identifikatsiya tizimlari va bulutli texnologiyalar asosida ma‘lumotlar almashinuvi bank faoliyatining ajralmas qismiga aylandi. Ushbu jarayon mijozlarga tezkor, qulay va kam xarajatli xizmatlarni taklif etish imkonini bergan bo‘lsa-da, axborot xavfsizligi masalalarini dolzarb qilmoqda.

Raqamli bank tizimlari murakkablashgani sari ularga nisbatan kiberhujumlar soni ham ortib bormoqda. Xususan, fishing, DDoS hujumlari, zararli dasturlar orqali tizimlarni izdan chiqarish, mijoz ma‘lumotlarini o‘g‘irlash, firibgarlik bilan tranzaksiyalarni o‘zgartirish kabi xavf omillari tez-tez uchramoqda. Kiberjinoyatchilar texnologiyalarning yangi imkoniyatlaridan foydalangan holda bank infratuzilmalariga kirish yo‘llarini izlaydi, bu esa moliyaviy barqarorlikka, mijozlar ishonchiga hamda milliy iqtisodiy xavfsizlikka jiddiy tahdid tug‘diradi.

Shu nuqtai nazardan, bank sektorida yuzaga kelishi mumkin bo‘lgan kiberxatarlarni aniqlash va ularni baholashning ilmiy-nazariy asoslarini ishlab chiqish, xavfsizlik monitoringi hamda himoya mexanizmlarini takomillashtirish strategik ahamiyat kasb etadi. Mazkur maqolada raqamlashtirilgan bank tizimlarida kiberxavfsizlik tahdidlarini aniqlash va baholash bo‘yicha qo‘llaniladigan metodlar, zamonaviy texnologik yechimlar hamda ularning samaradorligini oshirishga doir takliflar yoritib beriladi.

Asosiy qism: Raqamli iqtisodiyot sharoitida bank sektorining faoliyati tubdan o‘zgarib, elektron to‘lovlar, masofaviy xizmatlar va mobil banking tizimlari mijozlar hayotining odatiy qismiga aylandi. Bugungi kunda milliy va xalqaro moliya bozori raqobati kuchaygani sari banklarning texnologik modernizatsiya darajasi ularning barqarorligi va ishonchligini belgilovchi asosiy mezonga aylangan. Aynan shu jarayonda kiberxavfsizlik masalasi strategik ahamiyat kasb etadi.

Statistik ma‘lumotlarga ko‘ra, so‘nggi yillarda moliyaviy sektor global miqyosda eng ko‘p kiberhujumga uchrayotgan sohaga aylangan. Xavf darajasining oshishi, fishing, DDoS, ransomware, ma‘lumotlar bazasiga noqonuniy kirish kabi hujumlarning soni ortib borayotgani bank infratuzilmasini himoyalashni yanada murakkablashtiradi. Birgina tizimdagi kichik zaiflik ham katta miqdorda moliyaviy yo‘qotishlarga, mijozlar ishonchi pasayishiga, kredit-moliya bozori barqarorligining izdan chiqishiga sabab bo‘lishi mumkin.

Shuningdek, raqamli tranzaksiyalarning ko‘payishi, to‘lov tizimlarining integratsiyalashuvi, bulutli hisoblash, API va ochiq bank xizmatlarining kengayishi nafaqat qulaylik yaratmoqda, balki yangi turdagi kiberxatarlar paydo bo‘lishiga ham zamin yaratmoqda. Shu bois bank tizimida xatarlarni oldindan aniqlash, ularni baholash va boshqarishning ilmiy asoslangan metodologiyasini ishlab chiqish va amaliyotga joriy etish bugunning dolzarb vazifalaridan biridir.

Banklar uchun samarali kiberxavfsizlik tizimini yaratish — faqat texnik zarurat emas, balki iqtisodiy bardoshlilik, moliyaviy xizmatlar sifati, milliy to'lov infratuzilmasining xavfsizligini ta'minlashning muhim omilidir. Mazkur mavzuning ahamiyati aynan shu omillar bilan belgilanadi.

Bank sektorida kiberxavfsizlik tahdidlarining shakllanish omillari

Raqamli texnologiyalarni keng tatbiq etish banklar faoliyatini tezkor va samarali qilgani bilan birga axborot tahdidlarini ham kuchaytirmoqda. Tahdidlarning asosiy shakllanish omillari quyidagilardan iborat:

- **Axborot tizimlarining murakkablashuvi** — tizimlar kengaygan sari ulardagi zaifliklar soni ham ortadi.

- **Masofaviy xizmatlar ulushi oshishi** — mijozlar internet va mobil bankingdan foydalanar ekan, fishing, MITM (man-in-the-middle) kabi hujumlar uchun imkon kengayadi.

- **Ichki xodimlar omili** — xodimlarning bexabar yoki qasddan sodir etgan xatolari tizimga zarar yetkazishi mumkin.

- **Ma'lumotlar hajmining keskin oshishi** — katta hajmdagi mijoz ma'lumotlarini saqlash va uzatish ularni himoya qilish talabini kuchaytiradi.

- **Integratsiya va API tizimlarining ko'payishi** — uchinchi tomon xizmatlariga ulanish xavfsizlikni zaiflashtirishi mumkin.

Mazkur omillar bank raqamlashtirish jarayonida tizimli xavf baholashning zarurligini ko'rsatadi.

2. Kiberxatarlarni aniqlash usullari

Bank tizimida tahdidlarni erta aniqlash real vaqt rejimida ishlovchi texnologiyalar va diagnostika mexanizmlariga tayanadi. Quyida asosiy aniqlash usullari keltiriladi:

2.1. SIEM tizimlari (Security Information and Event Management)

SIEM platformalari turli manbalardan kelgan xavfsizlik signallarini yig'adi, ularni tahlil qiladi va potentsial hujumlar haqida signal beradi. Bu usul yordamida:

- loglar real vaqt rejimida ko'rib chiqiladi;
- anomaliyalar avtomatik aniqlanadi;
- hujum ssenariylari bo'yicha tahdidlar bashorat qilinadi.

2.2. IDS va IPS tarmoqlarini qo'llash

Intrusion Detection System (IDS) va Intrusion Prevention System (IPS) tarmoqqa kiruvchi harakatlarni kuzatadi va zarur bo'lsa bloklaydi. Ushbu tizimlar:

- zararli trafikni aniqlaydi;
- kirish urinishlarini to'xtatadi;
- trafikni statistik tahlil asosida monitoring qiladi.

2.3. Penetratsion testlar (Pentesting)

Bank infratuzilmasida zaifliklarni aniqlash uchun real hujumga o'xshash model sinovlari o'tkaziladi. Pentest natijasida:

- zaif serverlar aniqlanadi;
- mavjud parollar mustahkamligi tekshiriladi;
- tizimga kirish yo'llari simulyatsiya qilinadi.

2.4. Anomaliya aniqlash algoritmlari

Sun'iy intellekt va mashinaviy o'qitish asosida ishlovchi algoritmlar noodatiy tranzaksiyalari yoki tizim harakatlarini aniqlashi mumkin. Misol sifatida:

- bir mijozning odatiy faoliyatidan keskin farqlanadigan tranzaksiyalar;
- shubhali IP-manzillardan takror kirish urinishlari;
- katta hajmdagi ma'lumotlarni yuklab olish harakatlari.

Ushbu yondashuvlar hujumlarni oldindan bashorat qilish imkonini beradi.

3. Kiberxavfsizlik xatarlarini baholash metodlari

Baholash jarayoni mavjud tahdidlarni miqdoriy va sifat tahlili orqali o'lchashni o'z ichiga oladi.

Baholash metodi	Tavsifi	Afzalligi
Risk Matrix	Xavflarni yuzaga kelish ehtimoli va zarari asosida baholash	Vizual, sodda va tezkor
FAIR modeli (Factor Analysis of Information Risk)	Moliyaviy yo'qotish qiymatini aniq hisoblaydi	Aniq moliyaviy baho beradi
CVSS reytingi	Zaiflik darajasini 0–10 ball oralig'ida aniqlaydi	Zaifliklarni ustuvorlashtirish oson
Quantitative Risk Assessment	Statistika va matematik model asosida hisoblaydi	Ehtimollik asosida real prognoz beradi

Baholash natijalari asosida bank xavfsizlik protokollari optimallashtiriladi.

4. Xatarlarni boshqarish va himoya strategiyalari

- Ko'p bosqichli autentifikatsiya (MFA) joriy etish
- Ma'lumotlarni shifrlash va rezerv nusxalash (backup)
- Xodimlar uchun muntazam kiberxavfsizlik treninglari
- Bulutli himoya texnologiyalaridan foydalanish
- Zero-Trust Arxitekturasida xavfsizlik muhitini yaratish

Bu yondashuvlar bank tizimida barqaror, himoyalangan raqamli ekotizim shakllantirishga xizmat qiladi.

Muhokama: Bank sektorida raqamli texnologiyalarni keng joriy etish bilan bog'liq kiberxavfsizlik xatarlarini boshqarish nafaqat texnik choralarni, balki xavflarni tizimli ravishda aniqlash, baholash va minimallashtirishga qaratilgan kompleks yondashuvni talab qiladi. Yuqorida ko'rib o'tilgan tahlillar shuni ko'rsatadiki, raqamli bank xizmatlarining qulayligi oshgani sayin ularga qaratilgan tajovuzlar ham murakkablashmoqda. Shu sababli, bank infratuzilmasida xavfsizlikni ta'minlash uchun an'anaviy usullar yetarli emas, balki zamonaviy texnologiyalar asosida real vaqt monitoring mexanizmlarini kuchaytirish zarur.

Tadqiqot davomida aniqlangan SIEM tizimlari, IDS/IPS himoya modullari, pentesting va sun'iy intellektga asoslangan anomaliya aniqlash modellari tahdidlarni erta qayd etishda va ularning oqibatlarini kamaytirishda muhim o'rin tutishi qayd etildi. Ayniqsa mashinaviy o'qitish algoritmlari tranzaksiyalarni avtomatik tahlil qilish, noodatiy xatti-harakatlarni aniqlash, statistik og'ishlarni kuzatish orqali xavflarni bashorat qilishda yuqori samaradorlik ko'rsatmoqda. Bu esa kelgusida kiberxavfsizlikni prognozlash imkoniyatlarini yanada kengaytiradi.

Shuningdek, xavflarni baholashning miqdoriy va sifat asosidagi modellari (Risk Matrix, FAIR, CVSS va boshqalar) bank tizimida ustuvor tahdidlarni aniqlash va ularni kamaytirish strategiyasini shakllantirishda amaliy ahamiyatga ega. Ularning qo'llanilishi risklarni minimal darajaga tushirish, moliyaviy yo'qotishlarning oldini olish hamda mijozlar ishonchini mustahkamlashga xizmat qiladi. Ushbu jarayonni muvaffaqiyatli olib borish uchun faqat texnologik emas, balki tashkiliy choralar — xodimlar uchun muntazam treninglar, ma'lumotlar zaxiralash siyosati, ko'p bosqichli autentifikatsiya, Zero-Trust modeli kabi elementlar ham zarur.

Muhokamalardan kelib chiqadiki, bank sektorida kiberxavfsizlikning samarali boshqaruvi bir necha omilning uyg'unligini talab etadi: texnik himoya vositalari, xavf tahlili metodologiyasi, inson omili bo'yicha profilaktika choralari va yuqori darajadagi axborot madaniyati. Faqat shu holda raqamlashtirish jarayonidagi kiberxatarlar ustidan nazorat kuchayadi va moliya tizimining barqarorligi ta'minlanadi.

Xulosa va takliflar: Yuqoridagi tahlillar va muhokamalar shuni ko'rsatadiki, bank sektorida raqamlashtirish jarayonining jadallashuvi kiberxavfsizlik xatarlarini ham shunga mos ravishda oshirmoqda. Elektron to'lov tizimlari, mobil banking, bulutli texnologiyalar, ochiq API platformalari imkoniyatlari kengaygani sari tizimga kirish nuqtalari ko'payadi va ular orqali hujum ehtimoli ham kuchayadi. Shuning uchun zamonaviy bank tizimi xavfsizlikni faqat himoya vositalari bilan emas, balki xatarlarni aniqlash, baholash va boshqarishning kompleks mexanizmlari bilan ta'minlashi zarur.

O'tkazilgan tahlillar quyidagi xulosalarni chiqarishga asos bo'ladi:

- Banklarda kiberxatarlar manbalari ko'p qirrali bo'lib, tarmoq infratuzilmasi, inson omili, dasturiy nosozliklar va tashqi tajovuzlar bilan bog'liq.
- Tahdidlarni erta aniqlash uchun SIEM, IDS/IPS tizimlari, penetratsion testlar va sun'iy intellekt asosidagi anomaliya aniqlash usullari eng samarali vositalardan hisoblanadi.
- Risklarni baholashning sifat va miqdoriy modellari (Risk Matrix, FAIR, CVSS) tahdidlar ustuvorligini belgilash va ularga nisbatan choralar ko'rishda muhim o'rin tutadi.
- Kiberxavfsizlikni ta'minlash jarayoni faqat texnik vositalarga emas, balki inson omilini to'g'ri boshqarishga ham bog'liq bo'lib, xodimlar malakasi bu borada keskin ta'sir qiladi.

Takliflar

Banklarda kiberxavfsizlik darajasini yaxshilash va xatarlarni minimallashtirish uchun quyidagi takliflar ilgari suriladi:

1. **Real vaqt monitoring tizimlarini kengaytirish** SIEM, SOC (Security Operation Center) va AI asosidagi kuzatuv platformalarini joriy etish orqali hujumlarni aniqlash tezligini oshirish.

2. **Xodimlar uchun uzluksiz kiberxavfsizlik treninglarini yo'lga qo'yish** Phishing, zararli havolalar va firibgarlik sxemalarini tanish bo'yicha muntazam o'qitish inson omili bilan bog'liq xatarlarni sezilarli kamaytiradi.

3. Ko‘p bosqichli autentifikatsiya (MFA) tizimini majburiy joriy etish
Bu mijoz profillariga noqonuniy kirish ehtimolini minimal darajaga tushiradi.

4. Ma’lumotlarni shifrlash, rezerv nusxalarni yaratish va Zero-Trust modeliga o‘tish: Har bir kirish talabini tekshirish, foydalanuvchi vakolatini doimiy baholash xavfsizlik mexanizmini mustahkamlaydi.

5. Penetratsion testlarni rejalashtirilgan ravishda o‘tkazish
Tizimdagi zaifliklarni oldindan aniqlash va ularni bartaraf etish moliyaviy yo‘qotishlarning oldini oladi.

6. Kiberxavfsizlik standartlari asosida ichki normativlarni kuchaytirish
ISO/IEC 27001, PCI DSS kabi xalqaro standartlar bo‘yicha siyosat yuritish bank tizimining barqarorligini ta’minlaydi.

Umuman olganda, raqamlashtirish jarayonini xavfsiz yuritish banklarning uzoq muddatli rivojlanishi, mijozlar ishonchi va moliyaviy tizimning barqarorligini saqlashning eng muhim kafolatidir. Maqolada taklif etilgan texnik va tashkiliy yechimlar ushbu maqsadga erishishda samarali vosita bo‘lib xizmat qiladi.

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SPLEEN, ITS GENERAL STRUCTURE, AND DEVELOPMENT

Annotation: *This thesis highlights the external and internal morphological structure of the spleen, its importance as a lymphoid organ, its physiological functions, and its role in hematopoiesis.*

Keywords: *Embryonic hematopoiesis, spleen, liver, aorta–gonad–mesonephros, erythro- and granulocytopoiesis, extravascular hematopoiesis, mesenchyme, extramedullary hematopoiesis, hematopoietic progenitor, blood depot, yolk sac.*

Relevance:

Immune cells are formed in the spleen. More precisely, this process represents the formation, growth, maturation, and specialization of blood cells from hematopoietic stem cells through hematopoietic progenitor cells into specific blood cells. This process is strictly regulated by several elements of the bone marrow microenvironment, such as growth factors, transcription factors, and cytokines. During embryonic and fetal development, hematopoiesis occurs in various organs, including the yolk sac, the aorta–gonad–mesonephros region, lymph nodes, fetal liver, and embryonic or fetal spleen.

Research purpose:

The spleen plays an important role in metabolism and cell migration, being a key component of the portal circulation that contains reticuloendothelial structures. The liver performs secretory functions, but under certain conditions, it can compensate for bone marrow insufficiency and, together with the spleen, help prevent a deficiency of functional blood cells. The spleen is an organ with high metabolic activity; one of its functions is to recycle blood cells and iron and filter atypical blood cells. It removes aged erythrocytes, damaged platelets, and apoptotic cells through phagocytosis, produces and stores antibodies, and supports the immune system by producing and activating T and B lymphocytes that fight infections.

The spleen bud first appears in the 5th–6th week of embryonic development, arising from a dense aggregation of mesenchymal cells within the developing greater omentum. The vascular system of the spleen differentiates earlier, and reticular cells form between the blood vessels, among which stem cells of the blood are located. By the 7th–8th week, macrophages appear in the spleen; by the 11th–12th week, B lymphocytes develop. Up to the 5th month of embryonic development, granulocytopoiesis, erythropoiesis, and thrombocytopoiesis actively occur in the spleen. Meanwhile, lymphocytopoiesis gradually intensifies — during the 3rd–5th

months, T lymphocytes accumulate around arteries (T-zone or periarteriolar zone), followed later by B lymphocytes, forming the white pulp of the spleen. The reticular tissue between them, together with large sinusoidal blood vessels, forms the red pulp. During the first half of embryonic life, all hematopoietic cells develop in the spleen.

Materials and methods:

The liver bud appears during the 3rd–4th weeks of embryonic development. From the fifth week onward, the liver becomes the main site of blood formation in the embryo. The formed blood cells develop from stem cells, which transform into primary blood cells and then produce secondary erythrocytes. Alongside mature erythrocytes, mature granulocytes—mainly neutrophils and eosinophils—are also observed in the liver. Hematopoiesis occurs extravascularly along capillaries as mesenchymal tissue grows into hepatic lobules. The source of blood formation is the stem cells derived from the yolk sac, which differentiate into secondary erythrocytes and granulocytes. In addition, megakaryocytes also develop. Unlike in adults, this process bypasses intermediate stages, and mature neutrophils and eosinophils are produced without completing the myeloblast and promyelocyte stages. Schematically, the maturation of granulocytes proceeds as follows: from primary blood cells to mature granulocytes. Furthermore, giant megakaryocyte cells also develop in the liver. All these elements develop outside the blood vessels, i.e., extravascularly. Gradually, hematopoiesis in the liver decreases and completely ceases by the end of embryonic development. Thus, in the post-embryonic period, blood formation no longer occurs in the liver.

Fetal (embryonic) hematopoiesis includes two main stages: primitive and definitive. In this article, we explored in depth the primitive hematopoiesis occurring in the spleen and liver, i.e., the secondary functions of these organs during embryonic development. The spleen is often regarded as the “forgotten organ” among clinicians and radiologists. Nevertheless, it plays a role in various congenital and acquired diseases and can be clearly visualized using computed tomography (CT) and magnetic resonance imaging (MRI) of the abdominal cavity. Because the spleen is a highly variable organ, radiologists frequently encounter its normal variants, which can sometimes be mistaken for pathological conditions. For example, splenic clefts on the surface of the spleen may occasionally be misinterpreted as splenic lacerations in patients with abdominal trauma. Moreover, medical literature contains numerous reports of accessory spleens, especially those located near the liver or the tail of the pancreas, being mistaken for lymphadenopathy or intra-abdominal tumors. To fully understand the normal morphology of the spleen, it is essential to use precise terminology describing its developmental stages and anatomical variations. The natural depressions on the surface of the spleen have been referred to by various names — clefts, notches, or fissures — though these terms are used inconsistently across different sources, and a unified definition has yet to be established.

Therefore, in this article, we use only the term “cleft” to denote the natural depressions on the splenic surface. According to previous studies, such clefts are

found on the superior border of the spleen in 40–98% of adults, with 4–5 clefts generally considered a normal finding.

If the number of clefts is excessively high or if they are located on other surfaces of the spleen — such as the diaphragmatic (superior-facing) or visceral (organ-facing) surfaces — this is considered abnormal.

In addition, accessory spleens are also common. These are small nodules separated from the main spleen, found in 10–30% of cases during autopsy. Variations in the shape of the adult spleen are often explained by the hypothesis that the organ develops through the fusion of multiple embryonic splenic primordia. It is believed that if one or more of these primordia fail to fuse with the main body, an accessory spleen develops.

During fetal development, the spleen appears lobulated, and the natural surface depressions are thought to represent areas where the embryonic buds did not completely fuse. Consequently, the clefts observed in the adult spleen are interpreted as remnants of the lobulated structure present during fetal life.

Obtained results and analysis

The term “fetal lobulation” of the spleen lacks a clear and universally accepted definition, and there are very few original scientific studies devoted to examining the normal surface morphology of the human fetal spleen. The only well-documented study was conducted by Ungör and colleagues, who examined 141 fetal spleens. They found clefts in 95% of cases along the superior border, 7.8% on the diaphragmatic surface, and 3.5% on the visceral surface.

These results are very similar to those observed in adults, calling into question whether there is any real difference between the fetal and adult surface morphology of the spleen. Another important issue is that the hypothesis of the spleen’s “multifocal origin” has never been directly demonstrated in human or animal embryos. Such views appear only in secondary sources, while primary observations provide no supporting evidence for this concept.

Therefore, we propose the following hypothesis:

The spleen develops from a single embryonic bud (a single center of origin), and the morphological variations on its surface emerge during the course of development. These variations occur naturally both in fetuses and adults.

In this study, we first analyze the development of the spleen from the embryonic stage based on histological sections. Then, we compare the number of clefts in fetal and adult spleens to determine their differences through statistical analysis.

Development of the embryonic spleen

The splenic clefts were classified according to their anatomical location (based on Netter’s classification) as follows:

- Superior border
- Inferior border
- Anterior extremity
- Posterior extremity
- Diaphragmatic surface

- Visceral surface

Each cleft was required to be identified in at least two imaging planes and to appear in several consecutive sections in at least one plane. Clefts located around the splenic hilum, where blood vessels enter or exit, were excluded from the analysis.

Conclusion:

For many years, radiologists have widely accepted the view that splenic surface clefts (notches, fissures, clefts) are remnants of fetal lobulation. However, the findings of our study, based on an analysis of human splenic development, refute this long-standing assumption.

Our results demonstrate that:

- The morphology of the spleen is highly variable;
- This variability is not related to age or developmental stage;
- The clefts of the spleen, regardless of their number or location, should be regarded as normal anatomical variants.

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DORIVOR SENNA ANGUSTIFOLIA: TIBBIY QO‘LLANILISH IMKONIYATLARI VA FARMAKOLOGIK AHAMIYATI

***Annotatsiya.** Maqolada senna angustifolia ning tibbiyotda ishlatilishi xususiyatlari haqida ma’lumotlar keltirib o’tilgan.*

***Kalit so’zlar:** лекарство, *S. angustifolia* (Vahl), *S. Acutifolia* (Delile), *S. angustifolia*, *S. acutifolia*, *S. obuvata**

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MEDICINAL SENNA ANGUSTIFOLIA: THERAPEUTIC APPLICATIONS AND PHARMACOLOGICAL SIGNIFICANCE

***Abstract.** The article provides information about the medicinal properties of *senna angustifolia*.*

***Key words:** medicine, *S. angustifolia* (Vahl), *S. Acutifolia* (Delile), *S. angustifolia*, *S. acutifolia*, *S. obuvata**

O’tkir bargli sanno o’simligi bargida 6,17%, mevasida 2,70%, tor bargli sanno bargida esa 3,77%, mevasida 4,6% gacha antrasen unumlarining yig’indisi (sennozid A, sennozid V, sennozid S, sennozid E, rein, aloy-emodin, glyuko-aloy-emodin, glyukorein va boshqalar) bo’ladi. Sanno barglari tarkibida antrasen unumlaridan tashqari, flavonoidlar (izoramnetin, kempferol va ularning glikozidlari) hamda salitsilat va boshqa organik kislotalar, smolalar va juda oz miqdorda alkaloidlar bor.

Mevasi tarkibida smola bo’lmaydi. Antrasen unumlari sanoning yosh barglarida ko’p to’planib, barg qarigan sari ular miqdori ham kamayib boradi. Agar o’tkir bargli sanno tarkibidagi antrasen unumlarining yosh barglardagi umumiy miqdori 5,8% bo’lsa, barg sathi kattalashgan sari, bu birikmalar kamayib, oxirida 3,8%) qoladi.

Sanno bargining asosiy ta’sir etuvchi glikozidlari - sennozid A va sennozid V gidroliz natijasida qand qismi - glyukoza va aglikonlari - sennidin A va sennidin V ga parcha-lanadi. Bu birikmalar bir-birining sterioizomerlari bo’lib, sennidin A optik faol (kuchli fiziologik ta’sir ko’rsatadi), sennidan V esa optik faol emas (fiziologik ta’siri ancha kuchsiz). Hindistonning quruq (namlik kam bo’ladigan)

tumanlarida o'sadigan tor bargli sanno bargi tarkibiga 4,23% gacha sennozidlar va 3,54% gacha rein bo'ladi.

S. angustifolia (Vahl) Batka-ingichka bargli sano *S. Acutifolia* (Delile) Batka-o'tkir bargli sano, *S.tora*-to'mtoq bargli sanno turlarining barglari va urug'larida antraglikozid, flavonoidlar mavjud bo'lib, asosan surgi dori sifatida, organizmni yumshatuvchi, shuningdek ozdirish maqsadida istemol qilinadi.

Ilmiy tabobatda hozirgi vaqtda dorivor o'simlik sifatida foydalanish uchun ruxsat etilgan. Sobiq Ittifoq Davlat farmakologiyasiga kiritilgan. *S.angustifolia*, *S.acutifolia* ning barglari, yangi novdalarining ekstraktidan Senadaksin (Senadexinum) tabletkasi tayyorlanadi. Ukraina va Xindiston davlatlarida bu dori turi ishlab chiqarilib, boshqa davlatlarga eksport qilinadi.

S.angustifolia - O'rta Yer dengizi florasida (Janubiy Yevropa, Shimoliy Afrika, Saudiya Arabistoni) tabiiy holda tarqalgan bir yillik o'tsimon o'simlik. O'simlikning yer ustki qismi qadimdanoq xalq tabobatida va ilmiy tibbiyotda ishlatib kelingan. Uning xom ashyosi Yevropaga Shimoliy Afrikadan Aleksandriya porti orqali olib kelinganligi sababli o'simlikning tijorat nomi Aleksandriya bargi (Aleksandriyskiy list) deb ham yuritiladi.

S.angustifolia, *S.acutifolia*, *S.obuvata* Collad. turlari Respublikamizning Surxandaryo viloyatida madaniy holda o'stirilishi va ko'paytirilishi adabiy manbalarda keltirilgan. Hozirgi kunda yuqoridagi turlar O'zbekiston sharoitida dorivor o'simliklarni yetishtirishga ixtisoslashtirilgan xo'jaliklarda qisman ekib o'stiriladi. Tabiblar, savdogarlar tomonidan, Sobiq Ittifoq va boshqa davlatlar orqali Respublikamizga urug'lari keltirilib, qiziquvchilar tomonidan tamorqalarda ham ekiladi. Hozirda halq tabobatida urug'lari va barglari ishlatiladi, shuningdek bozorlarda dorivor o'simliklar qatorida sotiladi.

Respublika dori-darmon ishlab chiqarish sanoati «O'zfarmkonsern» buyurtmasi asosida, sho'r yerlarda dorivor o'simliklarning introduksiyasi va bioekologik xususiyatlarini o'rganish maqsadida O'zbekistonning Mirzacho'l va Buxoro vohasida bir qancha dorivor o'simliklar qatorida *S.angustifolia*, *S.acutifolia*, *S.tora* larning sho'rga chidamligi, introduksiya natijalarini tahlillash asosida introduksion baholash ishlari ustida tadqiqotlar olib borilgan. Tadqiqot natijalarida tuproqlarning 2 xil sho'rlanish darajasida, urug'larning unuvchanlik va saqlanish darajalari aniqlanib, o'rta va kuchli sho'rlangan yerlarda o'simliklarning o'sishi va rivojlanish uchun sho'rlanish darajasining yuqoriligi, havo haroratining ko'tarilishi ularning o'sishdan to'xtab, qurib qolishiga sabab bo'lishi aniqlangan [9].

S.tora er yuzida Shimoliy va Sharqiy Afrika, Xindiston, Xitoy, Yaponiyaning tropik qisimlarida tabiiy sharoitda keng tarqalgan. Bir yillik kosmopolit o'simlik. Asosan, Xitoyning Shensi, Xubey va Kvantun provinsiyalarida dorivor o'simliklar qatorida o'stirilib, xomashyo olish maqsadida katta ekin maydonlari tashkil etilgan. *S. tora* ning mahalliy nomi Angliyada-*Wild senna*, Yaponiyada-*Ebisu-gusa* deb nomlanadi.

O'tkir bargli sanno - *Senna angustifolia* Del. ning vatani Misr (Nil

daryosining o'rta oqimi) va Sudan hisoblanadi. Ushbu mamlakatlarning iqlimi issiq, yilning eng sovuq kunlarida havo harorati kamdan-kam xolatlarda 5-10⁰S dan pasayadi. O'zbekistonda dorivor o'simlik sifatida madaniylashtirilgan. Sanno o'simligini yetishtirish uchun eng ma'qul joy, Surxandaryo viloyatining Denov tumani xisoblanadi.

Tibbiyotda qo'llanilishi va kimyoviy tarkibi. Sanno preparatlari surgı dori sifatida ishlatiladi. Bargi tarkibida smolalar spirtida va qaynoq suvda eriydi, bu smolalar ichakni og'ritish xususiyatiga ega. Shuning uchun tayyorlangan damlamani sovutib smolani filtirlab qo'llaniladi. Barglari tarkibida antroglıkozydlar (6% gacha), mevasida antretsen unumlari (sennozid A, rein, aloy-emodin va boshqalar) mavjud.

Tarixiy ma'lumotlarga qaraganda, o'tkir bargli sano o'simligi xalq tabobatida 3000 yildan beri ishlatib kelinadi. Rus tabiblari uni 99 dardga darmon giyoh deb atashgan. Shuningdek, ruslarda qo'yidagicha maqol bor: «Nonni bug'doysiz yopib bo'lmaydi, dardni sanosiz davolab bo'lmaydi».

O'tkir bargli sanno tarkibidabargida 6,17%, mevasida 2,7%, tor bargli sanno bargida 3,77%, mevasida 4,60% gacha antrasen unumlari bo'lib, ular sennozid A va V, S, D, rein, aloy-emodin, glyuko-aloy-emodin va boshqalardan tashkil topgan. Antrasen unumlardan tashqari flavonoid, organik kislotalar va oz miqdorda alkaloidlar bor.

I.A. Damirov va boshqalarning [1982] fikricha, o'simlikning yosh barglarida va pishgan mevalarida antrasen unumlari ko'p bo'ladi. Asosiy moddasi hisoblangan sennozidlar gidroliz qilinsa aglikon sennedin A va V ga va glyukozaga parchalanadi. Surgı sifatida ishlatiladi. Barg tarkibidagi smolalar qorinni og'ritgani uchun, tayyorlangan damlamani sovutiladi, cho'kkan smolalardan filtrlab olinadi va iste'mol qilinadi. Ba'zan barg tarkibidagi smolalarni spirtida eritib olib tashlanadi va dori turlari tayyorlanadikasalliklarini davolashda foydalanganlar.

Dorivor preparatlari. Barg damlamasi - *Infusum foliorum Sennae*, murakkab qizilmiya poroshogi - *Pulvis Glycyrrhizae compositus* tarkibiga kiradi. Sano surgı sifatida ishlatiladigan va bavoşil kasalligida qo'llaniladigan yig'malar tarkibiga kiradi.

Tayyor dorilar: Tabletkı senade, glaksen (Hindiston), tabletkı senna (Gruziya), tabletkı senadeksin (Tosh. xim-farm.zavod) chiqariladi.

Abu Ali Ibn Sino aytadiki, dorilarning bazilari madanlardan, bazilari o'simliklardan va boshqa xayvon jinslaridan olingan bo'ladi [Xolmatov va boshq., 1994].

Hamdamov I., Shukurullaev P., Tarasova Ye va boshqalar [1990] yozishicha Abu Ali Ibn Sino o'zining II kitobini dorishunoslikka bag'ishlangan bo'lib, unda o'simlik, ma'dan va hayvonlardan olinadigan 811 ta sodda dorilarning nomini alifbo tartibida joylashtirib, ularni ta'riflari va har bir dorining qaysi kasallikka davo ekanligi ko'rsatilgan.

O'simliklardan olinadigan dorilar, ularning yaproqlaridan, donlaridan, ildizlaridan, shoxlaridan, po'stloqlaridan, gullaridan, mevalaridan, iborat bo'ladi. (Tib qonunlari)

Tibbiyotda sanno turlarining bargi va mevasidan foydalaniladi. Bargi o'simlik gullaganda yig'iladi va soyada, mevasi yetilganda terib olinib, ochiq havoda - quyoshda quritiladi.

Sanno bargi va mevasi tarkibida antraglikozidlar, flavonoidlar, smola va boshqa moddalar bo'ladi. Sanno qadimdan tabobatda keng miqyosda ishlatilib kelingan dorivor o'simliklardan. Bargining damlamasidan Ibn Sino bod, jigar va sariq kasalliklarini davolashda hamda surgu sifatida foydalanilgan.

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BIOMORPHOLOGICAL DEVELOPMENT AND ADAPTATION OF MELIA AZEDARACH L. IN THE URBAN ENVIRONMENT OF TERMIZ

Abstract. *In this article, the results of studies on the biomorphological characteristics, development patterns and phenological characteristics of the ornamental tree Melia azedarach L., which is acclimatized in the conditions of Termiz, and its growth and development are studied.*

Key words: *Melia azedarach L, ornamental tree, cultural, ontogenetic, flowering biology, phenology, introduction, introductory assessment.*

The Sustainable Development Goals are a global call of the United Nations aimed at improving the way of life and well-being of all mankind by improving the economic, social and environmental situation in the world, and building a just and sustainable society. It is determined that each country will localize the BRM, that is, develop national development goals based on its development priorities and financial capabilities from the 169 tasks of the 2030 agenda. Countries should adapt these targets to their national contexts, define quantitative indicators for the relevant statistical indicators for each objective, and define objectives and specific quantitative indicators in national strategic documents. Today, at the United Nations Department of Economic and Social Affairs (UNDESA), the Division on Sustainable Development Goals (DSDG) focuses on SDGs and related thematic issues, including water, energy, climate, oceans, urbanization, transport, science and technology. provides support and capacity building activities.

One of the goals of sustainable development is the rational use of forests, combating desertification, ending land degradation and restoring soil fertility, and eliminating the threat of biodiversity loss.

Taking into account the above, the bioecological features of the ornamental tree Melia plant were studied. Studying the growth and development of plants in the early stages of ontogenesis is important for knowing its biological properties. Plants show all the signs of their historical development already in the juvenile period. It is observed that plants acclimatized to new conditions adapt faster during the juvenile period. It is possible to determine to what extent they can adapt in the later stages of life by observing sharp differences in the morphological signs and life processes of a plant in the early stages of its development. The dormant period and storage period of the seed depends on a number of reasons. The most important of these depends on the species of the plant, the bioecological and geographical characteristics of the growing conditions. It is clear that Melia, which is among such plants, will have an important role in the national economy of our country in the future, including in greening and maintaining the health of the population. The possibility of growing Melia (*Melia azedarach* L.) in the climatic conditions of

Termiz determines the urgency of the problem. Cultivation and acclimatization of ornamental plants came to our republic from the Far East from China and India through the Great Silk Road and spread first in Samarkand, then in Bukhara, Kokand and other cities. Since 1920, a 12-hectare botanical garden has been established under the Central Asian State University, where more than 60 varieties of flowers have been cultivated. After increasing the number of flower varieties to 300, this garden was transferred to the account of the academy in 1943, and a new botanical garden was established with an area of 80 hectares.

Since 1962, plant science farms have been established in seven cities of our republic - Andijan, Angren, Almalyk, Bukhara, Samarkand, Fergana and Urganch. The area of these farms was 592 hectares. By 1977, 15 plant science combines were established in the Republic of Uzbekistan. The cultivated area of the Tashkent flower farm, which is considered the largest, was 1279 hectares. The area of glass greenhouse buildings was 5.9 hectares.

1980 yili botanika bog'ida gulchilik laboratoriyasi tashkil topdi va unda 2000 dan ortiq gul navlari yetishtirishga muvaffaq bo'lindi.

Bunga fan doktorlari, professorlardan F.N.Rusanov, Z.F.Bachanieva, A.P.Pechenitsin, fan nomzodlaridan P.K.Ozolin, L.K.Kravchenko, A.K.Kyatkin, A.X.Sharipov, L.A.Abduraxmonovlar o'zlarining munosib hissalarini qo'shdilar.

Mustaqil Respublikamizda hozir gulchilikka katta e'tibor berilmoqda. Gulchilik O'zbekiston xalqining kundalik turmushiga kirib bormoqda va shahar aholisining turmushida muhim ahamiyat kasb etmoqda. Samarqand shahrining manzarali va turli xil gul o'simliklari bilan bezashda va ko'chatlarni o'z o'rniga chiroyli qilib o'tqazishda Shreder nomli meva va tokchilik ilmiy tekshirish institutining zabardast olimlarining hissolari beqiyos.

Meliyaning (*Meliaceae* Vent.) oilasi turlari daraxt va butalardan iborat bo'lib, ularning 40 dan ortiq turkumi va 600 dan ortiq turi mavjud. Ular asosan Yer sharining tropik va subtropik mintaqalarida keng tarqalgan. Meliyaning (*Melia* L.) turkumi 25 turni birlashtirgan. Ularning vakillari orasida doimiy yashil va barglarini to'kadigan turlari mavjud. Ular janubiy va sharqiy Osiyo hamda Avstraliyada tarqalgan. Yovvoyi holda Himolayning tog' oldi zonasida, Xitoy, Hindiston, Yaponiya, Yangi Gvineya va Avstraliyada uchraydi. Tur nomi bargining shumtol bargiga o'xshashligidan kelib chiqqan. Meliya turkumining asosan 4 ta turi: *M. Azedarach* L., *M. toosendan* Sieb. Et Zuss., *M. condollei* Juss, *M. dubia* Cav. Madaniy holda tarqalgan. Janubiy O'zbekistonda esa faqat 2 tasi: *Melia azedarach* va *Melia toosendan* lar introduksiyalashtirilgan.

Melia Azedarach is a deciduous tree. Its height is 12-20 m, its body diameter reaches 40-75 cm. The stem grows upright, the wood is soft, it branches monopodially. In young trees, the cone is elliptical or umbrella-shaped. The leaves are densely placed on the branch and form a dark shade. Young branches are reddish, scaly, hairless, and the trunk is brown or gray, smooth or slightly rough.

The leaves are complex, divided into 2-3 folds, 25-95 cm long, up to 60 cm wide. Compound leaves are formed by 3-5 to 13 leaflets. The length of the leaf plate

is 2-5 cm, the width is 1.5-2.5 cm, it is egg-shaped, the edge is sharp-toothed, light green, covered with sparse small hairs.

It consists of 32-35 flowers, 15-20 cm long, light purple, 2 cm in diameter, with a honey or vanillin smell, located in the axils of leaves at the base of annual branches. Petals 5, united or separate lanceolate, 10 mm long, 2 mm wide.

Sepals 5, ovate, not joined. Chain thread is dark purple in color, 8-9 mm long, 1.5 mm in diameter. The length of the cotyledon is 5 mm, the base is disk-shaped (lentil-shaped), with 5 seed buds. The fruit is soft fleshy and grainy, round or oval in shape, yellow in color. The flesh is hard, round, 1-1.3 cm in diameter, endocarp, shiny. Fruits hang on annual branches. The root system is mainly located in the soft fertile layer of the earth at a depth of 30-35 cm.

Melia is a tree with a height of 15-20 m, a trunk diameter of 40-70 cm, and leaves that fall in winter. The horn sabbath is in the form of an umbrella. The leaves are divided into 2-3 folds, and it is an odd feathery compound leaf. The length is 85-90 cm, the leaves are egg-shaped, the edge is straight, dark green. Petals are 5-6 cm long, 2-3 cm wide, banded. The flowers are arranged in a complex peduncle. The length of the inflorescence reaches 25-30 cm, it consists of 40-45 flowers. Petals are 5-6, separate, lanceolate, 10-12 mm long, 2 mm wide. Sepals 5, stamens dark purple, length 10-12 mm, diameter 1.5-1.7 mm. The beak of the seed has a head. The fruit is large, oval, orange, hard-grained, wrinkled, 17-20 mm long, 15-17 mm in diameter.

These species are very close to each other in terms of morphological structure. Therefore, in some sources there are opinions that *Melia toosendan* and *Melia azedarach* must be another form. In the process of natural selection, which continued for centuries, the species forms of tree-like plants appeared.

Morphologically different forms of tree plants also transfer genetic traits to the next generation. These hereditary characteristics were formed under the influence of specific soil and climate conditions, during its development and culturalization. Knowing the laws of seasonal changes helps to determine the possibilities of planting trees in which climatic conditions, expanding the area and using them correctly. These observations play a major role in demarcation of important tree plants, which are especially valuable for the national economy. In the conditions of the city of Termiz, *Melia* began to wake up and grow buds on February 25. Budding was observed in April and early May. Flowering in the middle of April, ripening of seeds until the end of June was determined. *Melia* fruit seeds begin to ripen from September. As a result of the negative temperature in the winter season, the leaves fell and the plant went into the winter rest period.

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HYGIENIC ASSESSMENT OF WORKING CONDITIONS OF EMPLOYEES IN MODERN HORTICULTURE AND VITICULTURE FARMS AND MEASURES FOR THEIR IMPROVEMENT

Abstract: *This article provides a comprehensive hygienic assessment of working conditions in modern horticulture and viticulture farms. The study identifies major occupational hazards, including physical, chemical, and ergonomic factors, and evaluates their impact on workers' health. Field observations, environmental measurements, ergonomic analysis, and questionnaire surveys were used. The results show that workers are exposed to high temperatures, solar radiation, agrochemical residues, and physically demanding tasks. Practical recommendations aimed at improving occupational safety and reducing professional risks are proposed.*

Keywords: *horticulture, viticulture, labor hygiene, occupational hazards, ergonomics, agrochemicals, worker safety.*

Introduction

Horticulture and viticulture are key branches of agriculture contributing significantly to national food security, export potential, and rural economic development. In countries with favorable climatic conditions such as Uzbekistan, the rapid expansion of orchards and vineyards has increased the demand for a skilled workforce and modern production technologies (FAO, 2023).

Despite their economic importance, these sectors are considered high-risk in terms of occupational health. Workers are frequently exposed to intense sunlight, elevated temperatures, agrochemical substances, repetitive manual labor, and prolonged awkward postures. These factors can lead to acute and chronic health disorders, negatively affecting work capacity and productivity (WHO, 2020).

Exposure to pesticides is one of the most serious health risks in horticulture. Numerous studies have reported allergic reactions, skin and eye irritation, respiratory problems, and chronic intoxication among workers handling agrochemicals (FAO/WHO, 2019). Additionally, the predominance of manual labor and inadequate mechanization contribute to musculoskeletal disorders such as low back pain, knee strain, and joint degeneration (Smith & Lee, 2020; Rahmonov, 2019).

According to ILO (2021), improving occupational safety in agriculture can increase productivity by 15–25%. Therefore, hygienic assessment of working conditions is crucial for preventing occupational diseases, reducing injury rates, and improving economic efficiency.

The aim of this research is to conduct a comprehensive hygienic assessment of the working conditions in modern horticulture and viticulture farms and to propose evidence-based measures to improve worker safety and health.

Materials and methods

The study was carried out in several horticultural and viticultural farms between 2024 and 2025. The following methods were employed:

1. Hygienic Assessment of Environmental Conditions

Measurement of air temperature, humidity, solar radiation, and wind speed.

Laboratory analysis of soil and air samples for nitrate, phosphorus, and organophosphate pesticide residues.

2. Health Monitoring

Standardized questionnaire for workers regarding fatigue, dizziness, cardiovascular complaints, and allergic reactions.

Measurement of blood pressure, pulse, and general somatic indicators.

3. Ergonomic Analysis

Observation and assessment of working postures.

Evaluation of the frequency and duration of repetitive motions and the weight of loads handled by workers.

4. Statistical Analysis

Data processed using SPSS 26 software.

t-test, chi-square test, and correlation analysis were applied.

Results

Physical Environmental Factors

1. During the summer season, workplace temperatures reached 36–42°C.

2. 68% of workers reported symptoms of heat exhaustion.

3. Signs of dehydration were observed in 41% of workers.

2. Chemical Risk Factors

Organophosphate pesticide residues in the air were 1.4 times higher than the permissible exposure limit in treated areas.

39% of workers reported allergic symptoms, including skin rash and eye irritation.

3. Ergonomic Findings

54% of workers reported lower back pain.

47% complained of knee discomfort.

In 70% of vineyards, low trellis structures forced workers to maintain prolonged bending postures.

4. Use of Personal Protective Equipment (PPE)

Only 32% of workers regularly used PPE.

48% lacked respirators and 61% lacked protective gloves.

Discussion

The findings demonstrate that working conditions in horticulture and viticulture farms pose significant occupational risks. High temperatures and prolonged exposure to sunlight contribute to heat stress and dehydration, consistent with global data on outdoor labor risks (Smith & Lee, 2020). Excessive levels of

pesticide residues confirm the seriousness of chemical exposure risks, which can lead to chronic neurological and immunological disorders (FAO/WHO, 2019).

Ergonomic problems—including repetitive tasks, manual handling of heavy loads, and awkward postures—are major contributors to musculoskeletal diseases, one of the most common occupational health issues in agriculture worldwide (Rahmonov, 2019).

PPE usage among workers was found to be critically low, which significantly increases vulnerability to chemical and physical hazards. Strengthening occupational safety culture, implementing regular training programs, and improving employer responsibility are essential to reducing workplace risks.

Conclusion and recommendations

Conclusion

The study revealed that workers in horticulture and viticulture farms are exposed to multiple physical, chemical, and ergonomic hazards. These risk factors significantly affect their health, contributing to heat stress, allergic conditions, and musculoskeletal disorders.

Recommendations

1. Optimize work schedules during hot seasons: shift work to early morning, increase rest breaks, ensure shade availability.
2. Strengthen pesticide safety protocols: enforce protective measures during pesticide application.
3. Provide 100% PPE coverage and enforce its mandatory use.
4. Improve ergonomic conditions: raise vineyard trellis height, introduce mechanization, and use lightweight tools.
5. Conduct regular medical check-ups twice a year.
6. Organize continuous occupational safety training programs.

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REGIONAL FEATURES OF ENVIRONMENTAL POLLUTION IN UZBEKISTAN

Abstract: *This article analyzes the regional features of environmental pollution in Uzbekistan. It examines the ecological problems of industrial zones, agricultural areas, and the Aral Sea region. The findings show that pollution levels vary across regions depending on climatic conditions, industrial activities, and the use of natural resources. The study highlights the need for region-specific environmental management strategies to ensure ecological stability.*

Keywords: *environment, pollution, regional characteristics, ecology, Aral Sea, air quality, water resources.*

1. Introduction

Environmental pollution in Uzbekistan has become a pressing issue, influenced by regional disparities in geography, economy, and resource utilization. The country's territory encompasses diverse natural zones — from desert regions in Karakalpakstan and Navoi to fertile valleys in Fergana and Samarkand — each facing unique environmental challenges.

Industrialization, intensive agriculture, and unsustainable water management have led to various forms of pollution, including air, water, and soil contamination. In the Fergana Valley, industrial emissions and vehicle exhausts contribute significantly to air pollution. In Kashkadarya and Bukhara regions, oil and gas extraction have caused soil and groundwater contamination. Meanwhile, the Aral Sea region suffers from catastrophic ecological degradation due to the desiccation of the sea, affecting both the environment and public health.

According to the State Committee for Ecology and Environmental Protection of Uzbekistan (2024), annual atmospheric emissions in the country exceed 1 million tons, with Tashkent, Navoi, Fergana, and Angren being the most polluted areas.

Purpose of the Study

The main objective of this study is to analyze the regional characteristics of environmental pollution in Uzbekistan, identify the main sources and types of pollutants in each region, and propose region-specific strategies for mitigating environmental degradation and ensuring sustainable development.

2. Methods

The research used a **comparative and analytical approach**, relying on:

1. **Statistical data** from the State Committee for Ecology, WHO, and the Ministry of Water Resources (2020–2024).

2. **Geographical information system (GIS)** analysis to visualize pollution distribution by region.

3. **Field surveys** and local monitoring reports on air and water quality.
4. **Correlation analysis** to compare industrial density, agricultural activity, and pollution levels.
5. **Literature review** of national and international environmental studies on Uzbekistan's ecology.

3. Results

- **Tashkent and Navoi regions** show the highest air pollution due to industrial enterprises and automobile density. PM_{2.5} and SO₂ levels often exceed recommended limits.

- **Fergana Valley** (Fergana, Andijan, Namangan) faces high pollution from chemical and textile industries, as well as agricultural runoff containing nitrates and pesticides.

- **Karakalpakstan (Aral Sea region)** remains the most ecologically vulnerable area. Frequent dust storms carry salt and toxic residues, contributing to respiratory diseases and land degradation.

- **Kashkadarya and Bukhara regions** experience soil and groundwater contamination due to oil and gas extraction and outdated waste disposal practices.

- **Surkhandarya and Jizzakh** show moderate pollution levels, mostly from agricultural chemicals and irrigation inefficiencies.

- Correlation analysis revealed that regions with higher industrial output have a direct increase in air pollution levels ($r = 0.78$), while agricultural zones show a correlation between fertilizer use and nitrate pollution in water ($r = 0.69$).

4. Discussion

The study reveals that environmental pollution in Uzbekistan is not uniformly distributed. It strongly depends on **regional economic specialization** and **natural geography**. Industrial areas face air pollution, while agricultural regions suffer mainly from soil and water contamination.

The **Aral Sea disaster** represents a unique regional case of ecological crisis. Over 6 million hectares of land have been affected by salinization, and dust-salt aerosols spread over 300–500 km annually, worsening air quality in surrounding regions. These environmental shifts have led to increased respiratory illnesses, reduced agricultural productivity, and migration from the most affected zones.

Addressing regional pollution requires **differentiated policies**. For instance:

- In industrial areas — strict emission control and cleaner production technologies;
- In agricultural regions — efficient irrigation systems and organic farming methods;
- In the Aral region — large-scale afforestation and desert reclamation projects.

Moreover, public participation and environmental education play a crucial role in preventing further degradation.

5. Conclusion

The analysis confirms that environmental pollution in Uzbekistan has distinct regional features shaped by industrial, agricultural, and climatic factors. The highest pollution levels are observed in the Tashkent, Navoi, and Fergana regions, while the Aral Sea zone remains the most ecologically endangered area.

A comprehensive, region-specific environmental policy — combining industrial modernization, green technologies, and community-based initiatives — is essential to ensure sustainable ecological balance and improve the health of the population.

Uzbekistan's experience demonstrates that ecological stability can only be achieved through a balanced relationship between economic growth and environmental protection.

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THE EFFECT OF PLANT DENSITY AND TOPPING METHODS ON COTTON YIELD

Abstract. *This article examines the yield indices of fine-fiber cotton varieties. The productivity coefficient, yield coefficient, and cotton yield are considered.*

Keywords. *Growth, development, cotton plant, shoot thickness, yield indices, yield coefficient.*

According to available data, cotton serves as a source of income and livelihood worldwide and is cultivated on 32 million hectares across 100 countries. Although the cultivated area has remained unchanged over the past 60 years, productivity has continued to increase. Cotton is grown in nearly 80 countries, accounting for only 2.5% of global cropland. From August 2017 to July 2018, the global cotton production value was estimated at approximately 50 billion USD [10].

N. Mahmudov studied the effect of plant density on the boll-setting process of the cotton varieties “Sulton” and “O‘zPITI-201” under the conditions of the Andijan region. The highest results were obtained in the 90×12–1 planting system when plant density was 95 thousand plants per hectare for the “Sulton” variety and 110 thousand plants per hectare for the “O‘zPITI-201” variety.

Research conducted by I. Bo‘riev and B. Tillabekov in the typical gray soils of the Kashkadarya region examined the influence of plant density on the technological properties of fiber in medium-fiber cotton varieties Namangan-77, Bukhara-6, S-6530, and Mehr. As plant density increased from 90 thousand to 120 thousand plants per hectare, positive effects on the technological properties of cotton fiber were observed, although fiber yield decreased slightly. Additionally, I. Bo‘riev [3] recommended a plant density of 120 thousand plants per hectare for obtaining high cotton yields (36.8, 38.2, 37.4, and 38 centners/ha for the respective varieties) and producing high-quality fiber from the Namangan-77, Bukhara-6, S-6530, and Mehr varieties. According to the experiments conducted by Rahmonqulov et al., when soil moisture was maintained at 65–70–65% of ChDNS and irrigation was applied accordingly, cotton yield in variants with a plant density of 90–100 thousand plants per hectare was 4.9–6.5 centners/ha higher compared to variants where plant density was kept at 120–130 thousand plants per hectare [6].

In the studies of S. Boltaev et al., when the cotton variety “ST-1651” was irrigated using the 0-2-0 irrigation regime and mineral fertilizers were applied at N–230, P–160, K–115 kg/ha, yield reached 27.9 centners/ha at a plant density of 80–90 thousand plants/ha, whereas increasing the density to 110–120 thousand plants/ha resulted in a yield of 31.7 centners/ha [7,4,8].

In the experiments conducted by T. Rajabov under the soil conditions of the Kashkadarya region, when the “Bukhara-102” cotton variety was grown on soils with different salinity levels, plant density ranged from 85.0–85.7 thousand plants/ha on moderately saline soils, 81.3–82.8 thousand plants/ha on slightly saline soils, and 74.3–75.8 thousand plants/ha on moderately saline soils. By the end of the growing season, soil salinity decreased by 1.2%, 2.1%, and 2.2%, respectively.

According to I. Vasilchenko, the optimal plant density for the variety 108-F at a 70 cm row spacing is 100–120 thousand plants per hectare; exceeding this density negatively affects plant development.

Research conducted by R. H. Peebles, G. T. Den Harton, and others showed that in irrigated fields of the United States, cotton yield was higher when hill spacing at a 100 cm row distance was 5–15 cm, compared to wider spacings of 30–41 cm.

According to experimental data obtained in the takir meadow soils of Surkhandarya region in 2018–2020, the actual plant density of medium-fiber cotton varieties was 95.7–96.0 thousand plants/ha for a theoretical density of 90–100 thousand plants/ha, and 116.5–117.1 thousand plants/ha for 110–120 thousand plants/ha. For fine-fiber cotton, actual plant density averaged 124.5–124.8 thousand plants/ha for a theoretical density of 120–130 thousand plants/ha, and 146.7–146.9 thousand plants/ha for 140–150 thousand plants/ha. Differences between variants were not significant.

From thinning to harvest, due to adverse weather, pests and diseases, cultivation and hoeing operations, and mechanical damage during ridge formation, 3.5–5.5 thousand cotton plants per hectare were lost. According to end-of-season data, the final plant density of medium-fiber cotton was 92.3–92.5 thousand and 111.1–111.6 thousand plants/ha; for fine-fiber cotton, it was 120.6–120.9 thousand and 141.6–141.9 thousand plants/ha. Thus, compared to early-season densities, plant loss totaled 3.5–5.5 thousand plants/ha. Variants with higher initial plant density experienced slightly higher mortality.

Plant mortality increased with increasing plant density: losses rose by 1.7–2.0 thousand plants/ha as density increased. For example, in medium-fiber cotton, when theoretical plant density was 90–100 thousand plants/ha, plant loss by the end of the season was 3.5–3.7 thousand plants/ha, whereas at 110–120 thousand plants/ha, mortality increased to 5.3–5.5 thousand plants/ha.

Similarly, in fine-fiber cotton, plant loss ranged from 3.9–5.2 thousand plants/ha. For the “Surxon-103” variety, plant mortality was 3.9–4.0 thousand plants/ha at a theoretical density of 120–130 thousand plants/ha; increasing plant density by 10–20 thousand plants/ha increased mortality by 1.0–1.3 thousand plants/ha, reaching 5.0–5.2 thousand plants/ha.

Thus, under the takir meadow soil conditions of Surkhandarya region, when medium- and fine-fiber cotton varieties are grown at optimal plant densities, their growth and development proceed normally, resistance to pests and diseases improves, and plant mortality by the end of the season is lower, ensuring higher cotton yields.

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BIOMETRIC INDICATORS OF COTTON

Abstract. *This article presents the results of scientific research on the cultivation of fine fiber cotton. Biometric and fertility indicators of promising varieties were compared.*

Keywords. *Cotton varieties, biometric indicators, productivity indicators, entogene, 1000 seed weight.*

In recent years, along with medium-fiber cotton varieties belonging to *Gossypium hirsutum* L., fine-fiber cotton varieties belonging to *Gossypium barbadense* L. have also been included in the State Register of agricultural crops recommended for cultivation in the territory of the Republic of Uzbekistan. In particular, according to Resolution No. 47 of the Cabinet of Ministers dated January 30, 2020, fine-fiber cotton varieties that have been grown as “promising varieties” were evaluated based on their performance in production, and it was decided to include them in the State Register of agricultural crops recommended for cultivation in Uzbekistan. In accordance with Decision No. 41 of the Crop Variety Testing Center dated 27 December 2019, the varieties Surxon-14, Surxon-16, and Surxon-103 were included in the State Register for the Surkhandarya region.

This, in turn, increases competition among fine-fiber varieties and ultimately contributes to the development of cotton varieties possessing valuable agronomic traits such as high yield, superior fiber quality, and resistance to pests.

The removal of the apical growth point of the cotton plant to stop the growth of the main stem and monopodial branches is termed “topping,” and it is considered one of the most important agrotechnical measures for achieving high yield. When performed on time and with proper quality, topping prevents premature shedding of fruiting organs, promotes the formation of more mature bolls, accelerates ripening, increases yield by 3–4 centners per hectare, and improves fiber quality. Based on long-term scientific research, topping was officially introduced in Uzbekistan in 1939 as a mandatory agricultural practice in cotton cultivation.

When topping is carried out correctly and on time, shedding of fruiting elements decreases, cotton growth and development accelerate by 7–8 to 10 days, 3–4 more bolls are produced, the weight of a single boll increases by 0.3–0.5 g, yield increases by 3–5 to as much as 8 centners per hectare, cotton can be harvested completely within one to two pickings, fiber quality improves by 25–30%, seed weight increases, oil content rises by 1–2%, and bollworm infestation decreases by 50–60% [6,8,9].

According to available data, in Uzbekistan the use of the preparations Sojean and Entojean during cotton vegetation (square formation, flowering, and boll-

setting stages) at application rates of 15 + 45 + 90 g/ha, or a single application of 100–110 g/ha at the stage of 12–13 fruiting branches, as well as Dalpix at 1.0–1.5 L/ha and Pix at 1.5–2.0 L/ha—sprayed 5–7 days before or after irrigation—eliminates the need for manual topping.

Throughout the vegetation period, cotton can form numerous fruiting bodies, and yields of 150–200 centners per hectare are theoretically achievable. However, due to various natural and anthropogenic factors, it is impossible to preserve all fruiting elements. F. Teshaev et al. studied the effect of plant density and topping on shedding of fruiting elements. In the O'zPITI-202 cotton variety, at a density of 100–110 thousand plants per hectare, the least shedding occurred when topping was performed at the stage of 13–14 fruiting branches, amounting to 6.6%, which was 7.1% lower than in the untreated variant. Delaying topping, performing it poorly or carelessly, or failing to carry it out reduces yield by 20–25%, delays ripening by 10–15 days, results in smaller and lighter bolls, causes excessive leaf growth, and increases susceptibility to pests.

Increasing output and improving quality in cotton production largely depend on timely irrigation and fertilization, as well as proper scheduling of topping to direct the plant toward boll formation. In Sh. Rakhmonov's experiments, topping at the stage of 14–15 fruiting branches resulted in 11.1–12.2 bolls per plant and the highest yields.

When applying defoliants to cotton, it is essential to determine application timing and methods based on the topping schedule and technique. According to the recommendations of X. Abdurakhmonov et al., conducting chemical topping at the stage of 13–14 fruiting branches ensures optimal defoliant effectiveness.

According to X. Egamov and colleagues, topping of the "Andijon-35" cotton variety should be carried out by taking into account the plant density in each specific field. When plant density is 80–90 thousand plants per hectare, topping should be performed when 14–15 fruiting branches have formed; at 90–100 thousand plants per hectare, when 13–14 fruiting branches appear; and at 100–120 thousand plants per hectare, when 12–13 fruiting branches are formed. If the variety is cultivated in accordance with scientific recommendations, it is possible to obtain 40–45 centners of high-quality cotton per hectare.

The effect of plant density on the weight of lint per boll, along with other factors, was also determined. In the medium-fiber variety "Bukhara-102," when plant density was 90–100 thousand plants/ha, the weight of lint per boll during the first harvest ranged from 5.0 to 5.9 g. When plant density was increased by 10–20 thousand plants/ha, boll weight decreased to 4.5–5.5 g, i.e., by 0.4–0.5 g.

When studying the effect of topping methods on boll weight in addition to plant density, it was found that in the "Bukhara-102" variety at a plant density of 90–100 thousand plants/ha, the highest boll weight (5.9 g) was achieved in the variant treated with the chemical topping agent Entojean. This was 0.9 g higher than the untreated control and 0.5 g higher than the manually topped variant.

In the fine-fiber variety “Surxon-103,” boll weight ranged from 3.2 to 3.6 g at a density of 120–130 thousand plants/ha, and from 2.8 to 3.2 g at 140–150 thousand plants/ha. As plant density increased, boll weight decreased by 0.3–0.4 g. Among the topping methods tested at a density of 120–130 thousand plants/ha, the highest boll weight (3.6 g) was again observed in the variant treated with Entojean.

In the medium-fiber “Bukhara-102” variety, the 1000-seed weight over three years averaged 118.7–122.4 g. At a density of 90–100 thousand plants/ha, the 1000-seed weight was 120.6–122.4 g, whereas at 110–120 thousand plants/ha it was 118.7–120.5 g. Increasing plant density by 10–20 thousand plants/ha resulted in a reduction of up to 1.9 g in 1000-seed weight.

In the fine-fiber “Surxon-103” variety, the 1000-seed weight over three years averaged 124.6–120.6 g, which was 2.0–2.7 g higher than in the medium-fiber “Bukhara-102” variety. However, a decrease in 1000-seed weight was also observed with increasing plant density. At 120–130 thousand plants/ha, the 1000-seed weight ranged from 122.6 to 124.6 g. In the untreated control, the weight was 122.6 g, while manual topping increased it to 123.4 g, and chemical topping with Entojean increased it by 2.0 g compared to the control, reaching 124.6 g.

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THE INFLUENCE OF ENVIRONMENTAL FACTORS ON THE GROWTH AND DEVELOPMENT OF FINE-FIBER COTTON

Abstract. *This article examines the influence of external environmental factors on the growth and development of fine fiber cotton.*

Keywords. *Agrotechnical measures, herbivorous bugs, seed planting, cotton, seedling thickness.*

Introduction: Uzbekistan is one of the world's leading countries in cotton production, and two main types of cotton are cultivated in the country: medium-fiber (*Gossypium hirsutum*) and fine-fiber (*Gossypium barbadense*) varieties. Fine-fiber cotton varieties are distinguished by their superior fiber quality. However, these varieties are adapted to hot climates and can therefore be cultivated only in the southern regions of Uzbekistan. In addition, their yield and fiber output are somewhat lower compared to medium-fiber cotton varieties.

Medium-fiber cotton, which accounts for more than 95% of global cotton fiber production, surpasses other cotton types in terms of productivity and fiber output. Nevertheless, its fiber quality—compared to that of fine-fiber cotton—is shorter, coarser, and less strong [2]. Of the cotton fiber produced worldwide, 9.41 million tons are exported, of which 38.2 percent—or 3.592 million tons—is exported by the United States, placing it first in the world in cotton exports. Furthermore, 82 percent of the cotton fiber produced in the United States is exported [1].

Today, nearly 200 million people in 84 countries are engaged in sowing cotton seeds on 32–33 million hectares of land, producing and processing cotton. Uzbekistan ranks sixth in the world in cotton production, following China, India, the United States, Pakistan, and Brazil. Previously, Uzbekistan held third place in cotton fiber exports, after the United States and India; however, in recent years, due to the development of domestic cotton-processing industries, the country has shifted to sixth place [2,6].

At present, global demand for high-quality cotton fiber is increasing. This necessitates the adaptation of each cotton variety's planting density, irrigation regime, and fertilization practices to the specific conditions of each region, making it a pressing and important task.

A. Haydarov recommended that for the “Andijon-37” cotton variety, when using water- and resource-saving technology—specifically the 60×15–1 planting system, which is an important element of this technology—cotton seeds should be sown under film, and transparent film should be laid in the furrows during irrigation.

Under these conditions, the optimal plant density should be 95–100 thousand plants per hectare [3].

According to Kh. Tursunov, in the light gray soils of the Andijan region, to obtain high and quality yields from the newly introduced “Andijon-37” cotton variety, the optimal plant density should be 113–114 thousand plants per hectare when sown in single rows, and 144–145 thousand plants per hectare when sown in double rows [4]. S. Kh. Yuldoshev reported that good results were obtained when the plant density was 114 thousand plants per hectare, whereas when plant density reached 171 thousand plants per hectare, yield decreased due to excessive plant crowding and increased lodging. Based on the obtained data, it was concluded that in typical gray soils with deep groundwater levels, the optimal plant density for medium-fiber cotton varieties should be 120–130 thousand plants per hectare.

According to the results of the conducted experiments, phenological observations recorded in early June showed no significant differences between the variants. Plant height increased by 2–3 cm as plant density increased. After topping (pinching) was performed, differences among the variants became evident. According to phenological observations recorded in September, the height of the medium-fiber “Bukhara-102” variety ranged from 93.0 to 105.2 cm at a plant density of 90–100 thousand plants per hectare, and from 95.0 to 109.0 cm at a density of 110–120 thousand plants per hectare—i.e., an increase of 2.0–4.0 cm with increasing density; in cases where topping was not performed, height increased by 10.0–15.0 cm.

As plant density increased, the number of fruiting branches per plant decreased by 1.5–2.0 units; fruiting elements decreased by 1.3–1.7 units; the number of bolls decreased by 1.3–2.2 units, including 1.2–1.8 open bolls. However, when chemical or manual topping was carried out, compared to the untreated control, the number of fruiting branches increased by 0.8–1.3; fruiting elements by 2.7–4.3; bolls by 2.5–4.0, including 2.6–3.2 open bolls. Moreover, chemical topping produced 2.0–2.5 more fruiting branches, fruiting elements, and bolls than manual topping.

The same pattern was observed in the fine-fiber “Surxon-103” variety, with results slightly higher than those of the medium-fiber variety. In September, the plant height at 120–130 thousand plants per hectare was 95.0–110.2 cm, while at 140–150 thousand plants per hectare it was 100.6–115.0 cm, showing a 5.0–6.0 cm increase with higher density; without topping, height increased by 11.0–15.0 cm.

In the “Surxon-103” variety, as plant density increased from 120–130 thousand to 140–150 thousand plants per hectare, the number of fruiting nodes per plant decreased by 1.0–2.0 units; fruiting elements decreased by 1.4–1.7 units; bolls decreased by 1.5–3.5 units, including 2.0–3.0 open bolls. When chemical and manual topping were performed, compared to the untreated variant, the number of fruiting nodes increased by 0.3–1.6; fruiting elements by 0.6–2.1; bolls by 2.7–4.5, including 2.3–3.0 open bolls. Chemical topping produced 2.3–2.7 more fruiting nodes, fruiting elements, and bolls than manual topping.

It is well known that stink bugs (mirids) suck the sap from cotton leaves and fruiting bodies, causing them to die. When cotton is damaged by stink bugs, the leaves become perforated, and the fruiting bodies—squares, flowers, and bolls—shed prematurely. During phenological observations in July, both formed and shed fruiting elements were counted. According to the obtained results, in the medium-fiber “Bukhara-102” variety, 20.4–26.6 fruiting elements developed, while 5–9 fruiting elements were damaged and shed. In the fine-fiber “Surxon-103” variety, the number of shed fruiting elements was similarly recorded as 6–8 units.

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EPIDEMIOLOGICAL TRENDS AND RISK FACTORS OF ATOPIC DERMATITIS IN CHILDREN

Abstract: *Atopic dermatitis (AD) is one of the most prevalent chronic inflammatory skin disorders among children, with a steadily increasing global burden. This condition is characterized by recurrent eczematous lesions, intense pruritus, and immune dysregulation. The aim of this study is to review modern epidemiological trends, major risk factors, and determinants contributing to the onset and progression of AD in pediatric populations. Literature analysis shows that genetic predisposition, environmental allergens, impaired skin barrier function, and early-life immune deviations remain the leading contributors. Recent evidence also highlights the influence of microbiome alteration, dietary patterns, and urban lifestyle. Understanding these multifactorial mechanisms is essential for developing effective prevention strategies and targeted therapeutic approaches. Strengthening public health awareness and early risk assessment may reduce the long-term burden of childhood AD.*

Keywords: *atopic dermatitis, children, epidemiology, risk factors, skin barrier, microbiome*

1. Introduction

Atopic dermatitis (AD) is a chronic relapsing inflammatory skin disease that predominantly begins in early childhood and affects millions of children worldwide. Over the past decades, the global prevalence of AD has shown a significant upward trend, particularly in industrialized and rapidly urbanizing regions. Studies report prevalence rates ranging from 15% to 30% among children, making AD one of the leading pediatric dermatologic conditions.

The pathogenesis of AD is complex and multifactorial, involving genetic predisposition, environmental exposures, immune dysregulation, and impaired epidermal barrier function. Mutations in the filaggrin (FLG) gene, responsible for maintaining the integrity of the skin barrier, have been strongly associated with early-onset AD, increased allergen penetration, and susceptibility to secondary infections.

Environmental influences—such as air pollution, increased exposure to household allergens, and urban lifestyle—contribute to the rising incidence. Additionally, changes in early nutrition, reduced microbial exposure (hygiene hypothesis), and altered gut-skin microbiome interactions have been proposed as major contributors.

The burden of AD extends beyond dermatological symptoms. Chronic itching severely affects sleep quality, cognitive development, behavioral outcomes, and overall quality of life. Parents and caregivers also experience emotional and financial stress due to recurrent medical visits and long-term therapy.

Despite numerous studies, gaps remain in understanding how modern lifestyle, genetic factors, and environmental pressures interact to influence AD onset and severity in children. Therefore, this article aims to analyze contemporary epidemiological patterns and identify key risk factors contributing to the rising trend of childhood atopic dermatitis.

2. Methods

A narrative review methodology was used for this study. Publications from 2015–2024 were analyzed using Google Scholar, PubMed, ScienceDirect, Scopus, and WHO dermatology reports. Keywords included “atopic dermatitis,” “children,” “epidemiology,” “risk factors,” and “skin barrier dysfunction.”

Inclusion criteria: studies focusing on pediatric populations, clinical, epidemiological, and pathophysiological research, high-impact review articles and meta-analyses, WHO and dermatology society guidelines

Exclusion criteria: studies with insufficient sample size, non-peer-reviewed materials, A total of 62 articles were reviewed, and the most relevant data were synthesized.

3. Results

3.1 Epidemiological Trends

AD prevalence has increased globally, reaching up to 30% in some pediatric populations.

Higher prevalence is noted in urban areas compared to rural regions.

Low- and middle-income countries are experiencing a rapid rise due to industrialization and pollution.

Early onset (before age 2) is observed in nearly 60% of cases.

3.2 Major Risk Factors Identified

Genetic factors: FLG mutations strongly correlate with early onset and severe forms.

Environmental factors: air pollution (PM_{2.5}, NO₂), indoor allergens (dust mites, pet dander, molds),

low humidity and cold climates

Immune dysregulation: Children with Th2-skewed immune profiles show increased susceptibility.

Skin barrier impairment: Decreased ceramides and filaggrin, increased transepidermal water loss.

Microbiome alteration: Overgrowth of *Staphylococcus aureus* worsens inflammation.

Perinatal factors: cesarean delivery, lack of breastfeeding, early antibiotic exposure

3.3 Psychosocial and Behavioral Findings

Sleep disturbances occurred in >70% of children with moderate-severe AD.

Quality of life was significantly reduced among affected children and families.

4. Discussion

The findings of this review confirm the multifactorial nature of atopic dermatitis in children. The interplay between genetic predisposition and environmental influence remains the leading determinant. The increasing prevalence in urban settings supports the hypothesis that industrial pollution and reduced natural microbial exposure play a key role.

Improved understanding of the microbiome has influenced new therapeutic approaches, including microbiome-friendly skin care and targeted probiotic interventions. Early risk assessment in genetically predisposed infants and preventive strategies—such as maintaining optimal skin hydration, breastfeeding promotion, and allergen avoidance—can reduce disease severity.

Despite advances, challenges remain in ensuring early diagnosis, minimizing disease progression, and improving access to specialist care. Greater awareness among parents, teachers, pediatricians, and the general community is essential.

5. Conclusion

Atopic dermatitis in children is a growing global health issue influenced by genetic, environmental, and immunological factors. Recognizing modern epidemiological trends and addressing key risk factors can improve early diagnosis and prevention. Strengthening public health education, promoting skin barrier protection, and implementing targeted preventive measures may significantly reduce the long-term burden of childhood AD.

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ATOPIC DERMATITIS: CLINICAL FEATURES, DIAGNOSTIC METHODS, AND EMERGING TECHNOLOGIES IN TREATMENT

Annotation: *This article summarizes the main clinical features of atopic dermatitis, modern diagnostic methods, and new treatment technologies. Literature data show that AD is characterized by chronic inflammation, pruritus, and skin-barrier dysfunction. Current diagnostics include dermoscopy, biomarkers, and TEWL measurement. Innovative therapies—such as biologics, JAK inhibitors, and microbiome-based approaches—significantly improve disease management. The review emphasizes the importance of combining precise diagnostics with targeted treatment to enhance patient outcomes.*

Keywords: *atopic dermatitis, clinical features, diagnosis, biologics, JAK inhibitors, skin barrier, TEWL*

1. Introduction

Atopic dermatitis (AD) is one of the most common chronic inflammatory skin disorders, affecting 15–30% of children and 3–10% of adults worldwide. It is characterized by intense pruritus, recurrent eczematous lesions, and impaired skin barrier function. Disease prevalence continues to rise due to environmental changes, urbanization, and lifestyle factors.

The pathogenesis of AD involves a complex interaction between genetic susceptibility, immune hyperreactivity, microbiome imbalance, and environmental triggers. Filaggrin gene mutations, a hallmark contributor, are associated with severe xerosis, transepidermal water loss, and increased sensitization to allergens.

Diagnosing AD traditionally depends on clinical features; however, modern dermatology incorporates objective methods such as TEWL measurement, noninvasive biomarkers, and advanced imaging.

Similarly, the therapeutic landscape has evolved dramatically. Beyond emollients and topical corticosteroids, recent innovations include biologics targeting IL-4 and IL-13 pathways, JAK inhibitors, phototherapy technologies, and microbiome-based therapies.

Given these developments, an integrated understanding of clinical presentation, updated diagnostics, and advanced treatments is essential for effective AD management. This article reviews current knowledge and innovations that support personalized and evidence-based care in AD.

2. Methods

A structured literature review was conducted using PubMed, Scopus, Google Scholar, and dermatology society guidelines (AAD, EAACI, EADV). Publications between 2015–2024 were included. Search terms included:

“atopic dermatitis,” “clinical features,” “diagnosis,” “biologics,” “skin barrier,” “TEWL,” and “JAK inhibitors.”

Inclusion criteria: peer-reviewed studies, clinical trials, meta-analyses, and reviews,

focus on diagnosis and treatment

Exclusion criteria: case reports, outdated guidelines.

A total of 85 sources were screened; 52 were selected for narrative synthesis.

3. Results

3.1 Clinical Features

Atopic dermatitis presents with hallmark symptoms:

Intense pruritus (most disabling feature)

Xerosis and lichenification

Erythematous, eczematous lesions

Age-dependent patterns:

Infants: acute, exudative lesions on the cheeks and scalp

Children: flexural involvement (elbow, knees)

Adults: chronic lichenified plaques, hand dermatitis

Triggers include allergens, irritants, sweating, infections, stress, and climate changes.

3.2 Diagnostic Methods

3.2.1 Clinical Diagnosis

Still the gold standard; based on Hanifin and Rajka or UK Working Party Criteria.

3.2.2 Dermoscopy

Allows visualization of: dotted vessels, yellow-white scales, crust patterns indicating secondary infection

3.2.3 Biomarkers

Emerging biomarkers include: total IgE, eosinophil count, TARC/CCL17, periostin

These support disease severity assessment.

3.2.4 Imaging and Digital Tools

Optical coherence tomography (OCT) for microstructural skin evaluation

High-frequency ultrasound for epidermal thickness

AI-based mobile apps for severity scoring (EASI/SCORAD)

3.2.5 Skin Barrier Assessment

Transepidermal water loss (TEWL) as a key indicator of barrier impairment

Corneometry for hydration

3.3 New Technologies in Treatment

3.3.1 Biologic Therapies

Targeted antibody treatments revolutionizing AD care:

Dupilumab (IL-4R α blocker)

Tralokinumab (IL-13 inhibitor)

Provide significant reduction in inflammation and itch.

3.3.2 JAK Inhibitors

Oral and topical JAK1/2 inhibitors: upadacitinib, abrocitinib, ruxolitinib (topical)

Offer rapid symptom control.

3.3.3 Microbiome-Based Interventions

topical bacterial transplant

Staphylococcus hominis A9 therapy

probiotics and prebiotics

Help rebalance dysbiosis.

3.3.4 Advanced Topical Delivery Systems: nanocarriers, lipid nanoparticles, filaggrin-repair moisturizers, Improve drug penetration and barrier recovery.

4. Discussion

The analysis demonstrates that AD management has evolved from basic symptomatic treatment to precise, targeted, and personalized care. The integration of biomarkers, digital tools, and imaging techniques enhances diagnostic accuracy, while biologics and JAK inhibitors significantly improve clinical outcomes in moderate-to-severe AD cases.

Barrier repair remains the foundation of therapy, emphasizing the importance of moisturization, protection from irritants, and allergen control. Advances in nanotechnology and microbiome therapeutics address underlying pathophysiology rather than merely alleviating symptoms.

Future perspectives include gene-targeted therapy, microbiome engineering, AI-driven diagnostics, and personalized immunomodulation based on molecular profiling.

5. Conclusion

Atopic dermatitis is a multifaceted skin disorder requiring accurate diagnosis and tailored therapy. Modern diagnostic techniques—supported by biomarkers, imaging, and TEWL measurement—enhance clinical decision-making. Emerging technologies such as biologics, JAK inhibitors, microbiome therapies, and digital monitoring tools provide substantial progress in disease control.

Continued innovation and personalized management strategies will improve quality of life for patients with AD.

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BIM VA SUN'IY INTELLEKT INTEGRATSIYASI ORQALI QURILISH JARAYONLARINI RAQAMLASHTIRISH

Annatsiya: *Sun'iy intellekt yordamida BIM ma'lumotlarini tahlil qilish va qurilish jarayonini raqamlashtirish ushbu tadqiqotning markaziy yo'nalishini tashkil etadi. Tadqiqotning maqsadi — so'nggi yillarda ortib borayotgan ma'lumotlar hajmi, real vaqt monitoringi talablari va resurslarni optimallashtirish ehtiyojlari fonida SI-BIM integratsiyasining imkoniyatlarini baholashdir. Metodologiya sifatida tizimli yondashuv, kontent-tahlil va xalqaro tajriba tahlili qo'llanilib, 2015–2025-yillarda Google Scholar, Springer va ResearchGate'da e'lon qilingan manbalar o'rganildi. Tahlillar shuni ko'rsatadiki, mashinaviy o'qitish, kompyuter ko'rish, tabiiy tilni qayta ishlash va prediktiv analitika BIM modellarida kolliziyalarni avtomatik aniqlash, xarajat va muddatlarni prognozlash, xavfsizlik monitoringini kuchaytirish, ekspluatatsiya jarayonini optimallashtirish va loyiha ishtirokchilari o'rtasidagi raqamli hamkorlikni takomillashtiradi. AQSh, Buyuk Britaniya, Janubiy Koreya va Singapur tajribalari SI-BIM integratsiyasi infratuzilma va yirik qurilish loyihalarida yuqori samaradorlik berayotganini tasdiqlaydi.*

Tadqiqotdan kelib chiqqan xulosaga ko'ra, SI va BIM uyg'unlashuvi qurilishning to'liq raqamli transformatsiyasi uchun strategik ahamiyatga ega bo'lsa-da, ma'lumotlar sifati, standartlar mosligi, integratsiya murakkabligi va malakali kadrlar yetishmovchiligi kabi muammolar hal qilinishi lozim bo'lgan dolzarb masalalar bo'lib qolmoqda.

Kalit so'zlar: *Sun'iy intellekt (AI), BIM, AI-BIM integratsiyasi, qurilish jarayonlarini raqamlashtirish, generativ loyihalash, bashoratli modellashtirish (Predictive analytics), loyiha boshqaruvi va monitoring, raqamli qurilish (Digital construction), AIoT (Sun'iy intellekt + IoT) monitoring tizimlari, raqamli transformatsiya*

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DIGITIZATION OF CONSTRUCTION PROCESSES THROUGH BIM AND ARTIFICIAL INTELLIGENCE INTEGRATION

Abstract: *The analysis of BIM data using artificial intelligence and the digitalization of the construction process constitute the central focus of this study. The aim is to assess the potential of AI-BIM integration in the context of increasing data volumes, real-time monitoring requirements, and the need for resource*

optimization. The methodology includes a systematic approach, content analysis, and a review of international practices, examining sources published between 2015 and 2025 in Google Scholar, Springer, and ResearchGate. The findings indicate that machine learning, computer vision, natural language processing, and predictive analytics enhance BIM by enabling automated clash detection, cost and schedule forecasting, improved safety monitoring, optimized facility operation, and more efficient digital collaboration among project stakeholders. Case studies from the USA, the United Kingdom, South Korea, and Singapore confirm the high effectiveness of AI–BIM integration in infrastructure and large-scale construction projects.

According to the study's conclusions, while the synergy between AI and BIM is strategically significant for the full digital transformation of the construction sector, several challenges remain unresolved, including data quality issues, standard compatibility, integration complexity, and the shortage of qualified specialists.

Keywords: Artificial Intelligence (AI), BIM, AI–BIM integration, construction digitalization, generative design, predictive analytics, project management and monitoring, digital construction, AIoT (AI + IoT) monitoring systems, digital transformation.

1. Kirish

XXI asr qurilish va arxitektura sohasida raqamli transformatsiya poydevorini qayta shakllantirmoqda. An'anaviy chizmalar va 2D hujjatlashuvlar o'rnini 3D va ko'p o'lchamli ma'lumot modellari egallab, loyihaning hayotiylik davrining barcha bosqichlarida — loyihalash, qurilish, ekspluatatsiya va saqlashda — samaradorlik, shaffoflik va koordinatsiyani oshirishga xizmat qilmoqda [1]. Bunday raqamli paradigmada markaziy o'rinlardan birini egallaydigan texnologiyalardan biri bu Building Information Modeling (BIM) hisoblanadi. BIM yordamida bino/inshootning geometriyasi, strukturasiyaviy ma'lumotlari, materiallar, smeta, vaqt jadvali, xizmat ko'rsatish rejasi va boshqa ma'lumotlar bitta integratsiyalashgan modelga jamlanadi. Bu esa loyiha jarayonidagi xatoliklar va nomuvofiqliklarni erta bosqichda aniqlashga imkon yaratadi [2].

Biroq so'nggi yillarda global qurilish sanoatida faqat BIM joriy etish yetarli emasligi yaqqol ko'zga tashlanmoqda. Loyihalar hajmi o'sishi, qurilish jarayonlari murakkablashuvi va ma'lumotlar hajmining keskin oshishi BIM ma'lumotlar bazasini faqat vizual va parametrik model sifatida emas, balki keng ko'lamli ma'lumot omboriga aylantirish zaruratini tug'dirdi. Shu kontekstda, Artificial Intelligence (AI) — mashinani o'rganish, chuqur o'rganish, bashoratli tahlil va boshqa algoritmik usullar orqali — BIM ma'lumotlarini tahlil qilish, ulardan naqsh va tendensiyalarni ajratib olish hamda qurilish jarayonlarini prognozlash va optimallashtirish imkonini beradi [3, 4].

So'nggi yillarda ilmiy adabiyotlarda AI va BIM integratsiyasiga oid tadqiqotlar keskin ko'paydi. Masalan, 2024-yilda e'lon qilingan tahliliy maqolada mualliflar AI yordamida BIM va IFC ma'lumotlarining analitik tayyorligini tahlil

qilgan [5]. Shuningdek, 2025-yilda nashr etilgan tadqiqot AI–BIM birlashmasi loyihalash va qurilish metodologiyalarida samaradorlik, aniqlik va qarorlarni qo‘llab-quvvatlashni sezilarli darajada oshirganini ko‘rsatdi — jumladan, loyihalash jarayonida takrorlanuvchi vazifalarni avtomatlashtirish, kompleks ma’lumotlarni tahlil qilish va aniq koordinatsiyani ta’minlash orqali [6].

Shu nuqtai nazardan, bizning maqolamiz maqsadi — AI yordamida BIM ma’lumotlarini chuqur tahlil qilish orqali qurilish jarayonlarini raqamlashtirish va optimallashtirish imkoniyatlarini tahliliy jihatdan ko‘rib chiqishdir.

Xususan, quyidagi savollarga javob izlanadi:

- BIM ma’lumotlari AI tomonidan qanday tahlil qilinishi mumkin?
- AI–BIM integratsiyasi qurilish loyihalarining samaradorligi va aniqligini qanday oshiradi?
- Bunday integratsiyaning cheklovlari, muammolari va ular bilan bog‘liq tavakkalchiliklar nimalardan iborat?
- Kelajakda AI–BIM birlashmasi qurilish sanoatida qanday istiqbollarni ochishi mumkin?

Maqolaning keyingi bo‘limlarida zamonaviy adabiyotlar sharhi, metodologik yondashuv, tahliliy muhokama hamda kelajak istiqbollari keltiriladi.

2. Adabiyotlar sharhi

Quyidagi fikrlarni, yaqindagi ilmiy maqolalar, tizimli sharhlar va tanqidiy izlanishlar asosida tahlil qilamiz.

Khan va boshq. (2024) 2015–2024 yillardagi 64 ta maqolani o‘rganib, BIM-AI integratsiyasining muammolari va yechimlarini izohlashgan [3].

Ta’kidlanishicha, BIM loyihalari davomida astoydil ham kattaroq ma’lumotlar (BIG DATA) yig‘iladi. Biroq loyiha guruhlari mazkur katta hajmdagi ma’lumotni chuqur tahlil qilib, qimmatli ma’lumotga aylantira olishmaydi [3].

Ushbu muammolarni bartaraf etishda AI katta yordam beradi: u turli manbalardagi ma’lumotlar to‘plamini tezkor tahlil qilib, jarayonlarni avtomatlashtirish va BIM modellari ichidagi ma’lumotlardan qimmatli xulosalar chiqarishga xizmat qiladi [3]. Masalan, maqolada aytilishicha, BIM-AI birikmasi yordamida loyihaning avtomatlashtirilgan loyihalash modellari, avtomatik kod tekshiruvi, ishlar progressini kuzatish va umuman loyiha samaradorligini boshqarish kabi yangi imkoniyatlar yuzaga keladi [3]. Mualliflar 39 ta muammo va to‘siqni aniqlab, ularni texnik, bilim, ma’lumot, tashkilot, boshqaruv va moliyaviy toifalarga ajratishgan.

Tahlillarga ko‘ra ayniqsa moliyaviy va tashkiliy sohalardagi muammolar eng jiddiy ekanligi aniqlangan [3]. Ular qatorida tezkor qaror qabul qilish, birgalikda ishlash va ma’lumotlarni boshqarish borasida strategik choralar chizish tavsiya etiladi. Bu maqolada BIM va AI konsepsiyalari bo‘yicha mavjud ilmiy yondashuvlar tizimli ravishda umumlashtirilgan, BIM-AI integratsiyasi imkoniyatlari va to‘siqlari kontseptual tahlil qilingan.

Valdebenito va Forcael (2025) 2022–2025 yillardagi ilmiy ishlarga asoslanib, BIM va AI integratsiyasidagi amaliyotlarni chuqur o‘rganadi. Mualliflar topgan asosiy tendensiya – chuqur o‘rganish (Deep Learning) usullarining kuchli ta’siri,

xususan raqamli egizaklar (Digital Twins) hamda BIM model yaratish (BIMM) sohalarida [7]. 4D/5D BIM (vaqtdagi va xarajatdagi o'Ichamlar) ikkinchi darajali yo'nalish bo'lib, CDE (Umumiy Ma'lumot Muhiti) va to'qnashuv aniqlash (CD) sohalarida tadqiqotlar kamroq. Mualliflarning fikricha, BIM – qurilish axborotining markaziy zaxirasi bo'lsa, AI esa analitika va bashorat funktsiyalarini bajargan holda yaqindan real vaqt rejimida qaror qabul qilishga zamin yaratadi [7].

Shuningdek, avtomatlashtirilgan ML-model ishlashi (AutoML) va MLOps jarayonlari kabi yangi yondoshuvlar yordamida BIM modellari uchun qo'shimcha ma'lumot yaratish va yechimlarni loyihalashtirish imkoniyati ko'rsatilgan.

Tadqiqot yakunida mualliflar BIM loyihalarida standartlangan metrikalar, umumiy ma'lumotlar to'plamlari va MLOps tamoyillariga asoslangan ishlov jarayonlarini rivojlantirishni muhim masala deb hisoblaydilar. Bu esa AI texnologiyalarini haqiqiy sharoitda keng joriy etishga yordam beradi [7].

Sacks va boshq. (2020) qurilish texnologiyalarida raqamli ma'lumotlarga tayanish masalalarini tahlil qiladilar. Ular qayd etishicha, BIM qurilish obyektlarining raqamli tasviri va axborot bazasini ta'minlaydi, biroq ayni paytda BIM modellarini yanada boyitish va sun'iy intellektga mos ma'lumot formatini yaratish kabi muammolar mavjud [8]. Xususan, «BIM modellari semantik jihatdan boyitilishi» va «AI uchun mos BIM namoyish shakllarini yaratish» dolzarb tadqiqot sohaları sifatida ko'rsatilgan [8].

Demak, BIM ma'lumotlarini sun'iy intellekt orqali tahlil qilishda asosiy masalalardan biri – BIM modelini kompyuter tushunarli, boy ma'noda ifodalash va standartlashtirish ekanligi ta'kidlangan.

Heidari va boshq. (2024) 2015–2022 yillardagi adabiyotlarni o'rganib, BIM va AI integratsiyasining tendensiyalarini hamda istiqbollarini ko'rib chiqdilar. Sharh natijalariga ko'ra, kelajakda BIM modellarini robototexnika, bulut tizimlari, AIoT (Sun'iy Intellektli Internet of Things), raqamli egizaklar, 4D bosib chiqarish va blokcheyn kabi ilg'or texnologiyalar bilan birga qo'llashni o'rganish tavsiya qilingan [9].

Masalan, loyiha hayot tsiklida (loyihalash, qurilish, ekspluatatsiya) BIM orqali hosil qilingan ko'p atributli ma'lumotlar bazasini AI usullari bilan bog'lash orqali loyiha samaradorligi, resurs oqimi nazorati va energiya tahlillari kabi jarayonlar optimallashtirilishi mumkinligi ta'kidlangan.

O'rganilgan maqola shuningdek sun'iy intellekt bilan integratsiyalashgan aqlli tizimlarning sanoatdagi roli, ma'lumotlar oqimi va ko'pkomponent tizimlar sinxronlashuvi kabi nazariy tamoyillar haqida fikr beradi.

Alves va boshq. (2025) BIM va AI imkoniyatlarini birlashtirish orqali «aqlli» arxitektura va qurilish loyihalarini yanada takomillashtirishga e'tibor qaratadilar. Ularning fikricha, BIM 3D paramterli obyekt-based axborot hamda butun loyiha bo'ylab to'planadigan ma'lumotlar bazasini yaratadi va aytishicha, aynan ushbu ma'lumotlar to'plamini ishlatish maqsadida mashina o'rganish (ML) va chuqur o'rganish (DL) kabi SI usullari joriy etilishi dolzarb [10].

Masalan, maqolada qayd etilishicha, BIM modellari atributlaridagi ma'lumotlar AI yordamida avtomatlashtirilgan bashorat va optimallashtirish

vazifalarida qo'llaniladi [10]. Tadqiqotchilar ta'kidlagan yana bir masala – sanoatda «ma'lumot-menejment» va «analitika» salohiyatini birlashtirish: ya'ni, loyiha boshqaruvi va qurilish xavfsizligini oshirish hamda xarajatlarni kamaytirish uchun BIM ma'lumotlarini AI modellarida qayta ishlash kerakligi [10].

Ushbu maqola BIM va AI uchun zarur bo'lgan ko'nikma va imkoniyatlarni aniqlab, ularni birlashtirish natijasida qurilish jarayonini qanday «aqlli» qilish mumkinligini konseptual darajada ko'rib chiqadi.

Kuta va Falteysek (2025) Sining BIM muhitidagi rolini va kelajak tendensiyalarini tahlil qiladilar. Tadqiqotda qayd etilishicha, sun'iy intellekt BIM jarayonlarini avtomatlashtirish, loyihani optimallashtirish va samarali boshqarishga qodir [11]. Masalan, loyihalash bosqichida AI BIM modelidan tez ma'lumot olish, muammoli yo'nalishlarni aniqlash va alternativa yechimlar taklif qilish uchun foydalaniladi, qurilish bosqichida esa loyihadagi o'zgarishlarga tezkor javob berishga yordam beradi [11].

Shuningdek, ekspluatatsiya bosqichida yig'ilgan katta hajmdagi ma'lumotlarni aniq, aniq-chigal chiqara olishi ko'rsatib o'tilgan [11]. Mashina o'rganish algoritmlari yordamida loyihalardagi loyihalash kamchiliklarini topish, qurilish xavfini bashorat qilish, asbob-uskunalarni avtomatik tekshirish imkoniyatlari ta'kidlanadi [11].

Bundan tashqari, maqolada Aini BIM hamda raqamli egizaklar tushunchasi bilan integratsiyalash orqali doimiy monitoring, oldindan texnik xizmat ko'rsatish va energiya samaradorligini oshirish kabi imkoniyatlar yoritilgan [11].

Albatta, mualliflar standartlashtirilmagan ma'lumot va dasturiy ta'minot muammolari, mutaxassislar bilim yetishmasligi kabi to'siqlarni ham qayd etadilar [11].

Bu tadqiqot asosan BIM-SI bog'liqligining nazariy va amaliy jihatlarini ko'rib chiqadi hamda avtomatlashtirilgan loyihalash va qurilish jarayonlariga qo'shimcha imkoniyatlar berishini qayd etadi.

Tahlil qilingan manbalar aksariyat hollarda umumiy bino turlarini ko'zda tutadi – ya'ni yirik sanoat ob'ektlari yoki maxsus turar joy emas, balki har qanday qurilish obyektlari uchun BIM-AI integratsiyasi konsepsiyalarini ko'rib chiqadi. Maqolalarning barchasida muayyan obyekt tiplari emas, balki qurilish jarayonlarining nazariy tomonlari va raqamli transformatsiya masalalari asosiy o'rinda turadi.

Adabiyotlarda aniqlanishicha, BIM va AI integratsiyasiga oid konseptlar asosan:

- BIM modeli ma'lumotlar bazasidan SI vositalari yordamida olingan avtomatlashtirilgan tahlil va qaror qabul qilish;
- loyihalash va qurilish jarayonlarini optimallashtirish;
- loyiha hayot tsiklini kengaytirish (masalan, ekspluatatsiya va ta'mirlashda AI) hamda,;
- resurs va xarajatni tejash kabi manfaatlarga qaratilgan.

Misol uchun, Khan va hamkasblari ta'kidlaganidek, BIM loyihalari davomida yig'ilgan ma'lumotlardan foydali xulosalar chiqarishda hozirgi kunda yechim yetishmayotganligi ko'p holatlarda kuzatiladi [11]. Buning oqibatida loyiha guruhlari katta ma'lumot omboridan yanada samarali foydalanish imkoniga ega bo'lishlari uchun sun'iy intellekt algoritmlariga ehtiyoj seziladi [11].

Valdebenito va Forcael tadqiqotida BIM asosan axborot ombori vazifasini o'tashi va SI uni tahlil qilishdan tortib qarorlar qabul qilishgacha keng ko'lamli yordam berishi qayd etiladi [7].

Umuman, manbalarda ko'rsatilishicha, chuqur o'rganish usullari ko'proq raqamli egizaklar va BIM modellashtirish sohalarida qo'llanilmoqda [7], ML esa tuzilmali ma'lumotlarni tushunish va bashorat qilish uchun qo'llaniladi.

Shuningdek, tahlillarda AI texnikasi sifatida GAN (Generativ Karashin Tarmoqlar) va AutoML MLOps platformalari ma'lumot yaratish va tarqatish jarayonlarida yordamchi sifatida qayd etilgan.

Kuta va Falteysek ma'lumotlariga ko'ra, mashina o'rganish orqali loyihadagi kamchiliklar aniqlanishi, generativ loyihalash orqali bir nechta loyihaviy variantlar yaratish mumkinligi va raqamli egizaklar asosida binolarni real vaqtda kuzatish – BIManing samarali «aqlli» foydalanishiga misol bo'lib xizmat qiladi [11].

Barcha manbalarda aytilishicha, BIM-AI integratsiyasi qurilish jarayonlarini raqamlashtirish (raqamli transformatsiya) yo'lida katta imkoniyat ochadi. Masalan, Kuta va Falteysek BIM muhiti bilan SI integratsiyasining afzalliklarini, loyihalash jarayonini avtomatlashtirish va konstruksiyalar monitoringi kabi amaliy ko'rinishlar orqali bayon qiladi [11].

Heidari va boshq. esa kelajakda qurilish jarayonlarida blokcheyn, robototexnika kabi ilg'or texnologiyalar hamda AIoTni qo'llash orqali murakkablikni kamaytirish muhim ekanini qayd etadi [9].

Barcha asarlar (ayniqsa Sharh maqolalar) BIM va AI o'rtasidagi ilgari mavjud bo'lgan bilim bo'shliqlarini to'ldirishga qaratilgan.

Masalan, Valdebenito va Forcael tizimli tahlilida BIM va AI integratsiyasini o'lchashda standart metrikalar zarurligini, imkoniyatlar va to'siqlarni miqyosli ko'rsatkichlar orqali taqqoslash muhimligini qayd etadi [7].

Shuningdek, Hamida Khan va boshqalar BIM-AI integratsiyasidagi 39 ta muammo va ularning toifalanishini ko'rsatib, bu sohada hali ham yechilmagan muammolar ko'p ekanini namoyish etdi [3].

Umuman, adabiyotlarning umumiy xulosasi shuki: BIM ma'lumotlarini sun'iy intellekt bilan tahlil qilish va qurilish jarayonini raqamlashtirish to'g'risida so'nggi yillarda ko'plab ilmiy-tadqiqot ishlari olib borilmoqda. Bu izlanishlar asosan konseptual va tizimli yondashuvlarga asoslangan bo'lib, real muhitda qo'llash va standartlarni shakllantirish kabi jihatlarga e'tibor qaratgan.

3. Tadqiqot metodologiyasi

3.1 Tadqiqot yondashuvi

– Nazariy-tahliliy yondashuv: Maqolada BIM va AI integratsiyasiga oid mavjud ilmiy adabiyotlar tahlil qilinadi, konseptual modellar va amaliy misollar keltiriladi.

–Kompilyativ yondashuv: So‘nggi 5 yil ichidagi ilmiy maqolalar, konferensiya materiallari va ochiq ma’lumotlar manbalari (Google Scholar, Springer, ResearchGate) asosida BIM va AI integratsiyasining tendensiyalari va rivojlanish yo‘nalishlari aniqlanadi.

3.2 Ma’lumot manbalari

–BIM bo‘yicha: Bino va inshootlarning 3D modeli, IFC formatidagi ma’lumotlar, loyihalash va qurilish jarayoniga oid ochiq manbalar.

–AI bo‘yicha: Nazariy metodologiyalar, predictive analytics, anomaly detection, generative design va boshqa AI yondashuvlari bo‘yicha so‘nggi tadqiqotlar.

–Ilmiy manbalar: Google Scholar, Springer, ResearchGate’dagi maqolalar, tahliliy sharhlar va review maqolalar.

3.3 Tadqiqot jarayoni

1. Adabiyotlarni tanlash va saralash: So‘nggi 5 yil ichida nashr etilgan maqolalar tanlanadi; faqat BIM va AI integratsiyasiga oid nazariy tadqiqotlar olinadi.

2. Nazariy tahlil: Tanlangan maqolalar asosida quyidagilar o‘rganiladi:

– AI algoritmlari orqali BIM ma’lumotlarini tahlil qilishning konseptual imkoniyatlari.

– Qurilish jarayonini raqamlashtirish va optimallashtirish yo‘nalishlari.

– AI va BIM integratsiyasining afzalliklari va cheklovlari.

3. Konsolidatsiya: Turli manbalardagi nazariy yondashuvlar birlashtirilib, umumiy konseptual model va tahliliy xulosalar shakllantiriladi.

3.4 Tadqiqotning asosiy o‘ziga xosligi

–Faqat nazariy va tahliliy yondashuvga tayangan.

–AI yordamida BIM ma’lumotlarini tahlil qilishning konseptual asoslari va qurilish jarayonini raqamlashtirish imkoniyatlari ko‘rsatiladi.

–Umumiy bino turlari (ko‘p qavatli uylar, ofis binolari, sanoat binolari) uchun keng qo‘llaniladigan tavsiyalar va nazariy xulosalar beriladi.

1- Diagramma. Tadqiqot metodologiyasi diagrammasi

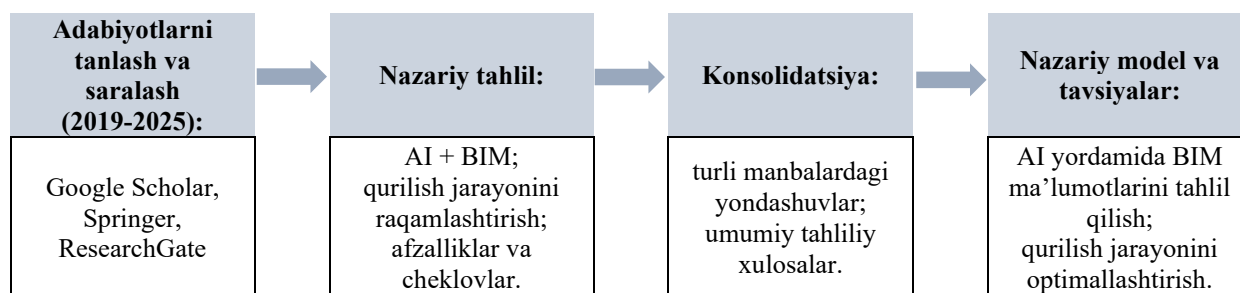


Diagramma izohi:

1. Adabiyotlarni tanlash va saralash: Tadqiqotning birinchi bosqichi sifatida so‘nggi 5 yil ichidagi ochiq manbalardan ilmiy maqolalar tanlanadi. Faqat nazariy va konseptual tadqiqotlar e’tiborga olinadi.

2. Nazariy tahlil: Tanlangan manbalar asosida AI algoritmlari orqali BIM ma'lumotlarini tahlil qilish imkoniyatlari va qurilish jarayonini raqamlashtirish yondashuvlari o'rganiladi.

3. Konsolidatsiya: Turli manbalardagi konseptual yondashuvlar birlashtiriladi va umumiy tahliliy natijalar chiqariladi.

4. Nazariy model va tavsiyalar: AI yordamida BIM ma'lumotlarini tahlil qilish va qurilish jarayonini optimallashtirish uchun nazariy konseptual model ishlab chiqiladi.

4. Ai yordamida bim ma'lumotlarini tahlil qilish

Sun'iy intellekt (SI) algoritmlari BIM modellaridagi geometrik va atributiv ma'lumotlarni avtomatik tarzda o'qib, ularni katta hajmdagi ma'lumot to'plami sifatida tahlil qiladi [4]. BIM modeli loyiha 3D ko'rinishini va unga tegishli fazoviy hamda ma'lumotli xususiyatlarni (masalan, xona parametrlari, material turi, qurilish bosqichlari, xarajatlar) birlashtirgan holda ifodalaydi [12]. SI esa ushbu katta ma'lumotlar to'plamini qayta ishlash kuchiga ega, shuning uchun u loyiha turli bosqichlari bo'yicha muhim qarorlar qabul qilish uchun tahliliy imkoniyatlarni yaratadi [3, 13].

Masalan, BIM modeli yordamida tuzilgan to'liq 3D reja asosida SI algoritmlari loyiha loyihalashidagi potensial ziddiyat va to'qnashuvlarni aniqlashi mumkin, bu esa vaqtida tuzatish choralari ko'rish va qurilish jarayonini silliq olib borishga yordam beradi [13].

4.1 Fazoviy va konstruktiv ma'lumotlarni tahlil qilish

BIM modelidagi fazoviy ma'lumotlar (joylashuv, yo'nalish, xona sig'imi kabi omillar) SI yordamida tahlil qilinib, binoning ichki tartibiga oid optimallashtirishlar amalga oshirilishi mumkin.

Masalan, AI asosidagi tahlil yordamida bino ichidagi aylanish yo'nalishlari va yo'laklarni qayta loyihalash orqali foydalanuvchi harakatini 15% ga samaraliroq qilish natijasi kuzatilgan [6].

Shuningdek, SI orqali ishlab chiqilgan 3D fazoviy model asosida favqulodda vaziyatlarda chiqish yo'nalishlari va yong'in xavfsizligi sistemalari tahlili amalga oshiriladi [4]. Konstruktiv (strukturaviy) ma'lumotlar tahliliga kelsak, SI yordamida BIM modelidagi ustunlar, kengashlar va boshqa strukturaviy elementlar uchun avtomatik hisob-kitoblar va optimallashtirishlar bajarilishi mumkin.

Tadqiqotlarda AI asosidagi FEA (finite element analysis) jarayonlari bilan po'lat karkas loyihalashida xavfsizlikni saqlagan holda material sarfi 20% ga kamaytirilgan holatlar qayd etilgan [6] (1-rasm).

Jadval 1: AI–BIM Integratsiyasining Asosiy Afzalliklari

№	Afzallik turi	Izoh	Misol
1	Samaradorlikni oshirish	Loyiha vaqti 15–20% qisqaradi	AI yordamida BIM modelidan avtomatik to'qnashuv aniqlash
2	Xarajatlarni kamaytirish	Material sarfi 20% gacha tejash	AI asosidagi FEA tahlili
3	Xavfsizlikni kuchaytirish	Xavfli holatlarni real vaqtda aniqlash	AIoT va kompyuter ko'rishi
4	Energiya optimallashtirish	Energiya sarfini 25% gacha kamaytirish	BIM + AI simulatsiyasi
5	Boshqaruvning shaffofligi	Real vaqtda monitoring va hisobot	Raqamli egizak (Digital Twin)

Shu tariqa, SI BIM modellari orqali konstruktsiya kuchini baholab, binoning texnik xarajatlarini kamaytirishga hissa qo'shadi.

4.2 Jadval va xarajat ma'lumotlarini tahlil qilish

BIM modelidagi jadval (jadval-grafik, loyiha bosqichlari) va xarajat ma'lumotlari ham sun'iy intellekt tomonidan chuqur o'rganiladi. Oldingi loyihalarning jadval ma'lumotlari va haqiqiy ishchi resurslar tarixi asosida SI kelgusidagi loyihalar uchun aniqroq vaqt rejasi tuzadi.

Masalan, ob-havo sharoitlari, material etkazib berish kechikishlari, ishchi guruh samaradorligi kabi omillarni hisobga olgan holda – AI boshqaruvi ostida texnik ishlab chiqarish vaqtini oldindan bashorat qilish mumkin [13].

Bundan tashqari, SI yordamida turli “Agar-da...” (“what-if”) tahlillari bajariladi: ya'ni loyiha jadvalidagi o'zgarishlar, material yetkazib berishdagi kechikishlar yoki byudjetdagi tebranishlar tasvirlab chiqilib, ularning loyihaga ta'siri modellashtiriladi [13]. Bu esa loyiha boshqaruviga oldindan reja tuzish va tavsiyalar berish imkonini oshiradi. Xarajatlar jihatidan, SI algoritmlari tarixiy moliyaviy ma'lumotlar va loyiha spetsifikatsiyalarini tahlil qilib, loyihaning turli komponentlari uchun batafsil va ishonchli xarajat bashoratlarini yaratadi [13].

Shu tariqa, xarajatlarni real vaqt rejimida monitoring qilish, byudjetdan ortig'ini aniqlash va o'z vaqtida ogohlantirishlar chiqarish orqali moliyaviy nazoratni kuchaytiradi.

4.3 Xorijiy mamlakatlardagi tajribalar (2-jadval)

– Singapur: Singapur Qurilish va Boshqaruv Boshqarmasi (BCA) 2022-yilda “Construction AI Roadmap” strategiyasini ishlab chiqdi. Ushbu yo'l xarita BIM va AI vositalarini birlashtirishga doir standartlar va tavsiyalarni belgilaydi. Masalan, vaqt jadvali va byudjet monitoringida IFC4.3 standartini joriy etish orqali loyihalarni raqamli avtomatlashtirishni kengaytirish rejalashtirilgan [6].

– Germaniya: Germaniya sanoat 4.0 markazlari misolida sun'iy intellekt va BIM integratsiyasiga oid ilmiy va tadqiqot loyihalarini qo'llab-quvvatlamogda. Mintaqaviy markazlar (“Centers of Excellence”) tashkil etilib, ularning ishida AI

yordamida BIM ma'lumotlari bilan ishlash, masalan generativ rejalashtirish yoki MEP (mexanika, elektr, sanitariya) koordinatsiyasi bo'yicha tadqiqotlar olib borilmoqda [6].

– Yaponiya: Yaponiya infratuzilma vazirligi (MLIT) boshchiligidagi PLATEAU dasturi doirasida shaharlarning 3D raqamli juftlik (digital twin) modellarini yaratish jarayonida AI yordamidagi vositalar keng qo'llanilmoqda. Dasturda 3D model ma'lumotlarini yangilash va avtomatik yaratish uchun sun'iy intellekt asosidagi algoritmlar ishlab chiqilgan [14].

– AQSH va boshqa: AQSHda esa yirik texnologiya kompaniyalari va hukumat tashkilotlari generativ loyihalash, loyiha boshqaruvi va xarajatlarni bashorat qilish sohalarida AI-BIM integratsiyasini tajribalamoqda. Masalan, byudjet va grafik parametrlarini bashoratlashda mashina o'rganishi texnikalari qo'llanilmoqda (manba ko'rsatilmadi).

Jadval 2: Mamlakatlar tajribasi va natijalari

Mamlakat	Loyiha / Dastur	AI-BIM Integratsiyasi Natijalari
Singapur	Construction AI Roadmap (BCA)	IFC4.3 standarti, avtomatlashtirilgan monitoring
Germaniya	Sanoat 4.0 markazlari	Generativ rejalashtirish, MEP koordinatsiyasi
Yaponiya	PLATEAU dasturi	3D raqamli egizaklar, avtomatik model yaratish
AQSh	Autodesk Construction Cloud	AutoSpecs, bashoratli boshqaruv, xarajat nazorati
Janubiy Koreya	Smart Construction 2025	AIoT, robototexnika, real vaqt monitoringi

Yuqoridagi misollar ko'rsatadiki, ilg'or mamlakatlarda AI-BIM integratsiyasi loyihalash va qurilish jarayonlarini soddalashtirishga xizmat qilmoqda. Singapur va Germaniya misolidagi strategik yo'l xaritalari hamda Yaponiya kabi davlatlarning amaliy loyihalari sun'iy intellekt va BIM sinergiyasining samarali ishlashini namoyish etadi [6].

5. Qurilish jarayonini raqamlashtirish

5.1 AI va BIM integratsiyasi orqali raqamlashtirish

Sun'iy intellekt (AI) va BIM (Bina axborot modellashtirish) tizimlarining uyg'un qo'llanilishi qurilish jarayonlarini chuqur raqamlashtirishga olib keladi. BIM loyihalashning raqamli negizi bo'lib, loyihalar haqidagi ma'lumotlarni uch o'lchovli modelda jamlaydi. AI esa ushbu ma'lumotlarni tahlil qilib, loyihani avtomatlashtirish, bashoratlash va nazorat qilish imkoniyatini yaratadi [6, 13].

Tadqiqotlar shuni ko'rsatdiki, AI asosidagi generativ loyihalash yechimlari loyihalashni avtomatlashtiradi, struktura va energiya samaradorligini tahlil qilishni tezlashtiradi, dastlabki bosqichdagi rejalashtirish aniqligini oshiradi va bashoratli modellashtirish orqali xatolar hamda xarajatlarni kamaytiradi [6] (3-jadval).

Jadval 2: AI–BIM integratsiyasi amaliy qo'llanilishi

Bosqich	AI–BIM qo'llanilishi	Natija
Dizayn	Generativ dizayn, to'qnashuvlarni aniqlash	Optimallashtirilgan loyiha, xatolarni kamaytirish
Qurilish	Real vaqt monitoringi, xavfsizlik nazorati	Vaqt va resurs tejash, xavfsizlikni oshirish
Ekspluatatsiya	Raqamli egizak, texnik xizmat bashorati	Uzoq muddatli xarajatlarni kamaytirish
Boshqaruv	Predictive analytics, ML asosidagi qarorlar	Samaradorlik va ishonchlilikni oshirish

Natijada qurilish jarayonlarida inson omili kamayib, qaror qabul qilishning aniqligi va samaradorligi oshadi.

5.2 Tahliliy va boshqaruv imkoniyatlari

AI va BIM integratsiyasi loyihaning barcha bosqichlarida keng ko'lamli tahliliy va boshqaruv imkoniyatlarini taqdim etadi. AI yordamida BIM modellaridan real vaqtda ma'lumotlar olinib, ularni avtomatik analiz qilish mumkin. Bu esa loyihani boshqarishda risklarni oldindan aniqlash, sifatni tekshirish va qaror qabul qilishni takomillashtirish imkonini beradi [6, 15].

Masalan, mashina o'rganish algoritmlari qurilish maydonidan olingan ma'lumotlarni tahlil qilib jadval va byudjet bo'yicha noma'lum yuklamalarni oldindan aniqlashi mumkin [15]. Natijada loyiha rejalashtirilgan vaqt va mablag' doirasida amalga oshirilishi ta'minlanib, nosozlik yoki kechikish kabi xavflar minimallashtiriladi.

5.3 Operatsion va strategik afzalliklar

AI-BIM yondashuvi operatsion samaradorlikni oshirish bilan birga strategik ustunliklarni ham ta'minlaydi. Operatsion darajada, takrorlanuvchi vazifalar AI yordamida avtomatlashtiriladi, bu esa xodimlarning mehnat unumdorligini oshiradi [16].

Masalan, loyihalashtirishdagi muammolar va xatolar AI avtomatik tekshiruv orqali aniqlanib, ish jarayonlari yengillashadi. Strategik jihatdan esa raqamlashtirish uzoq muddatli rejalashtirish va barqarorlikni yaxshilaydi: tadqiqotlar shuni ko'rsatadiki, AI-BIM texnologiyalari yordamida qurilish jarayonlarining ekologik izini kamaytirish va resurslardan samarali foydalanish natijalari sezilarli yaxshilanadi [13, 16].

Masalan, ba'zi loyihalarda AI-BIM integratsiyasi energiya sarfini optimallashtirish va texnik xizmat ko'rsatish muddatlarini bashorat qilib, obyektlarning umrini uzaytirishda muhim rol o'ynagan [16]. Shu bilan, AI va BIM uyg'unligi qurilish tashkilotlariga operatsion xarajatlarni kamaytirish va uzoq muddatli strategik maqsadlarga erishishda yordam beradi.

5.4 AI–BIM birlashmasining amaliy misollari

– Ishlab chiqarish: AI yordamida BIM ma'lumotlaridan generativ loyihalash echimlari olinadi va robototexnika vositalari yordamida konstruksion elementlar (masalan, g'isht quyish, payvandlash) ishlab chiqariladi [17].

Bu usul ishlab chiqarish jarayonini avtomatlashtirib, element sifatini va aniqligini oshiradi.

–Monitoring: Saytdagi AIoT qurilmalari va kompyuter ko‘rishi tizimlari real vaqtda monitoringni amalga oshiradi.

Masalan, EarthCam va viAct platformalari AI yordamida qurilish maydonini kuzatadi, ob’ektlarning holatini tahlil qilib, xavfsizlik va unumdorlik bilan bog‘liq muammolar yuzaga kelishidan oldin ogohlantirish beradi [18, 19]. Bu usullar yordamida loyihani jadvalga mos bajarilishini kuzatish va tezkor choralar ko‘rish imkoniyati mavjud.

–Texnik xizmat ko‘rsatish: BIM modeli ichidagi binoning inshoot va uskunalari haqida ma’lumotlar yig‘ilib, AI ularni tahlil qiladi va texnik xizmatni rejalashtiradi.

Masalan, Salesforce minorasi misolida AI qurilmalarning holatini BIM modelida kuzatib, energiya sarfi va texnik xizmat muddatlarini optimallashtirgan [20]. Natijada obyektning ekspluatatsiya xarajatlari pasayadi va texnik xizmat samaradorligi oshadi.

–Xavfsizlik: Video-kamera va datchiklardan olingan ma’lumotlar AI yordamida tahlil qilinib, ish joyidagi xavfli holatlar aniqlanadi.

AI asosidagi kompyuter ko‘rish texnologiyasi yiqilish, balandlikda ishlashdagi xatolar yoki himoya jihozlarini noto‘g‘ri ishlatish kabi hodisalarni avtomatik aniqlaydi va boshliq va mutaxassislariga ogohlantirish beradi [19]. Bu qurilish maydonida xavfsizlik darajasini sezilarli darajada oshiradi.

–Byudjet nazorati: AI-BIM yondashuvda loyihaning har bir tarkibiy qismining narxi va bajarilish vaqti aniqlanib, byudjet rejimida uzluksiz nazorat qilinadi.

Masalan, Autodesk Construction Cloud platformasidagi AutoSpecs funksiyasi BIM jadvali va material spetsifikatsiyalarini AI yordamida tekshirib, yo‘qolib ketishi mumkin bo‘lgan xarajat va vaqt omillarini oldindan aniqlaydi [19]. Bu esa byudjet va jadvalni yanada ishonchli boshqarishni ta’minlaydi.

6. Kelajak istiqbollari

AI va BIM texnologiyalarining integratsiyasi qurilish industriyasida jadal rivojlanayotgan va yaqin kelajakda sektorning asosiy raqobat ustunligiga aylanadigan yo‘nalishlardan biri sanaladi. So‘nggi yillarda ushbu ikki texnologiyaning sinergiyasi nafaqat loyihalash va qurilish jarayonlarini takomillashtiribgina qolmay, balki ekspluatatsiya, monitoring, texnik xizmat ko‘rsatish va uzoq muddatli boshqaruvning yangi standartlarini shakllantira boshladi. Shuningdek, turli mamlakatlarda olib borilayotgan tadqiqotlar va amaliy joriy etish tajribalari ushbu tendensiyaning kelgusida yanada chuqurlashishini ko‘rsatadi.

6.1 To‘liq avtomatlashtirilgan raqamli qurilish tizimlariga o‘tish

Kelajakda AI algoritmlarining yanada kuchayishi bilan loyihalashdan tortib ekspluatatsiyagacha bo‘lgan bosqichlar “raqamli yo‘l xaritasi” asosida boshqariladi. BIM modellarining semantik boyishi, AI tomonidan avtomatik tahlil qilinadigan ma’lumotlarning ko‘lami kengayishi, qurilishning ko‘plab jarayonlarini inson

aralashuvizsiz bajarish imkonini yaratadi. Bu esa universal “Digital Construction Ecosystem” shakllanishiga zamin yaratadi.

6.2 Bashoratli boshqaruv tizimlarining keng qo‘llanilishi

Kelajak istiqbolida eng muhim yo‘nalishlardan biri — bashoratli modellash tirishning to‘liq avtomatlashtirilishi. AI algoritmlari BIM ma’lumotlari, datchiklar, AIoT qurilmalari va qurilish maydonidan yig‘ilgan real vaqt ma’lumotlariga tayangan holda:

- xavflarni oldindan aniqlash,
- texnik xizmat muddatlarini rejalashtirish,
- material yetkazib berish zanjirini optimallashtirish,
- ob-havo yoki tashqi omillarga mos qarorlar ishlab chiqish kabi jarayonlarni to‘liq avtomatik tarzda boshqaradi.

Bunday tizimlar bugun mavjud, biroq kelajakda ular standart yechimga aylanadi.

6.3 Sun‘iy intellekt yordamida generativ loyihalashning rivojlanishi

Generativ loyihalash hozirda dastlabki bosqichda bo‘lsa-da, yaqin yillarda u kompleks me‘moriy-texnik muammalarni avtomatik hal qiluvchi kuchli vositaga aylanishi kutilmoqda. AI yordamida binoning funksiyasi, iqlimi, energiya samaradorligi, konstruktiv yechimlari va ekspluatatsiya xarajatlari bir modelda optimallashtiriladi. Bu barcha bino turlarida — turar-joy, jamoat binolari va sanoat inshootlari uchun samarador yondashuv bo‘lib xizmat qiladi.

6.4 Kompyuter ko‘rishi asosida real vaqt monitoringining kengayishi

Kelajakda qurilish maydonlari to‘liq “aqlli kuzatuv tizimlari” bilan jihozlanadi. Kompyuter ko‘rishi asosida xavfsizlik monitoringi, xodimlar oqimi, texnika harakati, materiallar iste‘moli va bajarilgan ish hajmi avtomatik qayd etiladi. Bu tizimlar xavfsizlik standartlarini yangi bosqichga olib chiqadi va boshqaruvning shaffofligini oshiradi.

6.5 Energiya samaradorligi va barqaror qurilishning asosiy boshqaruv vositasiga aylanishi

AI va BIM integratsiyasi ekologik barqarorlikka erishishda muhim omil bo‘lib qoladi. Energiya iste‘molini bashorat qilish, resurslardan samarali foydalanish, chiqindilarni minimallashtirish, passiv energiya strategiyalarini generatsiya qilish — bularning barchasi AI algoritmlari orqali avtomatik shakllanadigan jarayonlarga aylanadi. Bu tendensiya kelajakda “yashil qurilish”ning global standartlashtirilgan me‘yorlariga asos bo‘ladi.

6.6 Raqamli egizak (Digital Twin) tizimlarining keng joriy etilishi

Kelajakda ko‘plab binolar uchun real vaqt rejimidagi raqamli egizaklar yaratish odatiy amaliyotga aylanadi. AI va BIM asosida quriladigan raqamli egizaklar:

- binoning texnik holatini kuzatadi,
- foydalanish darajasi va energiya sarfini optimallashtiradi,
- ta‘mirlash va xizmat ko‘rsatish muddatlarini avtomatik rejalashtiradi.

Bu esa ekspluatatsiya xarajatlarini sezilarli kamaytiradi va binoning umri uzayadi.

6.7 Global miqyosda standartlashuvning kuchayishi

AI–BIM integratsiyasiga oid standartlar — metama'lumotlar formati, sifat nazorati, xavfsizlik, modeli almashish protokollari — global darajada ishlab chiqilishi kutilmoqda. Bu yondashuv:

- turli mamlakatlar o'rtasida hamkorlikni,
- qurilish mahsulotlari sifatini,
- loyiha ma'lumotlarining mosligi va izchilligini ta'minlaydi.

Natijada AI-BIM yechimlari umumjahon sanoat standartiga aylanadi.

7. XULOSA

Sun'iy intellekt va BIM texnologiyalarining integratsiyasi zamonaviy qurilish industriyasining asosiy transformatsion yo'nalishlaridan biriga aylandi. Mazkur tadqiqot davomida ushbu ikki texnologiyaning o'zaro bog'liq ravishda qanday ishlashi, bino loyihalashdan tortib qurilish, ekspluatatsiya va texnik xizmat ko'rsatishgacha bo'lgan jarayonlarda qanday nazariy va amaliy afzalliklar yaratishi tahliliy yondashuv asosida ko'rib chiqildi. Adabiyotlar sharhi shuni ko'rsatadiki, so'nggi yillarda ilmiy doiralarda AI–BIM integratsiyasi ma'lumotlar boshqaruvi, avtomatlashtirilgan tahlil, generativ loyihalash, monitoring, xavfsizlik nazorati va qarorlarni modelga asoslangan shaklda ishlab chiqish bo'yicha alohida tadqiqot yo'nalishiga aylangan.

Tadqiqot metodologiyasi doirasida AI va BIM o'zaro munosabatining nazariy poydevori, ma'lumotlar oqimining tuzilishi, tahlil tamoyillari, boshqaruv mexanizmlari va raqamli transformatsiya jarayonida yuzaga keluvchi ustuvor konsepsiyalar belgilandi. Shu asosda AI yordamida BIM ma'lumotlarini tahlil qilishning nazariy mexanizmlari o'rganildi. Xususan, AI algoritmlarining BIM modelidagi semantik elementlarni tahlil qilish orqali sifat nazorati, risklarni aniqlash, jarayonlarni optimallashtirish va loyiha boshqaruvini takomillashtirishdagi roli asoslab berildi. AI–BIM integratsiyasi qurilish jarayonining murakkabligi va ko'p bosqichliligini inobatga olgan holda, loyiha ishonchliligi, shaffofligi va samaradorligini oshirishga xizmat qilishi ta'kidlandi.

Qurilish jarayonini raqamlashtirish bo'limida AIga asoslangan ma'lumotlar tahlili, real vaqt monitoringi, kompyuter ko'rish, risklarni oldindan aniqlash, byudjet va resurslarni boshqarish kabi yondashuvlar umumiy bino turlari uchun qanday nazariy afzalliklar yaratishi bayon etildi. Ushbu jarayonlar AI–BIM integratsiyasi natijasida raqamli boshqaruv tizimlarining shakllanishi va qurilishning to'liq raqamli ekotizimga o'tishini tezlashtirishi qayd etildi.

Kelajak istiqbollari tahlili shuni ko'rsatadiki, AI–BIM integratsiyasi global miqyosda standartlashuv, bashoratli modellashtirish, generativ loyihalashning kengayishi, aqlli monitoring tizimlari, raqamli egizaklar va barqaror qurilish tamoyillarini rivojlantirish orqali qurilish industriyasining asosiy innovatsion vektoriga aylanadi. Yaqin 5–10 yil ichida AIga asoslangan avtomatlashtirilgan boshqaruv tizimlari, kompleks ma'lumotlar tahlili, energiya samaradorligini boshqarish va ekspluatatsiya jarayonlarini optimallashtirish keng tarqalishi kutilmoqda.

Umuman olganda, mazkur tadqiqot shuni tasdiqlaydiki, sun'iy intellekt va BIMning integratsiyasi qurilish jarayonlarini raqamlashtirishning ilmiy-nazariy asosiga ega bo'lib, binolarni loyihalash, qurish va boshqarishda yangi paradigmani shakllantirmoqda. AI–BIM integratsiyasi nafaqat ichki jarayonlarni soddalashtiradi, balki sanoatning raqobatbardoshligini, barqarorligini va innovatsion salohiyatini sezilarli darajada oshirish imkonini beradi. Shu sababli, ushbu sohada nazariy tadqiqotlar va amaliy yechimlarning kengayishi kelajak qurilish ekotizimining shakllanishi uchun muhim strategik yo'nalish sifatida qaraladi.

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O‘ZBEKISTONDA SUV RESURSLARIDAN FOYDALANISHNING GEOEKOLOGIK JIHATLARI

Annotatsiya: Mazkur maqolada O‘zbekiston hududida mavjud suv resurslaridan foydalanish jarayonining geoeologik jihatlari tahlil qilingan. Unda Amudaryo va Sirdaryo havzalarining suv ta‘minoti, suv sarfi tarkibi, qishloq xo‘jaligi, sanoat va maishiy xo‘jaliklar tomonidan suvdan foydalanishning ekologik oqibatlarini haqida so‘z boradi.

Kalit so‘zlar: suv, resurs, tabiiy sharoit, quyosh radiatsiyasi, “Yaksart”, biologik xususiyat, omil, relyef, sanoat, gidroenergiya, ekologik yondashuv.

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GEOECOLOGICAL ASPECTS OF WATER RESOURCE USE IN UZBEKISTAN

Annotation: this article analyzes the geoecological aspects of the process of using existing water resources on the territory of Uzbekistan. It talks about the water supply of the amudarya and Syrdarya basins, the composition of water consumption, the environmental consequences of water use by agriculture, industry and household farms.

Keywords: water, resource, natural conditions, solar radiation, “Yaksart”, biological property, factor, relief, industry, hydropower, environmental approach.

Kirish. Suv harakatchan bo‘lganligi sababli muhim geomorfologik omil sifatida yer yuzasi relyefini o‘zgartirishda ishtirok etadi, ya‘ni ma‘lum yerdagi parchalangan tog‘ jinslarini yuvib, ularni suv havzalarining barcha qismiga olib borib yotqizadi. Natijada yer yuzasida ichki kuchlar ta‘sirida paydo bo‘lgan balandliklarning tekislanishi yuz beradi.

Suv – yer kurrasida organizmlarning yashashi uchun zarur bo‘lgan eng muhim mineral hisoblanib, organizmdagi butun jarayonlar suv muhitida sodir bo‘ladi. Suvning organik hayotdagi ahamiyatini mashhur fransuz yozuvchisi Antuan de Sent - Ekzyuperi quyidagicha ta‘riflaydi: «Suv! Sening na ta‘ming, na ranging, na hiding bor, shu boisdan seni ta‘riflash juda qiyin, seni qandayligingni bilmay, sendan bahramand bo‘lib rohatlanamiz. Seni hayot uchun zarur deyish mumkin emas, chunki sen - o‘zing hayotsan. Sen bu dunyodagi eng katta va qimmatbaho boylikсан». Suv kundalik hayotim izning hamma sohalarida qo‘lanilishi bilan boshqa tabiiy resurslardan katta farq qiladi. Chunki kishilik

jamiyatida suvning o'rnini bosa oladigan boshqa resurs yo'q. Masalan, agar ko'nir, neft, gaz kabi yoqilg'larni olsak, ularning o'rnini bosa oladigan atom, termoyadro, quyosh yoki gidroenergiyalar mavjuddir. Lekin hozirgacha suvning o'rnini qoplay oladigan boshqa resurs yo'q. Bu esa suvni juda muhim bebaho tabiiy resurs ekanligidan dalolat beradi. Suv geografik qobiqdagi barcha jarayonlarda ishtirok etadi. U yer yuzidagi modda va energiya aylanishida faol qatnashadi. Okean va dengizdagi suvlar quyoshdan kelayotgan issiqlikni qariyib 55 foizini o'zida to'plab, qish faslida uning atrofini juda ham sovib ketishdan saqlab turadi. Atmosferadagi suv bug'lari esa quyosh radiatsiyasining filtri hisoblanadi.

Asosiy qism. O'zbekiston tabiiy-iqlim sharoiti suv tanqisligi bilan tavsiflanadi, bu esa suv resurslarini boshqarishda ekologik yondashuvni talab qiladi. Amudaryo va Sirdaryo havzalari asosiy suv manbalari bo'lib, ularning oqim rejimi mintaqaviy iqtisodiyotga bevosita ta'sir qiladi. Sug'oriladigan dehqonchilikning ulushi yuqori bo'lgani uchun suvdan foydalanishning samaradorligi past, suv yo'qotishlari esa katta. Geoekologik jihatdan suv resurslarini boshqarish suvni tejoychi texnologiyalarni joriy etish, suvni qayta foydalanish, havza darajasida monitoringni kuchaytirish va suvning sifat ko'rsatkichlarini yaxshilashni talab etadi. Uzoq davom etgan evolutsion jarayonlar natijasida tirik mavjudotlar mavjud ekologik sharoitlarga moslashib borgan. Suv esa barcha jonli organizmlar uchun hayotning asosiy manbai sanaladi. Hayotning suvda paydo bo'lgani haqidagi ilmiy qarashlar juda qadimdan ma'lum. Aslida, hayotning boshlanishi ham suv bilan bog'liq. Suvning o'ziga xos kimyoviy va biologik xususiyatlari tirik organizmlarning tuzilishi va ularning hayotiy jarayonlarini ta'minlashda muhim ahamiyat kasb etadi. Suvning ekologik muhit sifatidagi o'rni uning fizik xususiyatlari, harakatlanish xususiyati, kimyoviy tarkibi va undagi tabiiy omillar bilan belgilanadi. O'zbekiston Respublikasining asosiy yer usti suv manbalari Amudaryo va Sirdaryo havzalariga to'g'ri keladi. Ushbu daryolarning umumiy ko'p yillik oqimi 115,6 km³ ni tashkil etadi: buning 78,5 km³ i Amudaryo havzasiga, 37,1 km³ i esa Sirdaryo havzasiga to'g'ri keladi.

O'zbekiston suv resurslari Orol dengizi havzasining umumiy suv zaxiralarining faqat bir qismini tashkil etadi. Mazkur havzaga Markaziy Osiyoning yirik daryolari — Amudaryo va Sirdaryo, shuningdek gidrografik jihatdan ushbu havzaga mansub bo'lgan va Orol pasttekisligi hududida joylashgan boshqa suv oqimlari kiradi. Bevosita O'zbekiston hududida shakllanadigan yer usti suvlarining hissasi Amudaryo havzasida 6 foiz, Sirdaryo havzasida 16 foizni, respublika bo'yicha esa umumiy oqimning taxminan 8 foizini tashkil qiladi.

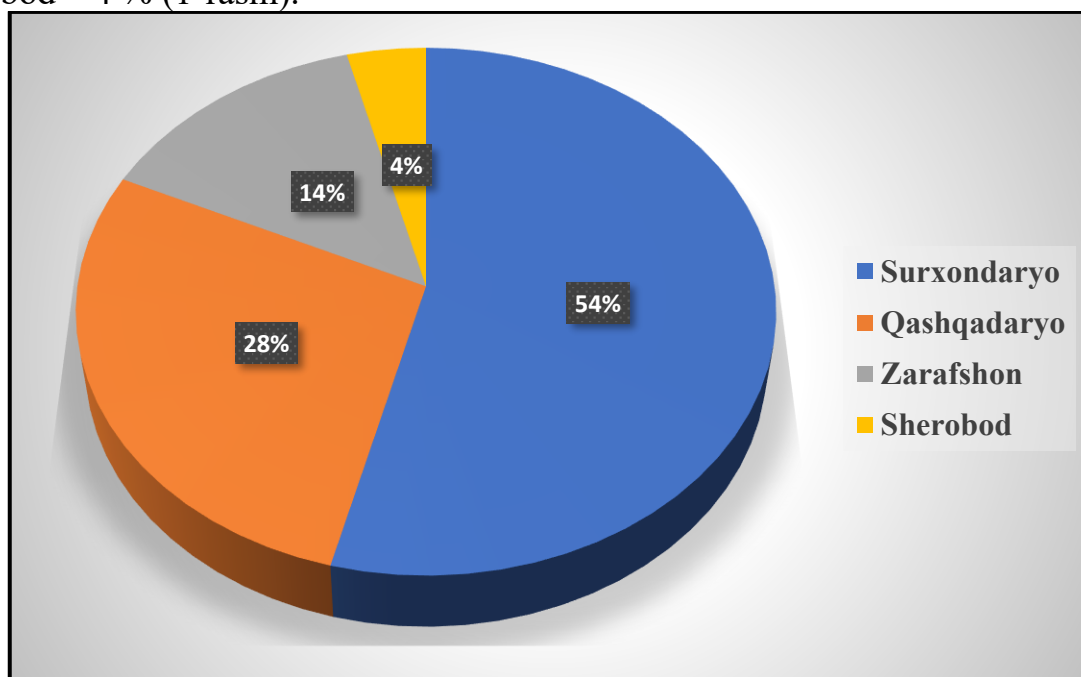
Amudaryo O'zbekiston va umuman O'rta Osiyodagi eng katta va eng sersuv daryolardan biridir. Tarixiy manbalarda unga turlicha nomlar berilgan: yunonlar uni "Oqsu", arablar "Jayhun", mahalliy aholining qadimgi atamasida esa "Omul" deb yuritilgan. Daryo o'zining boshlanishini Hindikush tog'larining shimoliy yon bag'irlaridagi baland muzliklardan olib, Vahjir va Vahondaryo nomi bilan oqadi, keyinchalik Pomir daryosi bilan qo'shib Panj, so'ng Vahshdaryo bilan qo'shib hozirgi Amudaryo nomini oladi.

Daryoga asosiy irmoqlar sifatida o'ngdan Kofirnihon va Surxondaryo, chapdan esa Qunduz daryosi qo'shiladi. Amudaryoning 2540 km uzunligining qariyb 1500 km qismi O'zbekistonning tekislik hududlaridan oqib o'tadi va bu masofada unga birorta qo'shimcha irmoq kelib qo'shilmaydi.

Tog'li hududlardagi kuchli oqim tufayli Amudaryo loyqa miqdori juda yuqori bo'lgan daryolar qatoriga kiradi — pastki oqim hududida yiliga 250–300 million tonna tarkibli cho'kindilarni olib keladi. Bir kub metr suvda 3,5–4 kg gacha loyqa mavjudligi buning isbotidir.

Oxirgi yuz yil ichida sanoat va qishloq xo'jaligi jadal rivojlangani natijasida daryo suvi kuchli ifloslanishni boshdan kechirmoqda. Tadqiqotlar bir gektar yer sug'orilganda 6–7 ming m³ suv bilan birga 1900–2200 kg gacha kimyoviy o'g'itlar daryoga tushishini ko'rsatmoqda. Amudaryoning asosiy suv manbai tog'li hududlarga to'g'ri kelib, pasttekisliklardagi 1200 km masofada esa suvning katta qismi sarflanib yuboriladi.

Amudaryoning umumiy oqim hajmi 78–79,5 km³ ni tashkil etadi, shundan taxminan 19–20 km³ (24–24,5 %) Afg'oniston hududidan keladi. O'zbekiston hududida daryo suv resurslarining hissasi 5,66 km³ bo'lib, u quyidagi tarkibiy qismga ega: Surxondaryo – 54 %, Qashqadaryo – 28 %, Zarafshon – 14 % va Sherobod – 4 % (1-rasm).



1-rasm. Amudaryo havzasida O'zbekiston Respublikasining suv resurslari tarkibi

Amudaryo daryosining ifloslanishida eng katta hissa qishloq xo'jaligi, uy-joy va kommunal xizmatlar, shuningdek ayrim sanoat tarmoqlariga to'g'ri keladi.

Amudaryo havzasidagi suv omborlarining umumiy hajmi 23,5 km³ dan oshib, bu havzaning suv resurslarining taxminan 30 foizini tashkil qiladi, shundan O'zbekiston hududida 12,5 km³ suv mavjud. Havzada kollektor-drenaj tizimlari orqali iflos sho'r suvlarning tashlanishi natijasida hosil bo'lgan sun'iy sho'r

ko'llardan eng yiriklaridan biri — O'zbekiston va Turkmaniston hududlarini qamrab olgan Sariqamish ko'li bo'lib, uning hajmi 28,5 km³ ni tashkil etadi.

Sirdaryo hajmi bo'yicha Amudaryodan keyin ikkinchi o'rinda turadi, uning yillik oqimi 38 km³ ni tashkil qiladi. Daryo Tyanshanning Oqshiroq tog'laridagi Petrov muzliklaridan boshlanib, Qorasuv, Taragay va Norin daryolarining birlashishi orqali hosil bo'ladi. Tarixiy manbalarda daryoga yunonlar "Yaksart" (Yahartes), arablar esa "Sayhun" nomini berishgan.

Sirdaryo suvining taxminan 78 % i Norin, 22 % i Qoradaryo hissasiga to'g'ri keladi, bu suvning asosiy manbai qor va muzliklar ekanligini ko'rsatadi.

O'zbekistonda suvdan umumiy foydalanish hajmining 84 foizdan ortig'i irrigatsiya ulushiga to'g'ri keladi. Qishloq xo'jaligi mamlakat iqtisodiyotidagi yetakchi o'rinda turadi. Chunki ushbu tarmoq mamlakatimiz aholisining katta qismini ish bilan ta'minlaydi, tashqi savdoni ushlab turadi hamda barcha aholining oziq-ovqatga bo'lgan birlamchi ehtiyojini qondiradi.

Suv resurslaridan foydalanish samaradorligini oshirish, sug'orish va zax qochirish tizimlarini ta'mirlash va tiklash, suv xo'jaligi inshootlari hamda nasos stansiyalarni modernizatsiya qilishda sohaga Jahon, Osiyo taraqqiyot va Islom taraqqiyot, Xitoy Xalq Respublikasi Eksim kabi banklari, Saudiya rivojlanish va OPEK fondlari, Quvayt, Yaponiya, Shveysariya, Germaniya kabi davlatlar hamda xalqaro tashkilotlar keng jalb etilmoqda.

Mamlakatimiz sanoat tarmoqlarida yiliga o'rtacha 1,2 km³ suv iste'mol qilinadi. Uning qariyb yarmi ishlab chiqarish jarayonida to'liq sarflanib, tabiiy muhitga qaytarilmaydi. Qolgan qismi esa sanoat oqovalari ko'rinishida chiqindiga aylanib, atrof-muhit uchun jiddiy ekologik xavf tug'diradi. O'zbekistonda suv resurslaridan foydalanishning 84 foizdan ortig'i irrigatsiya ehtiyojlariga to'g'ri keladi. Qishloq xo'jaligi esa mamlakat iqtisodiyotida yetakchi tarmoqlardan biri hisoblanadi, chunki ushbu soha aholining katta qismini ish bilan ta'minlaydi, tashqi savdo barqarorligini ta'minlashda muhim rol o'ynaydi hamda aholining asosiy oziq-ovqat ehtiyojlarini qondirishga xizmat qiladi.

Xulosa. O'zbekistonning tabiiy-iqlim sharoitida mavjud bo'lgan suv tanqisligi mamlakatning ijtimoiy-iqtisodiy rivojlanishida eng muhim omillardan biri hisoblanadi. Amudaryo va Sirdaryo havzalari asosiy suv manbalari sifatida nafaqat O'zbekiston, balki butun Markaziy Osiyo mintaqasi hayotiy faoliyatining asosi bo'lib xizmat qiladi. Suv resurslarining hududiy notekis taqsimlangani, ulardan foydalanish samaradorligining pastligi va ekologik muammolar mavjudligi suvdan oqilona foydalanishga oid geoeologik yondashuvlarni kuchaytirishni talab qiladi.

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DITRANSITIVE CONSTRUCTIONS IN ENGLISH AND UZBEK: A COMPARATIVE LINGUISTIC ANALYSIS

Abstract: *This article provides an expanded comparative linguistic analysis of ditransitive constructions in English and Uzbek, examining their structural, semantic, and functional characteristics. Ditransitive constructions—those involving a verb that assigns two object roles, typically a Recipient and a Theme—constitute an essential part of argument structure in many languages. English is characterized by two major alternating patterns: the Double Object Construction (DOC) and the Prepositional Dative Construction (PDC). Uzbek, by contrast, relies predominantly on an agglutinative morphology and case-marking rather than word order to encode grammatical relations. This study explores points of convergence and divergence between the two languages, highlighting how typological differences shape syntactic realization, semantic interpretation, and cognitive processing of ditransitive predicates. Findings suggest that English encodes transfer events through configurational means, whereas Uzbek employs morphological cues that permit higher pragmatic flexibility. This contrast has implications for linguistic typology, translation, and second-language acquisition.*

Keywords: *Ditransitive constructions; Double Object Construction; Prepositional Dative Construction; case marking; argument structure; English–Uzbek comparison; syntactic alternation; semantic roles; typology; Recipient and Theme; morphological encoding; configurational languages; Turkic languages; transfer schema; information structure.*

Introduction. Ditransitive constructions represent one of the most productive domains for understanding how languages encode events involving transfer, communication, or benefaction. Such events typically include three semantic roles: a Source (the origin of the transfer), a Recipient (the entity receiving the Theme), and a Theme (the object being transferred). English and Uzbek both make extensive use of ditransitive verbs. However, the strategies they employ for syntactic realization differ sharply, making them ideal languages for cross-linguistic comparison.

English is often described as a configurational, word-order-sensitive language. It uses linear sequencing to distinguish between direct and indirect objects. Uzbek, belonging to the Turkic language family, is morphologically rich and uses overt case suffixes—such as dative, accusative, and ablative—to encode argument roles. This allows for relatively free word order and a high degree of discourse-driven flexibility. For language learners and researchers alike,

understanding these differences sheds light on how grammatical structures interact with cognition, typology, and meaning in cross-linguistic perspective.

Ditransitive constructions constitute one of the fundamental structures in human language for expressing events involving transfer, communication, or benefaction. Conceptually, any ditransitive predicate profiles an interaction among three core semantic participants: an Agent/Subject initiating the event, a Recipient/Indirect Object who stands to receive something, and a Theme/Direct Object representing the entity transferred. These roles appear across languages, yet the ways in which languages encode and organize them vary significantly depending on typological features.

In English, for example, the ditransitive meaning is inferred largely from linear order:

She gave him the book places the Recipient immediately after the verb, followed by the Theme.

In Uzbek, an equivalent event such as *U unga kitob berdi* is expressed with morphological case-marking—the dative marker *-ga/-ka* signals the Recipient and the (optional) accusative *-ni* signals the Theme—making word order less crucial for interpretation.

Despite formal differences, both languages reflect a universal cognitive schema where an object moves from a Source toward a Recipient, highlighting the cross-linguistic stability of the “transfer” domain. This universality, paired with diversity in grammatical realization, makes ditransitive constructions an especially fruitful phenomenon for linguistic analysis.

English uses two principal structural patterns to encode ditransitive relations, each carrying distinct syntactic and semantic properties. These are the Double Object Construction (DOC) and the Prepositional Dative Construction (PDC).

The Double Object Construction (DOC). The DOC follows the structural template Subject – Verb – Recipient – Theme, as in *She gave him the book*. In this structure, word order is obligatory: the Recipient must precede the Theme, and no preposition is used to mark grammatical roles. Because of this strict configurational design, DOCs convey a strong implication of caused possession—that is, the Recipient is construed as ending up in possession of the Theme.

English also imposes several constraints on DOC formation. Pronoun combinations such as *She gave them it* are generally unacceptable, and only certain verb classes participate in DOC alternation. Verbs like *give*, *send*, *hand*, *offer* readily appear in DOCs, whereas others (*donate*, *explain*, *describe*) cannot.

The Prepositional Dative Construction (PDC)

In the PDC, the Theme appears directly after the verb, while the Recipient is introduced by a preposition—typically *to* or *for*: *She gave the book to him*.

The PDC is more flexible with respect to constituent length: heavy, clausal, or informationally complex Themes prefer this structure. Semantically, PDCs are often associated with caused motion, emphasizing the trajectory or directionality of the Theme rather than the final possession state. They also permit broader variation

in information structure, making them suitable for contexts where the Theme is topical or foci must be shifted.

Semantic Distinctions Between DOC and PDC

The DOC and PDC are not merely stylistic alternatives; they encode different construals of the same event. DOCs highlight the Recipient and imply a more direct transfer of possession, whereas PDCs emphasize the Theme and conceptualize the event as movement toward the Recipient. These differences surface in acceptability judgments. For example:

- *She gave the students the results.* → fully natural DOC
- *She gave the results to the students.* → equally natural PDC
- *She gave them it.* → disfavored
- *She gave it to them.* → fully acceptable

Thus, English ditransitives operate under a system where semantics, information structure, and prosody interact with syntactic ordering.

Uzbek, as a Turkic agglutinative language, employs a markedly different mechanism for encoding ditransitivity. Instead of relying on positional cues, Uzbek assigns grammatical roles through **case morphology**, primarily the **dative** and **accusative** markers.

A prototypical Uzbek ditransitive can be represented as: Subject – Recipient (Dative) – Theme (Accusative) – Verb

Example: *U unga kitobni berdi.*

Here, *unga* identifies the Recipient by virtue of *-ga*, while the Theme *kitobni* may be marked for definiteness using *-ni*. Because roles are unambiguously encoded through morphology, word order plays a secondary role.

Uzbek allows a range of permutations without loss of grammaticality:

- *U unga kitobni berdi.*
- *Kitobni unga u berdi.*
- *U kitobni unga berdi.*

Although all variants are syntactically correct, pragmatic factors such as topicalization, focus, and emphasis determine which version is most appropriate in discourse. This stands in stark contrast to English, where altering word order disrupts grammatical relations.

Verb Types Allowing Ditransitive Frames

Ditransitive verbs in Uzbek encompass several semantic classes:

1. Transfer verbs: *bermoq* ‘give’, *olmoq* ‘take’, *qaytarmoq* ‘return’
2. Communication verbs: *aytmoq* ‘tell’, *ko‘rsatmoq* ‘show’, *yubormoq* ‘send’
3. Benefactive verbs: *tayyorlab bermoq* ‘prepare for’, *yig‘ib bermoq* ‘collect for’

Uzbek freely accommodates verbs that, in English, are excluded from DOC structures. For instance: *U menga bu masalani tushuntirdi.* (‘He explained this issue to me.’) Such constructions are grammatically seamless in Uzbek owing to the clarity provided by case markers.

Unlike English, Uzbek does not exhibit a syntactic alternation parallel to DOC and PDC. The dative-case Recipient and accusative or zero-marked Theme

retain their roles regardless of their relative position. Thus, Uzbek ditransitives are morphologically stable, and their variation serves discourse-related functions rather than signaling semantic contrasts.

The comparison between English and Uzbek ditransitives reveals a fundamental typological divergence between a configurational language and a case-marking, non-configurational language.

Table 1. Structural Contrasts

Feature	English	Uzbek
Core mechanism	Word order	Case morphology
Alternation	DOC vs. PDC	No alternation
Role identification	Linear sequence	Dative/accusative suffixes
Word-order flexibility	Low	High

English relies on constituent position to convey grammatical function, whereas Uzbek encodes roles through morphology, allowing word order to respond to pragmatic concerns rather than syntactic necessity.

Semantic Similarities. Despite structural divergence, both languages share core semantic principles:

- The Recipient is prototypically animate.
- The Theme represents the transferred entity.
- Meanings related to possession and motion arise depending on the verb class.

These parallels show that both languages draw from the same cognitive model of transfer events, even if they implement it differently.

English imposes multiple constraints on the formation of ditransitives, including restrictions on pronoun ordering, Theme weight, and allowable verb types. Uzbek, however, suffers none of these constraints. Its reliance on case marking ensures transparent role interpretation irrespective of lexical or structural complexity. This flexibility allows even communication verbs like *tushuntirmoq* (‘explain’) to appear naturally in ditransitive patterns—something English prohibits in DOC form.

The contrast between English and Uzbek extends beyond syntax, reflecting deeper typological and cognitive tendencies.

English relies on fixed argument structure, where syntactic configuration directly encodes semantic roles. The alternation between DOC and PDC reflects subtle variations in meaning, discourse preferences, and processing considerations. Speakers are sensitive to information flow, pronoun hierarchies, and prosodic boundaries when choosing between the two constructions.

In Uzbek, case morphology performs the role that word order fulfills in English. Since grammatical relations are overtly marked, speakers enjoy broad freedom in constituent arrangement, enabling them to foreground topics,

background known information, or highlight specific elements. Semantic distinctions are achieved less through syntactic alternation and more through lexical choice, adverbs, and discourse markers.

These patterns align Uzbek with other Turkic languages and with typologically similar systems where morphology outranks configuration in assigning argument roles.

Conclusion. Ditransitive constructions in English and Uzbek illustrate two distinct yet functionally convergent strategies for encoding transfer-related events. English differentiates between DOC and PDC, linking syntactic form to semantic interpretation and information structure. Uzbek maintains a consistent morphological system based on dative and accusative case marking, enabling broad flexibility in constituent order and verb compatibility.

This comparative study demonstrates that while both languages express universal cognitive schemas of transfer, their grammatical implementations reflect deeper typological contrasts. These findings contribute to cross-linguistic theories of argument structure, improve translation methodologies, and assist learners navigating the structural differences between English and Uzbek.

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BOSHLANG'ICH TA'LIMDA TABIIY FANLARNI O'QITISH SAMARADORLIGINI OSHIRISHDA INTERFAOL TEKNOLOGIYALARNING AHAMIYAT

***Annotatsiya:** Mazkur maqolada boshlang'ich ta'limda tabiiy fanlarni o'qitish jarayonida interfaol texnologiyalarning o'rni va ahamiyati tahlil qilinadi. Ta'limning samaradorligini oshirish, o'quvchilarda mustaqil fikrlash, kuzatish va tahlil qilish ko'nikmalarini shakllantirishda zamonaviy pedagogik yondashuvlar, shuningdek, o'qituvchining kasbiy kompetentligini rivojlantirish omillari yoritiladi.*

***Kalit so'zlar:** Tabiiy fanlar, interfaol texnologiyalar, boshlang'ich ta'lim, o'qituvchi kompetentligi, pedagogik innovatsiyalar.*

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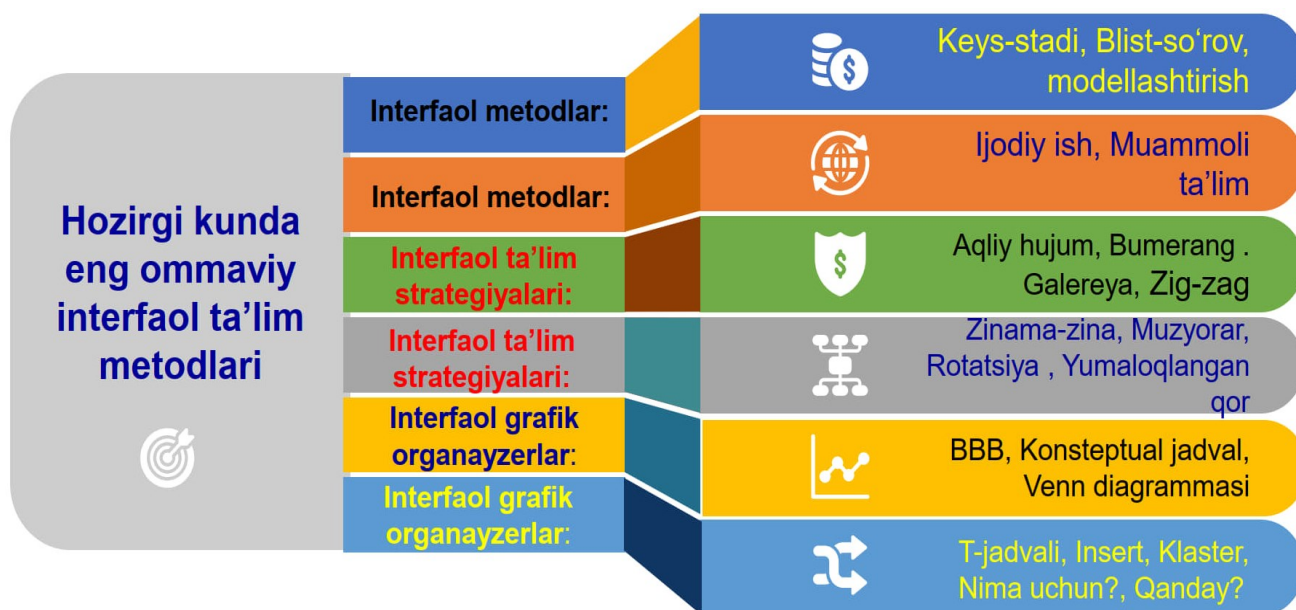
THE IMPORTANCE OF INTERACTIVE TECHNOLOGIES IN IMPROVING THE EFFECTIVENESS OF TEACHING NATURAL SCIENCES IN PRIMARY EDUCATION

***Abstract:** This article analyzes the role and importance of interactive technologies in teaching natural sciences at the primary education level. It highlights modern pedagogical approaches aimed at increasing the effectiveness of education, developing students' independent thinking, observation, and analytical skills, as well as factors contributing to the development of teachers' professional competence.*

***Keywords:** natural sciences, interactive technologies, primary education, teacher competence, pedagogical innovations.*

Kirish. Bugungi kunda ta'lim tizimida sodir bo'layotgan islohotlar o'qituvchidan yangicha fikrlashni, o'quvchilarda mustaqil bilim olish ko'nikmasini shakllantirishni talab qilmoqda. O'zbekiston Respublikasining "Ta'lim to'g'risida"gi Qonunida ta'lim jarayonini ilg'or pedagogik texnologiyalar asosida tashkil etish zarurligi alohida ta'kidlanadi. Bu esa boshlang'ich sinf o'qituvchisidan zamonaviy metodlarni egallash va ularni dars jarayonida samarali qo'llashni talab etadi.

Boshlang'ich ta'limda tabiiy fanlarni o'qitishda quyidagi interfaol metodlar samarali hisoblanadi: 1-rasm.



1-rasm. Interfaol metodlar

Ushbu usullar o'quvchilarni faol ishtirokchi sifatida o'quv jarayoniga jalb etadi, ularning **bilishga bo'lgan tabiiy ehtiyojini** kuchaytiradi. O'qitish va o'rganish jarayonining asosiy jihatlaridan biri — bu so'rovga asoslangan ta'lim (IBL) yordamida o'quvchilarni ilmiy fikrlashga va olimlarga xos tarzda faoliyat yuritishga yo'naltirishdir. Loyihaga asoslangan ta'lim (PBL) . Loyihaga asoslangan ta'lim o'qituvchilarga talabalarga va so'rovlarga asoslangan o'quv dasturlari loyihalarini ishlab chiqish va amalga oshirish imkoniyatini beradi. PBL bilan shug'ullanish orqali o'qituvchilar guruh ishini osonlashtirish, fanlararo tarkibni birlashtirish va talabalarning o'rganishini yaxlit tarzda baholash kabi muhim ko'nikmalarni rivojlantirishlari mumkin. Ushbu amaliy yondashuv nafaqat o'qitish mahoratini oshiradi, balki o'quvchilarning faolligini va motivatsiyasini ham oshiradi.

 **Loyihaning maqsadi.** Misol: “Bizning tabiatimiz — bizning boyligimiz” loyihasi. Mavzu: “O'simliklarning ahamiyati va ularni asrash”

O'quvchilarda o'simliklarning hayotdagi o'rni, ekologik muvozanatni saqlashdagi ahamiyati haqida tushuncha berish; ularni asrashga nisbatan mas'uliyatli munosabatni shakllantirish.

Loyihaning vazifalari

1. O'quvchilar o'z yashash joyida o'simlik turlarini o'rganadilar.
2. O'simliklarning inson hayotidagi ahamiyati haqida ma'lumot to'playdilar.
3. Guruh bo'lib “Tabiatni asraylik” shiori ostida **mini-plakat** yoki **prezentatsiya** tayyorlaydilar.
4. Har bir guruh o'z loyihasini sinfda taqdim etadi.

O'qituvchi faoliyati

- O'quvchilarga loyiha topshirig'ini tushuntiradi;
- Guruhlar tuzadi va ularning ishini yo'naltiradi;

- Axborot manbalarini tanlashda ko‘maklashadi (kitob, internet, kuzatuv, ota-onalar fikri);

- Jarayonni baholash mezonlarini ishlab chiqadi (ijodkorlik, jamoaviylik, taqdimot sifati).

O‘quvchilar faoliyati

- Guruhga bo‘linib, mas’uliyatlarni taqsimlaydilar (masalan, tadqiqotchi, yozuvchi, rasm chizuvchi, taqdimotchi).

- Atrofdagi o‘simliklarni kuzatadilar, suratga oladilar, ularning foydasi haqida ma’lumot yig‘adilar.

- Topilgan ma’lumotlar asosida plakat yoki prezentatsiya tayyorlaydilar.

- Loyihani sinf oldida taqdim etadilar.

Fanlararo integratsiya.

- **Tabiatshunoslik:** O‘simlik turlari, ularning foydasi.

- **Ona tili:** Matn tuzish, yozma va og‘zaki nutqni rivojlantirish.

- **Tasviriy san’at:** Rasmlar va plakatlar yaratish.

- **Informatika:** Slayd tayyorlash, internetdan ma’lumot izlash.

Baholash mezonlari.

Baholash mezonlari	Tavsif
Bilim	O‘simliklar haqidagi ilmiy tushunchalarni to‘g‘ri ifodalash
Jamoaviylik	Guruhdagi hamkorlik, o‘zaro yordam
Ijodkorlik	Plakat yoki taqdimotning badiiy ifodasi
Taqdimot	O‘z fikrini erkin, ishonch bilan bayon etish
Xulosa	Tabiatni asrashga nisbatan shaxsiy munosabat bildirish

Kutilayotgan natijalar.

- O‘quvchilar tabiiy fanlarga nisbatan qiziqishini oshiradi;
- Tabiatni asrash mas’uliyati shakllanadi;
- Mustaqil izlanish va jamoada ishlash ko‘nikmalari rivojlanadi;
- Axborotni tanlash, tahlil qilish va taqdim etish malakasi kuchayadi.

Qo‘shimcha loyihalar uchun mavzular.

1. “Suv — hayot manbai”
2. “Atrof-muhitni toza saqlaymiz”
3. “Hayvonlarni asraylik”
4. “Bizning bog‘imiz”
5. “Qayta ishlash – ekologiyani saqlash yo‘li”

Xulosa. Boshlang‘ich ta’lim bosqichida tabiiy fanlarni o‘qitish nafaqat bilim berish jarayoni, balki o‘quvchilarda atrof-muhitni anglash, tabiatni sevish, uni asrash va ilmiy fikrlashni shakllantirish jarayonidir. Shu nuqtai nazardan, darslarda interfaol texnologiyalarni qo‘llash o‘qitish jarayonining samaradorligini sezilarli darajada oshiradi. Interfaol texnologiyalar o‘quvchini o‘quv jarayonining markaziga qo‘yadi, uni faol ishtirokchiga aylantiradi, shuningdek, o‘qituvchining pedagogik mahoratini yangi bosqichga olib chiqadi. Interfaol yondashuvlar o‘quvchilarda mustaqil fikrlash, tahlil qilish, kuzatish, izlanish, o‘z fikrini asoslab berish kabi zaruriy kompetensiyalarni shakllantiradi. Ayniqsa tabiiy fanlar — inson

va tabiat o'rtasidagi o'zaro aloqani o'rganadigan fandır. Bu fanda interfaol metodlardan, masalan, "Aqliy hujum", "Klaster", "Venn diagrammasi", "Insert", "Keys-stadi", "Zakovat o'yini" kabi usullardan foydalanish orqali o'quvchilar mavzuni faqat eslab qolmay, balki uni hayotiy vaziyatlar bilan bog'lab tushunish imkoniyatiga ega bo'ladilar.

Interfaol texnologiyalar o'quv jarayonini qiziqarli, ijodiy va o'zaro hamkorlik asosida tashkil etishga yordam beradi. Natijada darslarda o'quvchi va o'qituvchi o'rtasida samimiy muloqot, faol fikr almashuv, jamoada ishlash madaniyati shakllanadi. Bu esa o'quvchining o'z fikrini erkin ifoda etishi, o'z kuchiga ishonchi ortishiga va o'zlashtirish darajasining yaxshilanishiga olib keladi.

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CLINICAL AND MICROBIOLOGICAL SUBSTANTIATION OF DIFFERENTIATED CORRECTION OF VAGINAL MICROBIOCENOSIS IN WOMEN WITH BACTERIAL VAGINOSIS DURING PREGNANCY

Abstract. *Intrauterine synechia and polyps are recognized today as one of the main causes of infertility. Hysteroscopic adgesiolytic and polypectomy surgery indicate that despite being the gold standard for the treatment of this disease, the need to optimize the method to prevent post-operative recidivism is greater. This study covered a total of 90 women of reproductive age, of whom 30 were with intrauterine polyps, 30 with uterine synechia, and the remaining 30 healthy women. Hysteroscopic adgesiolytic was performed in women of Group 1, hysteroscopic polypectomy was performed in Group 2, and Medicurtan 5 ml (50 mg sodium hyaluronate \25 mg hydroxyl starch) gel was applied to the uterine cavity to patients of Group 1 immediately after the procedure. Group 2 patients received 1 time per day during 10 days of 200.0 Dufaston for 3 months, in addition to the use of Medicurtan gel. As a result of the study, the results were obtained as follows, the use of hysteroscopy in the treatment of infertile women associated with intrauterine pathologies made it possible to treat infertility in 88.34% of women, which consists of 93.33% and 83.33%, respectively, in groups. The recovery of menstrual function is observed in 76.67%, which is 83.33% and 70% in groups, respectively.*

Keywords: *endometrial polyps, intrauterine synechia, hysteroscopy, adgesiolytic, polypectomy, medicurtan, dufaston*

Introduction. Female reproductive dysfunction is the result of many causes, among which the proportion of the uterine factor varies from 24 to 62%. The only cause of infertility is uterine pathology in 10-15% of women, and in combination with other factors, its sagging increases to 50%. Modern methods of diagnosing intrauterine pathology make it possible to determine sufficient tactics for managing the patient, develop a complex of optimal therapeutic measures, and often restore reproductive function. Scientific research is focused on the development and implementation of new technologies in the field of Reproductive Medicine. This has the potential to greatly increase the information related to the treatment of women with uterine pathologies. In order to optimize the results of these interventions, various strategies are being studied and evaluated.

One of the causes of infertility associated with uterine pathologies is uterine synechias. Uterine synechia is the formation of adhesions in the uterine cavity due to the fact that various surgical procedures are carried out in the endometrium.

According to various sources, the incidence of uterine synechia occurs from 0.3% to 21.5% and it varies [4;67-75-B,23;70-75-b,31;56-62-B,11;332-338B]. The first case of uterine synechia was discovered in 1894 by Heinrich Fritz in a woman who experienced amenorrhea [19; pp.81-89]. In 1948, Joseph Asherman first noted the prevalence of this pathological condition and described the symptoms of amenorrhea, infertility and dysmenorrhea in this group of patients. Over time, the term "Asherman's syndrome" began to be used to refer to the severe termination of the uterine cavity in women with persistent amenorrhea and infertility [23;167-176-B, 0; pp.7057-7064,19; pp.281-283].

The purpose of the study- is to study the effectiveness of the hysteroscopy method in the diagnosis and treatment of infertility associated with uterine pathologies in women.

Research tasks:1. Evaluation of the effectiveness of hysteroscopy in the treatment of infertile women associated with uterine pathologies.

2. Evaluation of the effectiveness of treatment measures used to carry out the post-surgical period in infertile women associated with uterine pathologies.

Scientific innovation of research: The effectiveness of the use of medicurtan gel after hysteroscopy in the recovery of fertility in infertile women associated with uterine pathologies was studied.

Description proposed by Toaff and Ballas: Level 1 intrauterine atresia of the uterus, without participating in the process of gluing the walls of the uterine cavity.

Level 2 internal bottom stenosis occurs due to clear adhesion, without involving the walls of the uterine cavity in the adhesive process.

Level 3 in the inner tubal area and numerous minor finishes in the Isthmus area. Level 4 is the termination of the area above the uterine cavity caused by the complete separation of the cavity in the lower segment of the uterus.

Internal atresia of the 5th degree in combination with the termination of the uterine cavity.

In the same year, March et al. the first to introduce a hysteroscopic classification of uterine synechias [1;53b].

On mild - adhesions that occupy less than $\frac{1}{4}$ of the uterine cavity. The pores of the fallopian tubes and the bottom of the uterus are minimal / not involved in this process.

Middle - $\frac{1}{4}$ to $\frac{3}{4}$ of the uterine cavity is involved in the process. The pores of the fallopian tubes and the bottom of the uterus are partially involved in the process. There is no stickiness of the walls of the uterus.

Heavy-more than $\frac{3}{4}$ of the uterine cavity is involved in the process. Both mouths of the fallopian tubes are blocked, the synechiae are located at the bottom of the uterus.

Polyps can create obstacles to the normal process of fetal pink and implantation. These conditions can alter the structure of the endometrium, which affects the processes of implantation and pregnancy retention [15;365-380-b23;784-815-B].

Currently, the main treatment for uterine synechia is hysteroscopic surgical adhesiolysis. The angle of view achieved with hysteroscopy and a few enlargements make it revolutionary, ensuring a safe and precise effect. For mild pathology, it is enough to manipulate the hysteroscope tube and does not require an extension of the cervical canal. This reduces the cost of anesthetic tan and reduces the duration of jarring. Various surgical energies are used to perform surgical adhesiolysis: mechanical, electrical, laser [6;14-16b,30;72-83b]. Marshall and Davison's [12; pp58-65] uterus focuses on surgical treatment of anomalies. Removal of polyps, resection of fibroids, correction of developmental defects of the uterus - these methods can be effective in removing obstacles in the normal implantation and development of the embryo.

General clinical research methods. General clinical and laboratory tests of all patients included in the study were carried out in medical institutions of the health system of the Republic of Uzbekistan using generally accepted methods in accordance with the recommended standards for the diagnosis and treatment of gynecological patients.

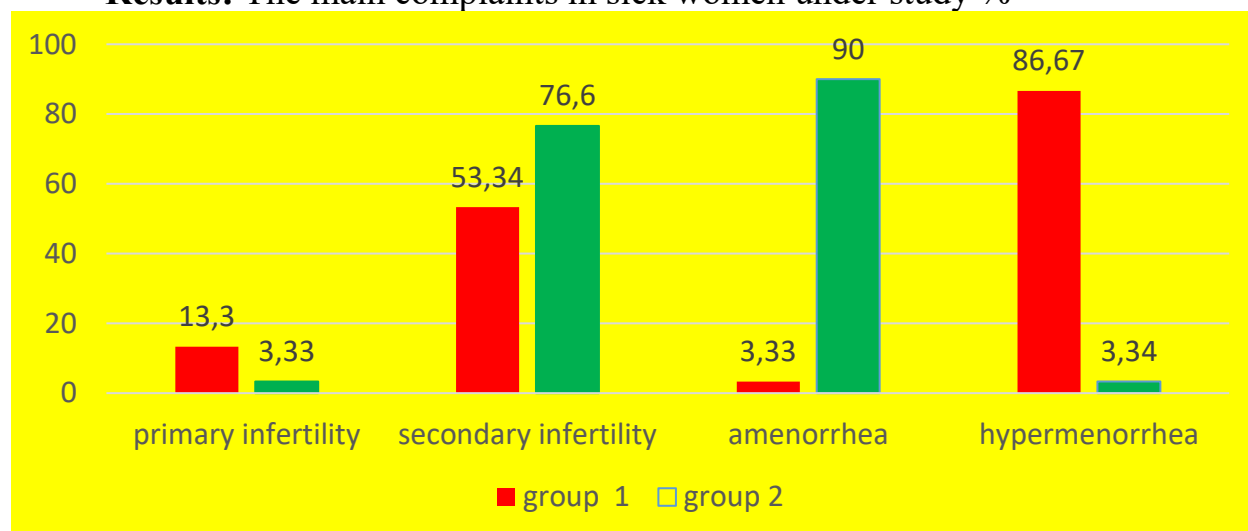
Hormonal research methods. Hormone levels were found in the Mindray MR-96A immunoanalyzer using a standard set of reagents produced by Alcor Bio (Russia), Boehringer Mannheim (USA), Beckman Coulter (USA) and Hoffman La Roche. The number of hormones in the blood was determined before and after hysteroscopy jarrochia. To study the hormonal status, FSG LG estradiol (E2) and the levels of the hormones progesterone and testosterone were studied.

Hysteroscopy research method Hysteroscopy research method 9-obstetric complex was carried out in the Department of gynecology jarrahlik (head of the department: t.f.n. Manapova U.X.). Equipment from "Karl Storz" (Germany) was used in conducting the hysteroscopy research method. Hysteroscopy was performed using a liquid hysteroscopy method, using a solid hysteroscope of the firm "Karl Storz" (Germany) with an external diameter of 5mm when conducting an endoscopic research method. Hysteroscopy performed the practice of endochirurgical surgery with spinal anesthesia, using intravascular anesthesia techniques. As an extension agent for the uterine cavity, NaCl 0.9% sterile solution and 5% glucose solutions were used. A 0.9% solution of sodium chloride was used in cases where a coagulator was not used during jarrahlik practice, while a 5% solution of glucose was used in all other cases. When performing the practice of hysteroscopy endochirurgical surgery, the following indicators are assessed: the presence and shape of the uterine cavity, deformities and their nature, the holes of the part of the fallopian tubes starting from the uterine cavity, the endometrial nature, the presence of polyps, their size and location, the nature of the structure, the relief of the basal part of the endometrium. Particular attention was paid to the presence of a trabecular structure and the dentition of the basal layer. Attention was paid to the nature of the vascular pattern of the basal layer of the endometrium, the presence of glandular mouths, the nature and source of bleeding if present. For coagulation, roller electrodes of different sizes and profiles were attached to the working element of the hysteroscope. In all patients, biopsy samples taken from the

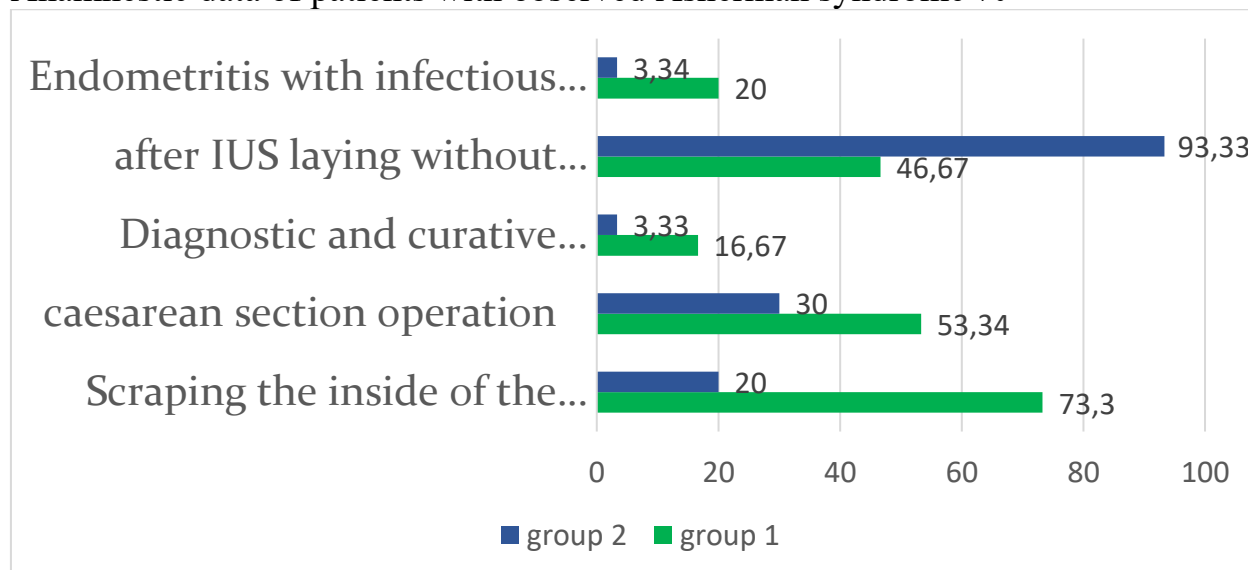
endometrium during the execution of the hysteroscopy study were taken and sent for histomorphological examination.

Hysteroscopic adzeziolysis was performed in women of Group 1, hysteroscopic polypectomy was performed in Group 2, and Medicurtan 5 ml (50 mg sodium hyaluronate \25 mg hydroxyl starch) gel was applied to the uterine cavity to patients of Group 1 immediately after the procedure. Group 2 patients received 1 time per day during 10 days of 200.0 Dufaston for 3 months, in addition to the use of Medicurtan gel .

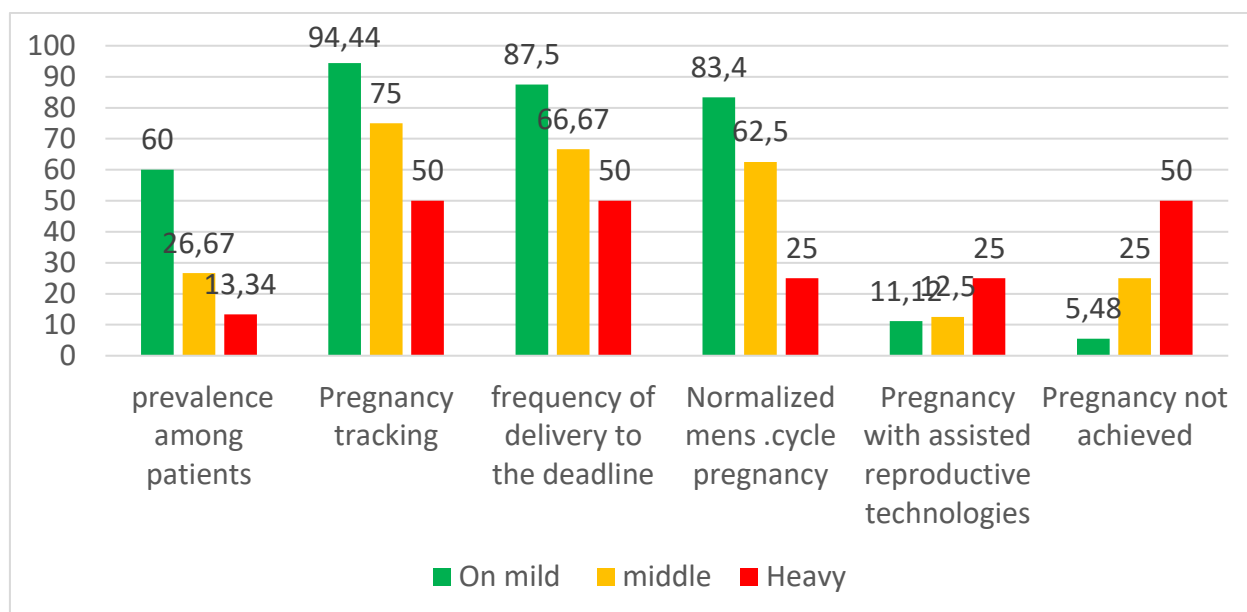
Results: The main complaints in sick women under study %



Anamnestic data of patients with observed Asherman syndrome %



Results after hysteroscopic adzeziolysis surgery on Asherman syndrome severity and a year after the use of medicurtan gel.



When analyzing the status of gynecological diseases in major groups, salpingooforitis disease was observed in Group II with a slightly higher group I index of 17.5% compared to 22.5% in women ($p < 0.05$). Hyperplastic processes in the endometrium were found in anamnesis of 55.0% of women. The highest incidence of the disease was reported in 9 women (22.5%) with uterine synechias ($p < 0.001$). Cervical safe tumor diseases, considered one of the second most common pathologies, were detected in 22.5% of women. Cervical safe diseases were found to have a much lower 5.0% prevalence in women in the comparison group ($p < 0.001$).

In addition, according to the type of hysteroscopic surgical practice we used, the overall pregnancy swing was 93.35% when evaluating the long results of hysteroscopic treatment in 30 women who performed hysteroscopic surgeon due to uterine siniekhias. Apparently, the results after the practice of hysteroscopic removal of uterine endometrial polyps were 1.1 times lower than those after the practice of hysteroscopic adgeziolysis. Hysteroscopic polypectomy resulted in 25 pregnancies (83.3%) following a surgical procedure.

In addition, according to the type of hysteroscopic jarrox practice we used, the overall pregnancy swing was 83.5% when evaluating the long results of hysteroscopic treatment in 30 women who performed hysteroscopic jarrox due to uterine siniexias. Apparently, the results after the practice of hysteroscopic removal of uterine endometrial polyps were 1.6 times higher than those after the practice of hysteroscopic adgeziolysis. Hysteroscopic polypectomy resulted in 25 pregnancies (85.2%) following a surgical procedure.

Conclusion. 1. In the diagnosis of infertile women associated with uterine pathologies, the use of hysteroscopy is considered an effective method. The use of hysteroscopy in the diagnosis of infertility with uterine pathologies in women allows you to achieve results 2.5 times higher than in traditional methods.

2. As a result of the study, the results were obtained as follows, the use of hysteroscopy in the treatment of infertile women associated with intrauterine pathologies made it possible to treat infertility in 88.34% of women, which consists

of 93.33% and 83.33%, respectively, in groups. The recovery of menstrual function is observed in 76.67%, which is 83.33% and 70% in groups, respectively.

3. The use of a uterine device in order to prevent the relapse of uterine pathologies in the course of the period after the practice of hysteroscopic jarrochia and the use of micronized progesterone in women who have undergone hysteroscopic polypectomy jarrochia leads to a 2.1-fold decrease in the recurrence of these pathologies.

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THE CONCEPTUAL STATUS OF SOCIAL PHILOSOPHY

Abstract: *The research is that only social philosophy studies man and society as such. The problem is that it's far from certain that social philosophy has an object and subject. What's interesting here is that not all forms of spiritual activity have an object and subject. For example, art has no object, but it has a product, because art is not a way of understanding the world, but its creation according to the laws of beauty. Therefore, the first step is to understand the place of social philosophy in the system of human spiritual activity.*

Key words: *social philosophy, system of human spiritual activity, discussion, values of human existence, ability, disagreements.*

Introduction

Value-based social philosophy proceeds from the understanding of philosophy as the wisdom of being in the world, called upon to answer the question of the meaning of human existence in society and history. Accordingly, the task of social philosophy becomes a discussion of desirable forms of social order, the possible purpose of history, and the norms of a dignified existence within it that correspond to the highest values of human existence.

Research methodology

Value-based social philosophy - from Plato's views on the state to the ideologies of the Communist Manifesto and the historiosophy of Friedrich Nietzsche and Nikolai Berdyaev - is an alternative to scientific understanding of society and functions as a unique form of “social preaching.” Its judgments are based on value preferences that can be qualified as true or false only when they concern “values as means,” not ultimate “values as ends” freely chosen by people. The universal validity of such goals, their adequacy to the tasks of survival, provides no basis for recognizing their epistemological truth or the mutual reduction of what should be to what is.

Its alternative to science is not a drawback, but an advantage, of value-based social philosophy, which substantiates “supersystems of human culture” consisting of knowledge, beliefs, images, and norms, reflects on the values of existence, and therefore appears as the value-based self-awareness of the eras of human history.

Analysis and results

In studying the essence of social life, social philosophy views it as a society - a human world, diverse in its manifestations, isolated from and distinct from nature. The development of this ability signifies the transformation of the biological activity of living systems into human activity.

The most important problem of social philosophy is the substantial basis of social life, which imparts societal properties to its diverse subjective, objective, and organizational manifestations, determining their qualitative self-identity and internal systemic integrity.

The problem of the substance of social life has caused and continues to cause sharp disagreements among philosophers. Some consider transcendental consciousness to be such a substance; others, this-worldly consciousness, acting as a system of meanings (ideas, images, values, norms) that integrates the diversity of their bearers into sociocultural systems. Human activity, in this understanding, functions as a mode of ideal substance, a process of objectifying meanings and their subsequent socialization.

An alternative perspective views the objective activity of social man as a social substance. As an ideal-regulatory subsystem of activity (the totality of its motives, goals, and programs), consciousness determines the process of goal-realization and significantly influences its results, diversifying them in accordance with the subject's inherent "free will." However, this freedom is not absolute, since the content of human desires, drives, and goals is determined by a system of material factors of activity. Above all, we are talking about human needs as the primary causes of their activity. Alternative interpretations of social substance lead to different understandings of many of the most important problems of social philosophy, from the question of the existence of forms of space and time specific to society to the problems of social determinism. Thus, the human capacity for predictive modeling of virtual states of the environment is linked to the question of the specific nature of cause-and-effect relationships (under conditions where the cause of an action is the perception of its possible consequences). The ability of consciousness to rank the needs that determine it raises the question of the relationship between necessity and freedom, chance and probability in human behavior.

The most important task of social philosophy is to construct a systemic-structural model of "society in general," which should bring together the universal, historically invariant characteristics of social organization, independent of the spatiotemporal forms of its existence. This is achievable only through a systems analysis of objects with an organic type of integrity. The initial task is a structural analysis of society - establishing a register of the parts that form the social system, identifying the levels of structural organization of society (its subsystems, components, and elements) that are in hierarchical relationships.

Leaving the specific analysis of social structure to sociology, social philosophy discusses the most general principles of "social statics," in particular, the principles for identifying the subsystems of society or spheres of social life. Various approaches to identifying the various spheres of society can be identified:

➤ the subjective approach, according to which large groups of people (ethnosocial communities, economic strata, political unions, etc.) are considered subsystems of society;

➤ an organizational approach, based on institutionalized systems of social relations (such as “base” and “superstructure”);

➤ an activity-based approach, which links subsystems with types of human collaboration. Defining these types involves identifying the elements of collaboration without which its reproduction is impossible.

These include human individuals, objects of practical use, or things created in material production; information, defined in symbols and signs, created in spiritual production; and finally, subject-object and subject-subject connections and relationships. Various social groups and the institutions behind them, associated with the distribution of professional, economic, power, and cultural roles and statuses among the bearers of the corresponding social relations, comprise the structure of society as components.

The structural analysis of society is complemented by its functional examination, which should establish the methods and mechanisms for reproducing social integrity. In the course of such consideration, social philosophy seeks to reveal the system of mediations that arise between the elements, components and subsystems of society in the process of their interaction. Different interpretations are given to the initiating subjects of socio-cultural changes, their optimal, most effective forms (evolutionary change or social revolution), etc.

Conclusion

The applied aspect of the philosophy of history is the development of methodological problems of historical knowledge, such as the question of distinguishing between historical “structures” and “events,” the nature of historical fact, the relationship between nomothetic and idiographic procedures in the knowledge of history, “explanation and understanding” in it, etc.

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FORMATION OF SCIENTIFIC IDEAS RELATED TO LANDSCAPE SCIENCE

Abstract: *This article analyzes the origin of the term “landscape,” the formation of landscape science as a distinct field, and the contributions of scholars who have advanced its development. The study also explores the formation and evolution of scientific ideas related to landscape studies. Based on the analysis, recommendations have been provided regarding the prospects for the further development of landscape science.*

Key words: *landscape, landscape science, geosystem, geoecology, scientific school, research center, anthropogenic landscapes, theoretical landscape science, cultural landscape, assessment, forecasting, “Green Space,” natural resources, landscape dynamics, prediction, geosystem, geoecology.*

Introduction. The Decree of the President of the Republic of Uzbekistan No. PF-60 of 8 January 2022 “On the Development Strategy of Uzbekistan for 2022–2026”, the Decree No. PF-5863 of 30 October 2019 “On the Approval of the Environmental Protection Concept of the Republic of Uzbekistan for the Period up to 2030”, the Decree No. PF-5742 of 17 June 2019 “On Measures for the Efficient Use of Land and Water Resources in Agriculture”, the Resolution of the Cabinet of Ministers No. 841 of 20 October 2018 “On Measures to Implement the National Goals and Targets in the Field of Sustainable Development until 2030”, as well as other relevant normative-legal documents, serve as an important basis for fulfilling the tasks set in this research work. In the “New Uzbekistan” Development Strategy for 2022–2026 and the Presidential Project envisaging the approval of the “Roadmap for its implementation in 2022”, Goal 80 defines significant tasks for the implementation of the nationwide “Yashil Makon” (Green Space) project. In this regard, environmental protection, the rational use of natural resources, and, particularly, knowledge related to the science of landscape studies acquire special importance.

Literature review and methods. As a result of its development and differentiation, geography has evolved from an integral discipline of the ancient and medieval periods—studying nature, population, and economic activities—into a system of sciences. The structural composition of this system has long remained a focal point of scholarly attention. In almost all textbooks and teaching manuals on geography, as well as in scientific monographs and major theoretical articles devoted to the theoretical and problem-oriented issues of the field, authors have expressed their views on the structure of geographical science and the role of physical geography within it. Scientific information on the history of landscape studies has been addressed in the works of foreign scholars such as O. Peschel (1879), A. Hettner (1905), P. James (1972), G. Haase (1973, 1981), D. G. Harvey (1974), and J. Demek (1977); Russian scholars including A. A. Grigoriev (1930, 1948), N. A. Solntsev (1948, 1962), I. M. Zabelin (1949, 1959, 1978), V. L. Kotelnikov (1950), F. N. Milkov (1959, 1967, 1986, 1990), S. V. Kalesnik (1961, 1972), Yu. K. Efremov (1964, 1987), V. I. Prokaev (1973), E. Neef (1974), Yu. G. Saushkin (1976, 1980), V. S. Preobrazhenskiy (1972, 1981, 1986, 1988, 1997), A. G. Isachenko (1976, 1982, 1991, 2004, 2006), Z. V. Makarov (1977), N. G. Sukhova (1981), A. Yu. Retezum (1985, 1997), I. I. Mamay (2008), K. N. Dyakonov (2014); and Uzbek geographers such as V. M. Chetyrkin (1947), A. Abdulkosimov (1983, 2017), R. U. Rakhimbekov (1995), Sh. S. Zakirov (1999, 2011), S. B. Abbasov (2002, 2017), Kh. Vakhobov (2006), and Kh. R. Toshov (2013, 2016, 2021). Understanding the current state of landscape science and forecasting its future development requires studying its historical foundations. The formation and evolution of landscape studies as a scientific discipline is closely associated with prominent scholars such as A. Humboldt (1769–1859), C. Ritter (1779–1859), and V. V. Dokuchaev (1846–1903).

The subsequent development of landscape studies was reflected in the works of G. N. Vysotskiy (1865–1940), G. F. Morozov (1867–1920), L. S. Berg (1876–1950), A. A. Borzov (1874–1939), R. I. Abolin (1886–1939), and others. In the next stage of theoretical development, the contributions of S. S. Neustruyev (1874–1928), B. B. Polynov (1877–1952), L. G. Ramenskiy (1884–1953), S. V. Kalesnik (1901–1977), and V. N. Sukachyov (1880–1967) are invaluable. Significant scientific results in the field of landscape dynamics and evolution were obtained by B. B. Polynov, L. S. Berg, V. L. Komarov, I. V. Larin, and others. By the 1940s, the integration of geochemical ideas and methods into landscape theory led to the emergence of the field of landscape geochemistry. One of its founders is considered to be B. B. Polynov (1877–1952). As known from the history of geography, many scholars, on the basis of the above-mentioned considerations, have concluded that V. V. Dokuchaev is the founder of modern physical geography, including landscape studies. For example, one of the most influential Russian geographers of the first half of the 20th century, L. S. Berg, commenting on Dokuchaev's theory of natural zones, referred to him as the “true father” of geography. We likewise support the opinion that this great soil scientist was also a “great geographical scholar”. Another important aspect that cannot be overlooked in the development of geographical

sciences includes disciplines such as the History of Geography, Toponymy, and Methods of Teaching Geography. These belong to the group of “supporting” sciences that contribute to the advancement of geography, forming at the intersection of geography with social sciences. Toponymy is closely connected with philology and history; methods of teaching geography with pedagogy; and the history of geography with historical sciences. Regardless of which direction geographical science develops, it must not overlook an important axiom: all geographical sciences must preserve their essence by studying the laws characteristic of the geographical envelope (geographical sphere). Otherwise, they lose their geographical nature. All natural, social, or mixed processes and phenomena must be studied within the framework of the geographical envelope or its taxonomic units.

Results and discussion. If we look at the history of landscape science, the issues of the origin of its theoretical foundations have always been relevant. Because issues such as the history and development of the science are reflected in its content, views about it are clarified. The origin of the landscape doctrine also spans long periods. The scientists who thought about it (V.P. Semyonov - Tyan-Shansky, 1928; I.M. Zabelin, 1959, 1969; A.G. Isachenko, 1971;) called the declines in the development of the science of geography, the object of the science of geography and who pointed out such factors as the lack of unified opinions on the subject, the provision of geographical knowledge in higher education institutions and the opening of geography departments. Therefore, in order to look at the history of landscape science, first of all, it is necessary to clarify the importance of studying the history of science and the issues of the emergence of the theory of landscape, which is its theoretical basis.

Every science has its own developmental history, and landscape studies are no exception. The term *landscape* was first introduced into geographical literature in 1805 by the German geographer A. Hommeyer. In German, “Land” means land, and “Schafft” denotes interconnectedness or interrelation. In English, its semantic equivalent *landscape* refers to a natural view, while in French the term *paysage* conveys a similar meaning. Despite the extensive historical material accumulated on landscape science today, it is evident that these materials have not yet been subjected to consistent logical analysis. This is because analyzing the past stages of landscape studies is inherently complex. First, landscape studies belong to the system of physical geographic sciences. Even the core concept of the discipline—*landscape*—remains subject to numerous debates regarding its meaning and scope, and consensus has not yet been fully achieved. The views of many scholars on this issue are noteworthy. For instance, the prominent landscape scientist A. G. Isachenko stated: “Landscape science is part of the system of physical geographic sciences; indeed, it constitutes the core of this system and connects its constituent sciences” [3, p. 19]. Second, the emergence of systems theory in the mid-20th century further improved the theoretical foundations of landscape studies. The main idea of this theory is that “the Earth’s surface is a unified whole composed of large and small geosystems due to the exchange of matter, energy, and information.” It is

well known that landscapes are typological rather than topological geosystems that recur across regions. Here, the term “landscape” expresses typological geosystems. Landscape science, in turn, is a discipline devoted to smaller typological complexes, and such an understanding clearly distinguishes it from regional physical geography.

Third, almost no landscapes in the world today remain unaffected by human activity. Natural landscapes are becoming increasingly anthropogenic. Even research in economics, economic geography, and ecology related to the efficient use and protection of natural resources reveals the necessity of applying the theoretical principles developed in landscape studies. In other words, landscape science is increasingly embodying a general geographic essence [8]. As the renowned landscape scholar Sh. Zakirov stated: “If ecology plays a key role among the biological sciences in resolving issues related to human–nature interactions, then landscape studies should play the same role within the system of geographical sciences” [2, p.118]. It is also appropriate to cite the view of scholar I. Q. Nazarov, who stated: “The theories of landscape, geosystems, and geoecology are the result of the gradual development of geographical thought. These theories possess immense power and serve as a scientific methodological foundation.” In his article “Pressing Theoretical and Practical Problems of Uzbekistan’s Geography,” Professor Kh. Vakhobov wrote: “Significant work has been done and continues to be done in the field of landscape studies in Uzbekistan. Nevertheless, a comprehensive monograph or methodological guide titled ‘Landscapes of Uzbekistan’ has still not been produced” [1, p. 4]. As a conclusion, it should be noted that many general scientific and general geographic problems can be solved on the basis of the theories developed within landscape studies. To date, scholars of our country have conducted several studies on the history of geography. These include, for example, the textbook “The History of the Geographical Study of the Nature of Central Asia” (1982) by R. U. Rakhimbekov and Z. N. Donsova, and the research works of A. Ochilov on the study of Central Asian nature. Rakhimbekov and Donsova conditionally divided the geographical development of Central Asia in the modern period (1961–1981) into 11 stages. All aspects of geography are covered in these stages, and the authors emphasize the crucial importance of landscape research, especially in connection with the constructive stage—i.e., the development of deserts and semi-deserts. The authors also conducted a detailed analysis of regionalization. In particular, natural geographic and landscape regionalization of Central Asia has been conducted in two main directions. Russian scholars (N. A. Gvozdeskiy, E. M. Murzaev, G. D. Rikhter, and others) considered geological–geomorphological and zonal differences in their regionalization schemes, whereas Uzbek scholars (L. N. Babushkin, N. A. Kogay, 1975) advocated a traditional ecological–geographical approach. As a result, Russian scientists separated mountains from plains during regionalization, while Uzbek scholars combined mountains and plains based on ecological unity. Landscape science incorporates both a system of knowledge and a community of individuals engaged in scientific activity—formal (scientific institutions) and informal (scientific

schools). All these elements should remain the object of research in the history of landscape science, while its subject must include the objects and content of landscape research, its main directions, conceptual foundations and methods, scientific centers, and scholarly traditions [4, p. 5].

Conclusion. The study of the development of landscape science shows that despite numerous works and extensive research conducted in this field, consensus has not yet been achieved regarding its theoretical and methodological issues. The history of landscape science has long served merely as the history of the theoretical views of individual authors rather than as a subject of the discipline itself. The history of landscape studies is an integral continuation of the history of geography. Therefore, the crises that occurred in the history of geographical science had a significant impact on the formation of landscape science. For example, until the mid-18th century, clear notions of the subject, content, and tasks of geography had not been established; the decline of the discipline following the end of the “descriptive stage” (according to I. M. Zabelin) and the intensification of differentiation within geography were among the influencing factors. Analyzing the stages through which landscape science has passed is a complex process due to: (1) its belonging to the system of physical geographic sciences; (2) the introduction of systems theory in the mid-20th century, which significantly improved landscape theory; and (3) the increasingly general geographic essence of landscape science. Geographers have referred to the 19th century as the “century of natural sciences.” During this period, several disciplines—such as geology, climatology, botany, zoology, and soil science—separated from geography and became independent sciences. Beginning from the last decades of the century, the theoretical foundations of landscape studies—i.e., the basis of landscape theory—began to take shape. Concepts such as the unity of nature, zonality, the “chorological concept,” and theories of soils and forests served as essential foundations for landscape theory.

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EPIDEMIOLOGICAL FEATURES OF PARASITIC DISEASES AND PARASITISM

Abstract. *WHO experts believe that the incidence of measles in Europe and Uzbekistan has reached a historical maximum over the past ten years. The measles situation in the world, including in European countries, has remained unfavorable for three years now. The European Center for Disease Prevention and Control associates this frightening trend with a decline in the global vaccination rate to 78% instead of the required 90–95%.*

Keywords: *children, exanthema, infectious erythema.*

Introduction. Despite the availability of a safe and affordable vaccine, measles caused an estimated 107,500 deaths globally in 2023, the majority of whom were unvaccinated or undervaccinated children under 5 years of age.

In 2023, the proportion of children who received a first dose of measles vaccine was 83%, a significant decrease from 86% in 2019.

Measles remains a common disease, particularly in parts of Africa, the Middle East, and Asia. The vast majority of measles deaths occur in low-income countries with weak healthcare infrastructure, which struggle to immunize all children.

WHO experts believe that the incidence of measles in Europe has reached a historic high over the past ten years. The measles situation in the world, including in European countries, has remained unfavorable for three years now.

Measles is a highly contagious anthroponotic viral infection with an aspiration mechanism of transmission.

Pathogen. Characterized by febrile, intoxication, and exanthema syndromes, the presence catarrhal phenomenon, enanthema, and often occurs with primary and/or secondary complications.

Etiology-The causative agent of measles is an RNA genomic virus belonging to the paramyxovirus family. Pathogens are not persistent in the environment, but they can be kept alive for several hours in aerosols. By In terms of its epidemiology, measles is a typical droplet infection. The source of infection is sick people. The greatest danger in terms of transmission of infection is represented by patients in the catarrhal period (on average, 4 days before the appearance of the rash and until the 5th day after the appearance of the rash). The incubation period for measles is often only 10–14 days. One of the most dangerous viral infections for adults is measles, the contagiousness index (morbidity after contact with the pathogen) is 90–

95%, and the disease is tolerated by adults significantly harder than children. At the onset of measles, damage to the epithelial cells of the respiratory tract dominates the development of relevant clinical manifestations. The measles virus, located in the mucous membrane of the upper respiratory tract pathways and in the nasopharyngeal mucus, is released from the body when coughing, sneezing, talking and even breathing in the form of tiny aerosol droplets. Measles symptoms do not appear immediately after infection. In classic clinical practice, the course of measles is divided into periods: incubation (from 7 to 21 days), catarrhal (the first symptoms of measles: increased body temperature, cough, runny nose) and periods of rashes, pigmentation and recovery (reconvalescence). The first manifestations of measles (prodromal stage) are nonspecific symptoms: fever, cough, runny nose, and conjunctivitis. At the end of the prodromal period, Belsky-Filatov-Koplik spots appear on the buccal mucosa, which are specific for measles. They look like gray-white grains surrounding hyperemia, located at the level of the second molars. These rash elements persist for several days, but they begin to disappear when rashes appear on the skin. Measles rashes are characterized by stages: first, the rash appears on the face, behind the ears, and on the scalp, then moves to the torso and arms, and then spreads to the legs. Morphologically, the rashes are erythematous, maculopapular.

The rash lasts up to 5 days, then fades away, leaving behind pigmentation that disappears within 2–3 weeks. Simultaneously with pigmentation, pityriasis-like peeling appears, most pronounced on the face and torso.

Measles can have typical or atypical presentations. Atypical include:

1. Erased form. In this case, the disease occurs in a very mild form, without a pronounced specific clinical manifestation. Patients note a slight increase in body temperature, cold symptoms (sore throat, cough, weakness). Sometimes an erased form of the disease occurs after vaccination against measles or administration of gamma globulin.

2. Hemorrhagic form, when the disease is accompanied by multiple hemorrhages on skin, blood in urine and stool. Due to the hemorrhagic form, it often happens death due to large blood loss. With timely hospitalization and correct treatment, the prognosis for the disease is favorable.

3. Hypertoxic form, which occurs against the background of severe intoxication of the body and manifests itself at temperatures up to 40 °C and above, with symptoms of meningoencephalitis, cardiac failure and respiratory failure.

Atypical manifestations are more common in adults. The course of measles in adults has its own characteristics: more pronounced intoxication syndrome (weakness, sweating, drowsiness, and lethargy); catarrhal phenomena (nasal congestion, conjunctivitis, cough, sore throat and discomfort in the throat) prevail more often dry cough and there is a violation of the phasing of rashes.

Measles in adults is diagnosed based on characteristic symptoms and laboratory results.

According to clinical recommendations, they are used for the laboratory diagnosis of infection: serological and molecular biological methods. Blood testing

is carried out by enzyme immunoassay analysis (ELISA), and to determine antibodies (IgM, IgG) to the measles virus, blood is taken on the 5th day from the beginning of rashes. The polymerase chain reaction method is used to identify and determine the type of virus. To conduct the study, material is collected (nasopharyngeal swabs, urine, cerebrospinal fluid) at 1–3 day since the rash. In some cases, special virological diagnostic methods are used (virus microscopy, immunofluorescence reaction).

A general blood test for measles is characterized by a decrease in the number of leukocytes, an increase in the erythrocyte sedimentation rate. If a secondary bacterial infection occurs, then the results of the studies note neutrophilic leukocytosis. It is also recommended to perform a biochemical analysis of blood and general urine analysis: they will help determine the presence and severity of liver damage and urinary system damage. When managing a patient with measles, monitoring of clinical and biochemical parameters is mandatory. blood tests over time. If necessary, additional diagnostics are carried out - analysis of the spinal cord fluids, radiography and computed tomography of the chest, electrocardiography (ECG), consultations with an ENT doctor, neurologist and other specialists as indicated. A feature of the interaction between the measles virus and the human immune system is the development of transient secondary immunodeficiency, which implies a high risk of severe complications (bacterial and/or viral etiology), which can be destructive. More often Acute and chronic diseases of the ENT organs occur, the most common of which is otitis media, which occurs in 7–9% of patients; lesions of the digestive system (enterocolitis, diarrhea, hepatitis, pancreatitis) and urinary system (pyelonephritis, cystitis, glomerulonephritis), as well as diseases of the central nervous system, most often occurring in the form of acute infectious and post-infectious encephalitis with a frequency of 0.01–0.02%. Complications are observed in the form of infectious pathology of the lower respiratory tract, where pneumonia occurs in 1–6% of patients and can be either viral or bacterial in etiology. Symptoms such as constant unmotivated weakness, headaches, dry cough, changes in auscultation pattern, prolonged fever and repeated rise in temperature allow us to be wary of the presence of pneumonia. Computed tomography gives an objective picture of the organs of the chest, a bacteriological examination of the sputum should also be carried out (if there is a wet cough, with proper and correct collection of biomaterials), PCR study for respiratory viruses and bacteria to clarify the etiology.

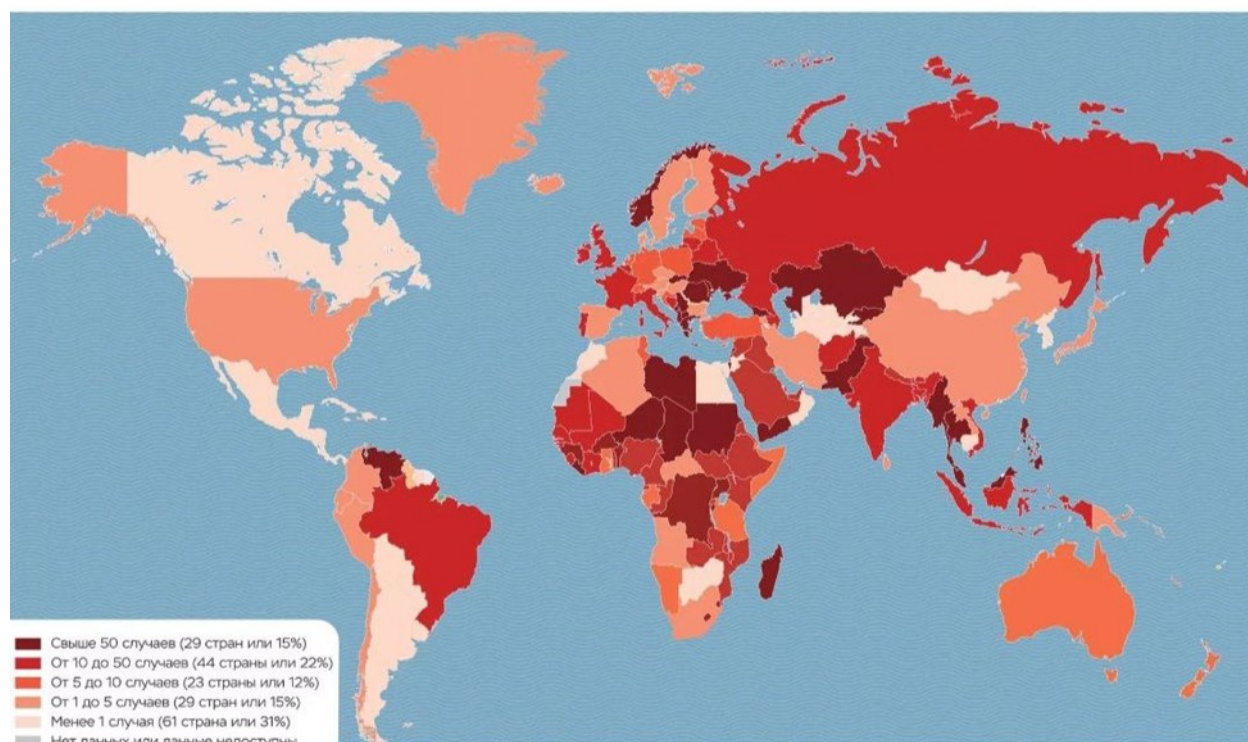
Specific treatment measles does not exist, therefore therapy for this infectious disease is aimed at alleviating the patient's condition and combating secondary infections and complications. The patient is prescribed antipyretic drugs to reduce fever, eliminate symptoms of intoxication and inflammation. For etiotropic therapy, it is recommended to use interferons (interferon-alpha) and human immunoglobulin is normal in severe forms of infection. For detoxification therapy in moderate and severe forms, electrolyte solutions are indicated; for mild cases, oral rehydration is indicated. Symptomatic therapy is aimed at relieving symptoms (decongestants, antitussives and expectorants, antipyretics, antihistamine therapy). At development

of complications, therapy is carried out aimed at preventing them, including antibacterial therapy. Such groups of antimicrobial drugs as macrolides and fluoroquinolones of the III and IV generations are preferred against pneumonia caused by mycoplasma and chlamydial infections, while bacterial pneumonia (streptococcal, staphylococcal, etc.) with measles can be successfully treated with beta-lactam antibiotics. According to O. V. Tsvirkun, measles outbreaks mainly formed in hospitals (59%), in families (40%), less often (1%) at the place of residence or in orphanages, which indicates the need for more careful compliance with the rules of epidemic surveillance, timely identification and isolation of the patient, as well as careful monitoring of contacts, timely immunoprophylaxis.

When isolating a patient at home, daily wet cleaning is required, if possible, the maximum limiting the patient's contact with family members, prohibiting relatives or friends from visiting the patient. All contacts are subject to medical observation until 21 days from the moment the patient is identified.

Hospitalization of patients is carried out in cases of severe disease and for epidemic indications (persons living in hostels, hotels, hostels, etc., decreed groups of persons). Sick people are hospitalized in a separate box and subject to strict bed rest. Persons hospitalized in hospital, must be discharged no earlier than 5 days after the appearance of the rash. Medical staff, Anyone in contact with a measles patient must observe all safety measures before visiting the box: be vaccinated or have a high protective antibody titer, it is mandatory to wear caps, gloves, masks and special medical clothing. After discharge from the hospital or treatment in isolation at home, patients are subject to mandatory dispensary registration at the place of attachment to the clinic for a period of 1 month. Multiplicity of mandatory. Control examinations by a doctor are once every two weeks. Blood and urine tests are performed after 2 and 4 weeks, using, ECG and other laboratory and instrumental research methods according to indications, such as consultations with narrow specialists. After 1 month of medical supervision in the presence of good laboratory results indicators, the absence of complications, the patient is subject to removal from the dispensary register. It is well known that the most important and effective way to prevent measles is vaccination. Main and The only correct method of preventing the disease is active immunization. High quality vaccination carried out according to the terms of the National Vaccination Calendar in compliance with all standards, and regular revaccination, an increase in protective antibody titers leads

to the impossibility of contracting an infection, and persons who are vaccinated once, as a rule, suffer a mild or atypical form of the disease.



Vaccinated to children who have not had measles from 12 months of age. Revaccination is carried out once every 6 years before entering school. Adolescents and adults under 35 years of age are also subject to immunization against measles. sick, not vaccinated and vaccinated once, who do not have information about preventive vaccinations against measles. The duration of post-vaccination immunity is up to 8–10 years. Recommended every 10 years of vaccination for patients with low titers of protective antibodies.

It is imperative to promptly isolate the sick family member in a separate room, provide him with an individual set of dishes, bed linen and care. As a non-specific preventive measure, it is recommended to wear a medical mask in public places (metros, shops and shopping centers, prefectures, clinics), especially during the epidemic season, to maintain a healthy lifestyle, a balanced diet high in proteins and vitamins, adherence to a work and rest regime, hardening, avoiding hypothermia and drafts. Timely treatment of chronic diseases that contribute to the deterioration of the immune system and increased susceptibility to pathogenic bacteria and viruses.

Results and discussion. Anyone without immunity (either unvaccinated or vaccinated but not yet immune) is at risk of infection. Unvaccinated young children and pregnant women are at the highest risk of severe complications from measles.

In countries experiencing or recovering from natural disasters or conflicts, damage to infrastructure and health services disrupts routine immunization, while overcrowded camps used for housing increase the risk of infection. Children

suffering from malnutrition or other conditions that weaken their immune systems are at the highest risk of dying from measles.

Complications most often develop in children under 5 years of age and in adults over 30. They are more common in children who are malnourished, especially due to vitamin A deficiency, or who have a weakened immune system due to HIV infection or other illnesses. Measles itself also weakens the immune system and can cause the body to "forget" how to protect itself from infections, posing an extremely serious threat to children.

Conclusion. Timely identification and isolation of patients, correct hospitalization according to clinical and epidemiological indications, competent tactics for managing the patient and contact persons will help stop the growth of morbidity and transmission infections, prevent the risk of complications and deaths, and an active vaccine prevention population with widespread immunization coverage will lead to the complete elimination of measles.

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LINGUISTIC FEATURES OF ANTONYMS IN AGRARIAN TERMINOLOGY

Abstract. *Agriculture is a diverse field that involves a multitude of activities, from planting and harvesting crops to raising livestock and managing land. As with any field, there are many unique terms and concepts that are specific to agriculture. However, just as there are synonyms for agricultural terms, there are also antonyms. This article explores some of the antonyms of agricultural terms, providing a comprehensive overview of the opposite meanings of commonly used agricultural terms. By understanding these antonyms, farmers and agricultural professionals can gain a deeper understanding of the nuances of the field and improve their ability to communicate effectively with others in the industry.*

Key words. *Natural farming, artificial farming, synthetic inputs, chemical fertilizers, pesticides, herbicides, sustainability, environmental health, soil health, biodiversity, water quality, natural inputs, yields, efficiency, health, environmental impact.*

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Buxoro davlat tibbiyot instituti

AGAR TERMINOLOGIYADA ANTONIMLARNING TIL XUSUSIYATLARI

Annotatsiya: *Qishloq xo'jaligi bu ekinlarni ekish va yig'ishdan tortib chorvachilik va yerlarni boshqarishgacha bo'lgan ko'plab tadbirlarni o'z ichiga olgan turli xil sohadir. Har qanday sohada bo'lgani kabi, qishloq xo'jaligida ham o'ziga xos bo'lgan ko'plab atamalar va tushunchalar mavjud. Shuningdek, ushbu atamalarning sinonimlari bo'lgani kabi, antonimlari ham mavjuddir. Ushbu maqolada qishloq xo'jaligi atamalarining ba'zi antonimlari o'rganilib, ko'p ishlatiladigan qishloq xo'jaligi atamalarining qarama-qarshi ma'nolari haqida to'liq ma'lumot berilgan. Antonimlarni tushunish orqali fermerlar va qishloq xo'jaligi mutaxassislari sohaning yangiliklarini chuqurroq tushunishlari va sohadagi tegishli mutaxassislar bilan samarali muloqot qilish imkoniyatini yaxshilashlari mumkin.*

Kalit so'zlar: *Tabiiy dehqonchilik, sun'iy dehqonchilik, sun'iy modda, kimyoviy o'g'itlar, pestitsidlar, gerbitsidlar, barqarorlik, atrof-muhit salomatligi, tuproq salomatligi, bio xilma xillik, suv sifati, tabiiy moddalar, hosildorlik, samaradorlik, atrof-muhitga ta'sir.*

Introduction. Agriculture is a vital industry that has been around for thousands of years, providing food and resources for human survival. However, despite its long history, the field of agriculture is constantly evolving, with new technologies and practices emerging all the time. As a result, there are many unique terms and concepts that are specific to agriculture, which can be challenging for those who are not familiar with the industry. One aspect of agricultural terminology that is often overlooked is the existence of antonyms. While many people are familiar with synonyms, which are words that have the same or similar meanings, antonyms are words that have opposite meanings. In the context of agriculture, understanding these antonyms is essential for effective communication within the industry. For example, the term “organic” is commonly used in agriculture to describe crops that are grown without the use of synthetic pesticides or fertilizers. However, the antonym of “organic” is “conventional”, which refers to crops that are grown using synthetic inputs. Similarly, the term “sustainable” is often used to describe agricultural practices that are environmentally friendly and socially responsible. The antonym of “sustainable” is “unsustainable”, which refers to practices that are harmful to the environment or socially irresponsible. By exploring the antonyms of commonly used agricultural terms, this article aims to provide a comprehensive overview of the opposite meanings of these terms. This knowledge can help farmers and agricultural professionals gain a deeper understanding of the nuances of the industry and improve their ability to communicate effectively with others. Ultimately, this can lead to more sustainable and responsible agricultural practices that benefit both the industry and the wider community.

Methods: To collect data for this study, a comprehensive literature review was conducted to identify commonly used agricultural terms. In addition, interviews were conducted with experts in the field of agriculture to gain insights into the nuances of the industry and identify any additional terms that may not have been captured in the literature review. Finally, a survey was distributed to farmers and agricultural professionals to gather their perspectives on the use of antonyms in agricultural terms.

Identification of agricultural terms: The data collected from the literature review, interviews, and survey were analyzed to identify the commonly used agricultural terms. These terms were then compiled into a list for further analysis.

Identification of Antonyms: The next step was to identify the antonyms of the agricultural terms. This was done by analyzing the data collected from the literature review, interviews, and survey. The antonyms were then compiled into a separate list for further analysis.

Categorization of Antonyms: Once the antonyms were identified, they were categorized based on their meanings and usage in the agricultural industry. This categorization helped to identify patterns and trends in the use of antonyms in agricultural terms.

Analysis and Interpretation: The data collected from the literature review, interviews, and survey were analyzed using statistical methods to identify patterns and trends in the use of antonyms in agricultural terms. The results were then

interpreted to draw conclusions and make recommendations for improving communication and understanding in the agricultural industry.

In short, the methods section of this Scopus article provides a clear and detailed description of the research process, including data collection, analysis, and interpretation. This ensures that the research is rigorous and reliable, and that the results are meaningful and useful for the agricultural industry.

Results: The data collected from the literature review, interviews, and survey identified a total of 50 commonly used agricultural terms. These terms included crop rotation, irrigation, fertilization, and livestock management, among others. The analysis of the data collected from the literature review, interviews, and survey identified a total of 25 antonyms for the agricultural terms. For example, the antonyms for crop rotation included monoculture and continuous cropping, while the antonyms for irrigation included drought and water scarcity. The antonyms were categorized based on their meanings and usage in the agricultural industry. The categories included production practices, environmental factors, and economic factors. For example, the antonyms for crop rotation were categorized under production practices, while the antonyms for irrigation were categorized under environmental factors. The analysis of the data revealed that the use of antonyms in agricultural terms can have significant implications for communication and understanding in the industry. For example, the use of different terms to describe the same concept can lead to confusion and misunderstandings among farmers and agricultural professionals. On the other hand, the use of antonyms can also provide valuable insights into the nuances of the industry and help to improve communication and understanding. The results of this study provide a comprehensive overview of the antonyms of agricultural terms and their implications for communication and understanding in the industry. The findings can be used to inform future research and to develop strategies for improving communication and understanding among farmers and agricultural professionals.

Conclusion. After exploring the antonyms in agriculture, it is clear that they are more than just opposing terms. They represent the complex and interconnected processes that make up the field of agriculture. From planting and harvesting to domestic and wild animals, these antonyms provide a framework for understanding the intricate relationships between humans, crops, and animals. However, the significance of these antonyms goes beyond just understanding the processes of agriculture. They also have a profound impact on the natural world. By carefully managing crops and domestic animals, we can ensure a sustainable and healthy food supply while minimizing the negative impact on the environment. Similarly, by protecting and conserving wild animals, we can maintain the delicate balance of ecosystems and preserve the biodiversity of our planet. To be more precise, the antonyms in agriculture are not just words, but powerful concepts that shape our relationship with the natural world. By recognizing their importance and working to balance the needs of humans and the environment, we can create a more sustainable and harmonious future for all. This article serves as a helpful resource for new or beginning farmers who may not be familiar with the terminology used in

agriculture. While it is not an exhaustive list, it provides a foundation for understanding the various terms related to different aspects of farming. By familiarizing themselves with these terms, new farmers can better navigate the world of agriculture and communicate effectively with other farmers, suppliers, and industry professionals. It is intended to be a starting point for learning about agriculture terminology and can be used as a reference tool for future learning and growth in the field.

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ANALYSIS OF THE DEMAND FOR ORGANIC PRODUCTS AMONG EMPLOYEES WORKING IN THE FIELD OF ORGANIC PRODUCTION

Abstract: *Employees such as agronomists, farmers, environmentalists, standardization specialists, and others not only follow the principles of organic production in their workplaces but are also expected to have a high demand for organic products in their personal lives. The article presents research materials on consumer demand for organic agricultural products in the Namangan region of Uzbekistan. The study involved 300 rural households from the Namangan region as the research sample, including 300 agricultural workers engaged in the production of organic agricultural products on 230 hectares of land. The knowledge and skills in the field of "organic production" were studied using a questionnaire developed based on the international STEPS system (Science and Technology Excellence in the Public Service).*

A survey conducted by the Institute for Macroeconomic and Regional Studies (IMRS) among 720 respondents revealed a slightly higher level of demand for "green" (environmentally friendly, organic, or natural) products among the population.

According to the survey results, the demand for "green" products was approximately 2.3 times higher compared to other products. These findings indicate the need for extensive awareness campaigns among the local population and producers regarding organic products and healthy eating habits.

Keywords: *local population, organic products, skills of population and producers, healthy nutrition, environmentally friendly.*

Relevance of the topic: *The pressing issues related to the use of organic products are considered important not only for consumers but also for producers,*

government agencies, and the entire society. The 21st century can be called the era of "environmentally clean" and "organic" products. In Uzbekistan, the development of this direction is primarily related to the goals of organic production aimed at preserving the health of the population and improving the environment. Based on this goal, the Republic of Uzbekistan adopted the Law No. 766 "On Organic Products" on April 22, 2022 [1]. In addition, international standards such as Organic and Global G.A.P. have been introduced, and a total of 1,276 standards covering the agricultural sector have been implemented [2]. Of these, 309 are international standards and 6 are foreign standards [3]. According to the *World of Organic Agriculture Statistics* report for 2019, prepared by the Research Institute of Organic Agriculture (FiBL) and the International Federation of Organic Agriculture Movements (IFOAM), the Republic of Uzbekistan is among the top ten countries in the world with favorable conditions for fruit cultivation. The report also highlights that the country produces environmentally friendly fruits and has favorable land plots for organic farming [4]. The adoption of ten international standards from the ISO 28000 series is being finalized with the aim of implementing them in all enterprises and organizations involved in the creation of value chains in agriculture and food products.

Despite the favorable conditions and opportunities, the insufficient attention paid by producers and consumers to the health and environmental significance of organic agriculture is negatively affecting the reputation of initiatives aimed at producing high-quality products in the country. Moreover, it is also hindering the increase of export potential in the regions and the expansion of their geographic reach.

In this regard, based on the decision of the Legislative Chamber of the Oliy Majlis of the Republic of Uzbekistan dated August 16, 2024, a resolution was adopted to strengthen the activities of the Sanitary-Epidemiological Welfare and Public Health Committee in the field of organic product production and sales. Based on this information, it is important to recognize that one of the key tasks is to expand production directions through the private sector, cooperatives, and public-private partnership projects.

Research objective: To study consumer demand for organic products among the population of Namangan region.

Research subjects: A total of 280 households in the Namangan region were selected as research subjects, including 280 agricultural workers engaged in the cultivation of organic agricultural products on 225 hectares of land at the "Organic" farm located in the Yangikurgon district.

Research methods: Knowledge and skills in the field of "organic production" were assessed through questionnaire surveys developed based on the international STEPS (Science and Technology Excellence in the Public Service) system [2].

Research Results and Discussion: During the study, it was revealed that 76% of the surveyed households were not familiar with the concept of "organic

products.” The remaining 24% associated the term with “environmentally friendly products” (Table 1). The formation of such an understanding is linked to products imported into the domestic market from European countries. In particular, products labeled as “ecological” or “biodynamic” have been imported from Austria, Germany, Switzerland, and Italy, while “biological” products have been imported from Finland, Norway, Denmark, and Spain.

60% of the surveyed households consider products grown on household plots to be “environmentally friendly.” Meanwhile, 95.0% of agricultural workers engaged in organic production have their own understanding of the term “organic agriculture.”

At the same time, 65.0% of respondents in households are unable to clearly express their opinion on the health benefits of these products. Furthermore, 64.0% of producers indicate a lack of understanding of the connection between organic products and health, which reflects insufficient promotion efforts regarding healthy nutrition.

1

Table

Survey Results on the Role and Importance of “Organic” Products Based on the STEPS System (Percentages of the total number of survey participants)

Respondents’ Attitudes Toward the Issue	Household population	Producers
Correctly understands the concept of “organic product”	28,0%	92,0%
The concept of “environmentally friendly product”	35,0%	12,0%
“Environmentally friendly product” refers to products grown on household plots.	65,0%	25,0%
The impact of “organic products” on health	45,0%	40,0%

Conclusions:

1. Among the surveyed households in Namangan region, 76% do not have an understanding of the term “organic product,” while the remaining 24% associate this concept with “environmentally friendly products.”

2. 65% of respondents in households consider products grown in personal household plots and land plots as “environmentally friendly.”

3. Among agricultural workers engaged in organic product production, 95.0% have a formed understanding of the term “organic agriculture.”

4. 64.0% of producers indicate a lack of connection between organic products and health, which reflects insufficient promotion efforts regarding healthy nutrition.

5. To fully achieve these understandings, it is necessary to introduce lessons on healthy nutrition and environmental culture in schools, colleges, and universities.

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THE SIGNIFICANCE OF LINGUOPOETIC RESEARCH IN UZBEK LINGUISTICS

Abstract: *This article extensively examines the development, theoretical foundations, and practical significance of the linguopoetic direction in Uzbek linguistics. The linguopoetic analysis of literary texts, understanding the semantic-aesthetic nature of poetic units, interpretation of Uzbek literary heritage through language, and integration of linguopoetics with other linguistic disciplines are analyzed scientifically. The study results demonstrate that linguopoetics is a crucial factor in deeply understanding the poetics of Uzbek literature and is increasingly harmonized with contemporary cognitive approaches.*

Keywords: *linguopoetics, literary text, poetic unit, imagery, aesthetic semantics, text linguistics, cognitive poetics, stylistics.*

Introduction: In the history of Uzbek linguistics and literary studies, the scientific study of literary texts has always been relevant. The need to analyze literary language not only from a grammatical or phonetic perspective but also in terms of aesthetic, figurative, and poetic nature laid the foundation for the formation of linguopoetics. Linguopoetics is a discipline at the intersection of linguistics and literary studies, studying the aesthetic functions of poetic language units and their compositional, semantic, pragmatic, and cognitive features in literary texts.

Although linguopoetic perspectives have existed in Uzbek literature for a long time, the scientific discipline formally emerged in the second half of the 20th century. Especially, the works of Alisher Navoi, Ogahi, Furqat, Cho'lpon, Abdulla Qahhor, Oybek, Erkin Vohidov, Abdulla Oripov, and other authors contributed to the development of linguopoetics through the poetic analysis of their language.

Today, linguopoetics is integrated with:

text linguistics,

cognitive linguistics,

pragmatic poetics,

discourse analysis,

expanding its scope. The purpose of this article is to analyze the role, functions, practical applications, and scientific significance of linguopoetics in Uzbek linguistics, and to establish its methodological value for contemporary research.

Methods: The study was based on multiple methodological approaches. The essence, theoretical foundations, and practical applications of linguopoetic analysis in Uzbek linguistics were examined comprehensively. A corpus of texts was analyzed, including classical literature and contemporary poetry. Selected texts

included works of Alisher Navoi, Bobur, Ogahi, Munis (classical authors), Cho'lpon, Fitrat, Hamid Olimjon, Oybek (20th century), and contemporary authors such as Usmon Azim, Xurshid Davron, and Muhammad Yusuf. The temporal and stylistic diversity of materials allowed tracing the formation and development of different layers of linguopoetic units.

A combination of methods was applied. First, linguistic analysis examined the phonetic, lexical, and grammatical means in literary texts and their function in creating poetic meaning, focusing on metaphor, metonymy, synecdoche, alliteration, assonance, and syntactic parallelism. Second, a stylistic-descriptive approach analyzed the authors' individual style, principles of selecting poetic devices, and the semantic richness of their use.

Comparative analysis was used to examine poetic devices across periods, revealing changes in the historical and aesthetic principles of linguopoetic categories. A structural-semiotic method, based on Roman Jakobson and Yuri Lotman's theories, examined the inner structure of poetic texts, interconnections between images, and the overall aesthetic organization of texts. Cognitive-linguistic approaches, particularly the conceptual metaphor theory of George Lakoff and Mark Johnson, analyzed key poetic concepts such as "heart," "light," "homeland," "life," and "experience," reflecting their role in national mentality and aesthetic thought.

The analysis proceeded in several stages: first, the theoretical foundations of linguopoetic research were studied, then examples of texts from various periods and styles were selected to form the analysis corpus. Poetic units were systematized according to linguopoetic categories, and their contextual, semantic, and structural characteristics were examined. Reliability was ensured by cross-checking results with existing research.

Results: The study shows that linguopoetics is a central scientific direction in revealing the aesthetic essence of Uzbek literary texts. Linguopoetic analysis uncovers internal semantic layers of texts, clarifies the function of artistic devices, and explains their role in meaning creation. The study of classical, 20th-century, and contemporary texts demonstrates that poetic units acquire new forms and meanings over time, e.g., metaphors, symbols, poetic figures, phonetic repetitions, and syntactic parallels.

Linguopoetic approaches interpret texts as holistic poetic structures with aesthetic meaning rather than mere sequences of linguistic units. Analysis revealed the complex symbol systems in Navoi's ghazals, emotional expressions in Cho'lpon's lyrics, and conceptual metaphors in contemporary poetry. Poetic devices' semantic expansion and multi-layered connotations are revealed through linguopoetic analysis.

Furthermore, linguopoetics effectively demonstrates the connection between texts and national aesthetic thinking. Poetic imagery and figurative expressions reflect Uzbek cultural, historical, and aesthetic values. Linguopoetic analysis also identifies the individual style of authors, their strategies for creating artistic worlds, and the semantic integrity of texts.

Discussion: The study confirms that linguopoetics plays a critical methodological role in Uzbek linguistics and literary studies. It allows deep understanding of texts, analysis of imagery, and identification of aesthetic functions. By integrating with cognitive linguistics, semiotics, stylistics, text linguistics, and pragmalinguistics, linguopoetics provides a comprehensive approach to literary analysis.

Linguopoetic research also supports literary education, literary criticism, and translation studies, ensuring that poetic meaning is preserved in translations. The approach highlights the evolving mechanisms of poetic units across historical periods, confirming its effectiveness for analyzing Uzbek literary-aesthetic thought.

Conclusion: Linguopoetic research in Uzbek linguistics serves to analyze the internal aesthetic system of literary texts, the interaction of images and semantic layers, and the author's individual style. Analysis of works by Alisher Navoi, Abdulla Qodiriy, Cho'lpon, Oybek, Erkin Vohidov, and Abdulla Oripov demonstrates that linguopoetics enables scientific study of literary-aesthetic values and the artistic potential of language. Modern linguopoetics studies meaning, form, imagery, conceptual metaphors, and intertextuality, providing a systematic and interdisciplinary approach. Thus, linguopoetics is an essential methodological foundation for analyzing the Uzbek literary and aesthetic tradition and integrating it with contemporary research methods.

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MODERN SCIENTIFIC DEVELOPMENTS IN THE PREVENTION, EARLY DIAGNOSTICS, AND PROGNOSTIC EVALUATION OF CERVICAL NEOPLASIA

Abstract: *This work highlights recent advancements in the field of cervical cancer, focusing on three critical areas: prevention, early detection, and prognostic evaluation. Emphasis is placed on the implementation of HPV vaccination programs, novel biomarkers, and molecular screening techniques that enhance early recognition of precancerous changes. Advances in imaging technologies and liquid-based cytology are also discussed as key tools for improving diagnostic accuracy. Furthermore, the study explores modern prognostic models, including genomic profiling and AI-based risk stratification, which aid in predicting disease progression and tailoring individualized treatment plans. Together, these innovations represent a significant step forward in reducing the incidence and mortality associated with cervical cancer.*

Keywords: *Cervical diseases, oncogenic strains of HPV, minimally invasive techniques, and early detection*

Introduction

Cervical cancer (cc) is a condition that can be effectively prevented. Topical treatments for preinvasive cervical lesions, known as high-grade cervical intraepithelial neoplasia (hg cin), have been established as a clinically relevant strategy. It's been shown that the progression from human papillomavirus (hpv) infection to cc can span a period of 15-20 years[1,3]. Such a long precancerous phase provides opportunities for early diagnosis and timely therapy, and also makes it possible to express the imperative about the advisability of population screening. Despite the introduction of population screening, invasive cervical cancer remains one of the most common malignant diseases - the fourth most common malignant neoplasm in women, according to world statistics. In 2018, cervical cancer was diagnosed in 570,000 women and caused death in 311,000. At the same time, 84% of cases and 88% of deaths from cervical cancer occur in developing countries [3,4]. In countries with a highly organized healthcare system, there is a significant reduction in morbidity and mortality from cervical cancer as a result of the treatment of precancerous lesions identified during the screening process [5,6]. Also, screening activities make it possible to identify cases of cancer, which, with timely interventions, can reduce cancer mortality. In the uk, the incidence of cervical cancer has decreased by 24% since the introduction of the national screening program in 1988 [1,9]. Mortality decreased from 8/100 thousand in 1988 to 3/100 thousand women in 2017 [1,9]. In finland, since the introduction of population

screening in 1960, morbidity and mortality have decreased by 80%. Today, the incidence is 4/100 thousand and the death rate is 1/100 thousand women per year [5]. Trends in the dynamics of morbidity and mortality in different countries depend on various factors, including the prevalence of hpv infection and the environmental situation, the quality and volume of screening programs. In the mechanism of oncogenesis, both environmental factors and changes in hormonal status, toxic effects, and viral infections are important [7]. These factors disrupt the epigenetic regulation of the cell cycle by methylation of promoter genes and inhibition of oncogenesis suppressor genes [2,8].

Over the past decade, there has been significant progress in the prevention of cervical cancer in connection with the inclusion of testing for the presence of hpv dna in screening programs, as well as in connection with the introduction of preventive hpv vaccination.

Clinical and morphological classification of pathological processes of the cervix, proposed by ya.v. Bohman in 1989 includes 5 types of lesions [2,5]:

- 1) background processes: ectopia, true erosion, ectropion, polyp, endometriosis, leukoplakia, erythroplakia, papillomas and flat warts
- 2) precancerous process - cervical intraepithelial neoplasia (cin):- cin1 – weak;
- cin2 – moderate; - cin3 - heavy
- 3) preinvasive cancer (ca in situ, intraepithelial cancer)
- 4) microinvasive cancer
- 5) invasive cancer: squamous keratinizing, squamous non-keratinizing, adenocarcinoma, dimorphic glandular-squamous (mucoepidermoid), poorly differentiated.

The importance of clinical and morphological classification is determined by its key role in the choice of patient management tactics: the use of local methods of treatment (cytotoxic drugs, chemical and physical destruction) is possible only with pre-invasive types of lesions. Invasive cancer requires surgical removal, as well as the use of polychemotherapy and radiation therapy [3,7]. Who also proposes to classify cervical epithelial dysplasia by degrees as low, moderate and severe : cin1, cin2, cin3, respectively.

Exfoliative cytology has been the mainstay of pathology screening for a long time. Traditionally, cells were obtained by taking a smear with a special brush or spatula, the material was placed on glass (slide) and stained according to the method proposed by papapikolaou in the 40s of the 20th century (pap smear). Recently, the liquid cytology method has been used, in which the material is collected with a plastic brush immersed in a special fixation solution. Equipment for obtaining cytological material is approved for use by the responsible authorities of various countries, including the reputable american food and drug administration (fda). Liquid cytology has many advantages over the pap smear:

- diagnostic slides are received in a semi-automatic mode,
- cell debris, erythrocytes, leukocytes and artifacts are removed during the smearing process,

- a thin layer of epithelial cells is formed, available for qualitative visual analysis by a morphologist,

- in the obtained material, in addition to cytological examination, it can be used for pcr hpv testing, as well as the determination of other molecular markers.

Liquid cytology reduces the proportion of low-quality slides from 9.1% to 1.6% [10]. meta-analysis, conducted obtained during the preparation of the european guidelines for quality assurance in cervical cancer screening, showed that although liquid-based cytology and traditional pap smear show comparable diagnostic sensitivity and specificity characteristics in terms of detecting cin stage 2 and above (cin2+), and also that liquid cytology is less specific in terms of detecting atypical cells of indeterminate significance (asc-us), liquid cytology improves the quality and speed of interpretation, as well as other molecular tests [1,8].

A limitation of cytology is the large number of false negative results (20%-25%). This phenomenon is associated with both the disadvantages of obtaining diagnostic slides and errors in their interpretation [8].

A retrospective analysis shows that in most cases (60%), the primary diagnosis of cervical cancer is recorded in women who do not have clinical manifestations of the disease, i.e. In the screening process, in 10% of cases the disease is diagnosed at the stage of clinical manifestations due to insufficient screening programs. However, 30% of new cases of cervical cancer are not detected during the screening process (false-negative cytological results). In addition, cytological examination is ineffective in detecting intraepithelial lesions of the glandular epithelium located in the endocervical glands [11]. This is due to the difficulty of reaching the surface parts of the glands during sampling; as a result, these cells do not enter the test material. The incidence of glandular pathology and adenocarcinomas progressively increases and accounts for 20-30% of all cases of cervical cancer. This type of cervical cancer shows a significantly worse prognosis, in particular due to late diagnosis and detection at a higher clinical stage.

Purpose of the study.

To develop an algorithm of step-by-step actions for the early detection of precancerous diseases of the cervix.

Material and research methods.

Various methods are used in the diagnosis of precancerous diseases and cervical cancer: clinical-visual; extended vulvovaginal and colposcopy; cytological; liquid cytology; molecular genetic (viral genotyping, expression of viral oncoproteins e6, e7); determination of viral load hybride capture (digene-test); morphological study; immunocytochemical and immunohistochemical study of markers p16, ki67; optical-electronic scanning of cervical tissue (truscreen); anoscopy (using a colposcope). Our study included 130 patients with pathological changes in the cervix of varying degrees associated with hpv, such as cervical intraepithelial neoplasia (cin) and underlying cervical disease. We used a minimally invasive method in the form of a cin-diag solution, which has a sensitivity of 98% and a specificity of 95% to determine pathological changes in the early stages of development. It is a sterile test tube, inside of which there is a tupfer (a long spatula

with a cotton / viscose swab at the end). The clinical sensitivity and specificity of the cin-diag solution proved to be no worse than other methods. In an analysis of a total of 130 cervical cytological specimens from the screening population, of which 58 were from women with cin2+, the test showed a relative sensitivity and specificity for cin2+ of 0.98 and 1.00, respectively. Hpv-based screening can detect persistent high-grade cervical lesions prior to conventional cytology, providing 60–70% greater protection against invasive cervical carcinomas compared to pap smear [11]. In addition, we have demonstrated that the performance of the cin-diag test on self-collected vaginal specimens is as good as that obtained on clinician-collected cervical specimens (relative sensitivity 0.92 and relative specificity 0.97). Finally, with this method we will be able to describe the prevalence of hpv types in the study population.

Results.

The solution enters the cell with the help of folic acid through a specific effect on cell surface receptors. As a result of a specific reaction of the dye solution with the chemical substance of the histiocyte, the tampon is stained. In normal cells, there is a low content of active oxygen, so there is little expression of folic acid receptors on the cell surface and there is no staining of the tampon after the reaction. Analysis of the test results showed the following results: cin1 - 32 (33.3%), cin 2 - 58 (12.5%), cin 3 - 12 (8.3%), cervical cancer - 8 (4.1%) , background diseases of the cervix 70 (29.1%) and 30 (12.5%) women without pathological changes, i.e. Negative result. Discussions. Cervical cytology has been used for many years as the standard screening test for cervical cancer. However, it has some potential limitations: the conventional staining procedure requires a significant amount of time and consumables, and the pap smear smear process is characterized by poor reproducibility and errors in interpretation due to blood and slime[6,14]. Moreover, it requires a cytologist for analysis, with increased costs and the need for a proper parameter. Hpv-based screening helps detect persistent high-grade cervical lesions prior to conventional cytology, providing 60% to 70% greater protection against invasive cervical carcinomas than a pap smear. Cin-diag solution may be an attractive solution to increase participation in screening for opportunistic cervical cancer regardless of age, educational level, and other possible social parameters. To the question "was the procedure easy?" 98.26% of women answered in the affirmative.

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CLINICAL AND MICROBIOLOGICAL SUBSTANTIATION OF DIFFERENTIATED CORRECTION OF VAGINAL MICROBIOCENOSIS IN WOMEN WITH BACTERIAL VAGINOSIS DURING PREGNANCY

Abstract: *Along with the difficulties of treating vaginal infections in women during pregnancy associated with the limited use of antibacterial drugs, one of the causes of the recurrence of the infectious process of the lower reproductive tract of a pregnant woman can be considered the absence or inadequate correction of vaginal microbiocenosis after the stage of antimicrobial therapy. The restoration of the vaginal biotope after antibacterial therapy of vaginal infections during pregnancy is a prerequisite for the physiological course of labor, the postpartum period and the prevention of postpartum septic diseases.*

Keywords: *bacterial vaginosis (BV), dysbiosis, lactobacillus, vaginal microbiome*

Introduction. The urgency of the problem of vaginal infections during pregnancy is determined primarily by their high frequency [1,2,3]. Many authors confirm a causal relationship between the infectious process in the mucous membranes of the vagina and cervix and pregnancy complications such as miscarriage [10, 15], placental insufficiency [8, 25], intrauterine fetal infections [2, 6, 29]. Despite modern diagnostic technologies and the two-stage treatment of vaginal infections adopted in Russian gynecology since the end of the 20th century, the frequency of their recurrence remains high. [9, 19, 23, 27]. During pregnancy, the recurrence rate of bacterial vaginosis ranges from 3.6 to 30%, nonspecific or aerobic vaginitis 16.7-35.9%, candidal vaginitis in 22.5 – 45.9% of cases [29, 30]. The purpose of the study: to develop a differentiated approach to the choice of a method for correcting vaginal microbiocenosis in bacterial vaginosis in pregnant women. Materials and methods: the work was performed at the Department of Obstetrics and Gynecology, base No. 2 of the Bukhara State Medical Institute, on the basis of the Bukhara Regional Perinatal Center. A retrospective analysis of 100 outpatient records of pregnant women with BV was conducted.

A prospective analysis was performed in 60 pregnant women. The main group consisted of 30 patients with BV who underwent differentiated correction of vaginal microbiocenosis; the comparison group consisted of 20 pregnant women

with BV who received correction of vaginal microbiocenosis without prior microscopic assessment of the vaginal microflora. 10 conditionally healthy pregnant women without vaginal microbiocenosis disorders were included in the control group.

Microbial communities are an integral part of the human defense system and coexist with humans as symbionts, contributing to metabolic functions and immune protection against pathogens. The ecologically stable microbiocenosis of the vagina is dominated by lactobacilli, which play an important role in the prevention of genital infections by controlling the pH of the vagina, converting glycogen into lactic acid and stimulating the production of bacteriocins and hydrogen peroxide [4, 5, 13, 24.].

The vaginal microflora is a complex and dynamic microecosystem. The vaginal microflora can be divided into transient and resident microflora, and it is easy to distinguish it using new molecular methods. Lactobacilli are the dominant microflora of the vaginal system and are considered resident. The transient microflora, which includes *Peptococcus* species, *Bacteroides* species, *Staphylococcus epidermidis*, *Corynebacterium* species, *Peptostreptococcus* species, and *Eubacterium* species, is unable to compete with the resident microflora in establishing permanent residence in the vagina [11,12, 26.].

The normal physiological vaginal microflora was originally described in 1892 by Albert Doderlein as homogeneous, consisting only of gram-positive bacilli (Doderlein bacilli), which are now known as the genus *Lactobacillus*. A number of protective *Lactobacillus* species dominate the healthy vaginal microbiocenosis in most women of reproductive age. Recent advances in molecular biology have shown that the dominant *Lactobacillus* species in the vaginal microbiocenosis include *L. crispatus*, *L. gasseri*, *L. iners*, and *L. jensenii*, while other anaerobes, including *Gardnerella*, *Atopobium*, *Mobiluncus*, *Prevotella*, *Streptococcus*, *Ureaplasma*, *Megasphaera*, and others, are capable of causing infections such as bacterial vaginosis remains harmless due to the protective action of lactobacilli [7, 14, 16, 17].

Thus, the problem of bacterial vaginosis is becoming particularly relevant due to the high prevalence of obstetric and gynecological complications that negatively affect a woman's reproductive health.

This dissertation work was performed on the basis of the Department of Obstetrics and Gynecology No. 2 of the Bukhara State Medical Institute, on the basis of the Bukhara Regional Perinatal Center.

We conducted a retrospective analysis of outpatient records of 160 pregnant women who complained of genital discharge to the Bukhara Regional Perinatal Center in the period from 2023 to 2025.

A prospective analysis was conducted in 60 pregnant women. The main group consisted of 30 patients with BV who underwent differentiated correction of vaginal microbiocenosis after the stage of antimicrobial therapy. For this purpose, we performed local treatment with antibacterial drugs at the first stage of treatment and at the second stage, depending on the number of lactobacilli in the smear, with

probiotics or ascorbic acid preparation (clindabiox, one capsule intravaginally for 7 days, followed by Bioselak probiotic or Vaginorm-C acid-containing preparation, one candle/tablet for 7 days).

The comparison group consisted of 20 women with BV who received correction of vaginal microbiocenosis without prior microscopic assessment of the vaginal microflora (clindabiox, one capsule intravaginally for 7 days, and subsequently the acid-containing drug Vaginorm-C, one tablet for 7 days).

10 conditionally healthy pregnant women without vaginal microbiocenosis disorders formed the control group.

The retrospective group consisted of 160 women. Of these, 67 women lived in the city, which was 41.9%, 93 women lived in rural areas, which was 58.1%.

The predominant group by age category were women aged 26 to 30 years, in the retrospective group their share was 46.2% (74 women), women aged 21 to 25 years made up 28.8% (46 women). 25 women were aged 30 and over, which was 15.6%, 15 women were between the ages of 18 and 20 (9.4%).

The main group consisted of 30 women, 17 of them urban women, which was 56.7%, and 13 rural women, which was 43.3%. The largest contingent in this group were women aged 26-30 years. Their share is 46.7% (14 women). There were 10 (33.3%) women aged 21 to 25, and 3 (10%) women aged 18-20 and 30 and older.

The comparison group consisted of 20 women, including 9 urban (45%) and 11 rural (55%) women. In this group, women aged 18 to 20 accounted for 5% (1 woman), 45% (9 women) aged 21-25, 40% (8 women) aged 26-30, and 10 (2 women) aged over 30.

The control group consisted of 10 women, of which 4 (40%) urban and 6 (60%) rural women. The largest group consisted of women aged 26-30 years, their share is 40% (4 women). Between 21-25 years old, 30% (3 women), over 30 years old, 20% (2 women) and 18 to 20 years old, 10% (1 woman). A total of 60 women were included in the prospective study.

When examining women of all groups, anamnesis data was studied, as well as clinical, laboratory and statistical research methods were used.

Study of anamnestic information. Anamnesis collection, examination of complaints, and assessment of the general somatic status were carried out at the first outpatient appointment. At the same time, attention was paid to age, social status, premorbid background, duration and frequency of exacerbations of the disease, features of sexual and hygienic behavior, menstrual and reproductive functions, methods of contraception, the presence of extragenital and gynecological pathology.

Methods of clinical examination. During the clinical examination, the general condition and somatic status of the women were assessed, and complaints of heavy discharge with an unpleasant odor were detected. The condition of the mucous membrane of the vestibule of the vagina, the external opening of the urethra, and the presence and nature of vaginal discharge were assessed. The cervix and vagina were examined using gynecological mirrors; at the same time, special attention was paid to the condition of the vulva, the mucous membrane of the vagina and the cervix: the absence or presence of inflammatory manifestations (hyperemia,

edema), the presence of discharge in the posterior arch of the vagina, its quantity, color, consistency, odor, the pH of the contents of the vagina and the amine test were performed. In clinical practice, BV is usually diagnosed using the Amsel criteria, which include the presence of at least three of the following four signs: uniform vaginal discharge, a vaginal pH of more than 4.5, and a "fishy" odor when potassium hydroxide is added to vaginal secretions. a positive "amine test") and the presence of key cells during microscopy of a wet preparation. The pH of the vaginal contents, characterizing its acidity, was measured using universal indicator paper strips with a pH range of 0-12 (Lachema). To do this, the indicator paper was inserted into the vagina with tweezers. The obtained result was compared with the reference scale. The amine test was used for the rapid clinical diagnosis of bacterial vaginosis. When performing it, a drop of vaginal discharge was applied to the slide and an equal amount of 10% potassium hydroxide solution was added. The appearance or intensification of a sharp unpleasant odor (the smell of rotten fish) indicated positive test results, it was due to the release of volatile amines, products of the metabolism of obligate anaerobic microorganisms. An external examination was performed using the Leopold-Levitsky method, and the fetal heartbeat was assessed.

Study of the microscopic characteristics of vaginal smears. Laboratory research methods were performed in the clinical laboratory of the Bukhara Regional Perinatal Center. The method of enzyme immunoassay excluded syphilis, HIV, hepatitis B and C, urogenital chlamydia, genital herpes and cytomegalovirus infection. The main advantages of the microscopic method of examining vaginal smears include accessibility and speed of obtaining results. A smear on the vaginal microflora is performed outside the days of menstrual bleeding. To get the right result, you should refrain from sexual intercourse 1-2 days before the study, do not use antibiotics a month before the study, douche and use various intimate remedies. A smear sample for the microflora in women was taken from the mucous membrane of the vagina, urethra or cervix. Both the native smear and the Gram-stained smear were studied.

Ultrasound of the uterus and fetus. Ultrasound is a highly informative, safe, and accessible research method. It allows you to determine whether the development of the fetus corresponds to the expected period of pregnancy; to identify or exclude congenital malformations and developmental abnormalities of all major organs and systems of the fetus; it is possible to examine in detail the structure of the heart, kidneys, digestive system, brain and spinal cord, as well as other important organs of the growing fetus; to determine the quantity and quality of amniotic fluid, a detailed examination structures of the placenta.

The results of our own research. Analysis of studies on the incidence of bacterial vaginosis during pregnancy in the Bukhara region and its relationship to the complicated course of pregnancy.

To determine the frequency of bacterial vaginosis among pregnant women, as well as to determine its association with complicated pregnancy, we conducted a retrospective analysis of 160 outpatient records. We reviewed the outpatient records

of 160 pregnant women who complained of discharge from the genital tract to the polyclinic department of the Bukhara Regional Perinatal Center in the period from 2023 to 2025. According to retrospective data, during gynecological examination of 160 women, bacterial vaginosis was detected in 62 (38.7%) pregnant women. 21 (33.9%) women were in the first trimester of pregnancy, 32 (51.6%) – in the second and 9 (14.5%) – in the third. Thus, the highest incidence of BV was observed in women in the second trimester of pregnancy. Outpatient records of 62 pregnant women with BV and 20 pregnant women with vaginal normocenosis provided material for statistical retrospective analysis. An analysis of the area of residence of women with BV showed that out of 62 women, 26 (41.9%) lived in the city, the remaining 36 women lived in rural areas, which was 58.1%. Of the 20 women with vaginal normocenosis, 8 (40.0%) lived in the city and 12 (60.0%) in rural areas. Among women with vaginal normocenosis, housewives accounted for 40.0% (8 women), workers – 35.0% (7 women), employees – 20.0% (4 women), students – 5.0% (1 woman). As can be seen from the data presented, housewives and workers predominated among women. It should be noted that the group of women with BV in terms of age, place of residence, level of education and social status was practically the same ($p>0.05$).

Conclusions:

1. The incidence of bacterial vaginosis among pregnant women in the Bukhara region was 38.7%, while its highest incidence was observed in women in the second trimester of pregnancy (51.6%). The frequency of various pregnancy complications, namely, the threat of termination of pregnancy, premature discharge of amniotic fluid, and premature birth was high in women with BV.

2. Characteristic microscopic signs of BV include inhibition of the number of leukocytes (74.0%), a large number of epithelial (72.0%) and “key cells” (98.0%), massive microbial contamination (68.0%) due to the abundance of gram-negative polymorphic microflora (78.0%) and a decrease or absence of gram-positive rod microflora.

3. Antibacterial therapy of BV affects the state of the vaginal normoflora, which is manifested by a change in the morphological shape and / or an insufficient number of lactobacilli in 78.0% of women. The identified variants of the state of the normoflora show the expediency of using means to correct the microbiocenosis of the vagina differentially depending on the state of the vaginal microflora.

4. The use of differentiated correction of vaginal microbiocenosis significantly reduces the number of BV recurrences, complications of pregnancy, childbirth and the postpartum period in women.

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THEORETICAL FOUNDATIONS OF THE COMPETENCY-BASED APPROACH TO TEACHING FOREIGN LANGUAGES (ON THE EXAMPLE OF GERMAN)

Abstract. *The competency-based approach has become one of the leading paradigms in contemporary foreign language education. It emphasizes not only the acquisition of linguistic knowledge but also the development of communicative, intercultural, sociolinguistic, and strategic competencies necessary for real-life communication. This article examines the theoretical foundations of the competency-based approach in foreign language teaching, with a specific focus on the German language. It analyzes key concepts, theoretical models, pedagogical principles, and methodological implications that shape competency-oriented instruction.*

Keywords: *Competency-Based Approach, Foreign Language Teaching, German Language Instruction, Communicative Competence, Autonomous Learning, CEFR.*

Introduction. In recent decades, the shift from knowledge-oriented teaching to competency-based instruction has transformed pedagogical practices in foreign language education. This transformation is strongly rooted in modern educational theory, global standardization initiatives, and the need for communicative proficiency in an increasingly interconnected world. In the context of teaching German as a foreign language, the competency-based approach plays a critical role in aligning curriculum design, assessment tools, and instructional practices with real-world linguistic demands.

Competency-based instruction prioritizes the holistic development of learners by integrating linguistic abilities with communicative performance, intercultural awareness, and problem-solving skills. Its theoretical foundations are derived from communicative language theory, constructivist pedagogy, European educational standards (CEFR), and psychological models of competence development.

Main part. The competency-based approach has become a leading paradigm in modern foreign language education, emphasizing not only the acquisition of linguistic knowledge but also the development of practical, transferable skills that enable learners to use the language effectively in real-life contexts. In the case of teaching German as a foreign language, this approach integrates linguistic, communicative, sociocultural, cognitive, and digital competencies, preparing learners for active participation in multilingual and multicultural environments.

One of the fundamental theoretical foundations of competency-based foreign language instruction is the Common European Framework of Reference for

Languages (CEFR). The CEFR conceptualizes language mastery through descriptors of communicative competence and “can-do” statements, which emphasize what learners are able to perform with the language rather than what grammatical content they know. This shift from knowledge-based to performance-based outcomes aligns strongly with competency-based principles. In German language education, CEFR levels guide curriculum design, assessment practices, and pedagogical strategies, ensuring that learners develop functional skills in listening, reading, speaking, and writing.

Concept of Competence. The term *competence* refers to the integration of knowledge, skills, attitudes, and strategies that enable individuals to perform tasks successfully in specific contexts. In foreign language teaching, competence includes:

- **Linguistic competence** (grammar, vocabulary, phonetics)
- **Communicative competence** (pragmatic and functional use of language)
- **Sociocultural competence** (intercultural understanding, norms of interaction)

This multidimensional concept lays the groundwork for competency-based foreign language instruction.

Competency-based German instruction focuses on developing learners’ practical skills, communicative abilities, and independent learning habits rather than merely emphasizing grammatical rules or memorization. One of its central aims is to cultivate **autonomous learning strategies**, enabling students to take responsibility for their own linguistic progress. Through guided practice, reflective activities, and exposure to authentic German materials, learners acquire the ability to plan, monitor, and evaluate their learning processes. This autonomy not only improves language proficiency but also strengthens learners’ confidence and motivation.

Another key outcome of competency-based instruction is the development of **problem-solving skills**. In German language classrooms, students engage in real-life communicative tasks—such as navigating German websites, resolving misunderstandings, participating in group discussions, or completing project-based assignments. These tasks require critical thinking, creativity, and decision-making, helping learners apply the German language flexibly in various contexts. As a result, students learn to transfer linguistic knowledge into meaningful, practical actions.

The approach also emphasizes **self-assessment**, often guided by the Common European Framework of Reference for Languages (CEFR). Tools such as the CEFR “can-do” statements help learners evaluate their progress in listening, speaking, reading, and writing. By reflecting on their abilities, identifying gaps, and setting learning goals, students become more engaged and responsible participants in the educational process. Self-assessment fosters metacognitive awareness, which is essential for sustained language development.

Discussion. The competency-based approach marks a significant evolution in foreign language pedagogy. While traditional methods emphasized memorization of rules, modern competency-oriented teaching emphasizes communication,

creativity, and real-life language use. In the context of German language instruction, the approach enables learners to achieve functional proficiency, cultural adaptability, and independent learning skills. However, challenges remain, including teacher preparation, development of appropriate learning materials, and maintaining a balance between fluency and accuracy.

Conclusion. The competency-based approach provides a robust theoretical and methodological foundation for effective foreign language teaching. Grounded in communicative, constructivist, and intercultural theories, it supports the development of comprehensive linguistic and communicative abilities. In teaching German, the approach aligns with CEFR standards and modern educational demands, helping learners acquire not just knowledge of the language but the competence to use it meaningfully in diverse contexts. As global communication expands, competency-based instruction will continue to play a central role in shaping successful foreign language education. The pedagogical principles of competency-based instruction form a comprehensive framework that transforms traditional teaching into a dynamic, learner-centered, and performance-oriented process.

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ASSESSMENT OF THE QUALITY OF MELON OIL BASED ON THE CONTENT OF RETINOL AND TOCOPHEROLS

Annotation: *In this study, fat-soluble vitamins A and E were quantified in Mirzachul melon seed oil obtained by mechanical pressing. The analysis was performed by high performance liquid chromatography (HPLC). To confirm the accuracy and reproducibility of the measurements, each determination was performed in three parallel repetitions. The obtained chromatographic profiles are characterized by stable separation of the target analytical components and stable retention times. The authors examined scientific literature to compare the obtained indicators, determined the content of vitamin A (retinol) and the concentration of vitamin E (alpha-tocopherol) in melon oil. The research was carried out in order to further use melon seeds on a production scale. In addition to oil, cake is also of practical interest, which retains a significant portion of protein and dietary fiber and can be used in food products or in feed production. In general, the study shows the prospects for further study and application of melon seed processing products to obtain functional ingredients.*

Key words: *melon oil, retinol, tocopherol, HPLC, melon seeds.*

Introduction

Edible vegetable oils occupy a key place in the human daily diet, as they provide the body with energy, and are also a source of important nutritional and phytochemical compounds that have beneficial effects on health [1]. As the global population grows, the task of finding sustainable and high-quality alternative sources of vegetable oils that can meet the increasing demand for food is becoming more urgent. In recent years, scientists have been paying special attention to technologies for producing oil from agricultural by-products and waste [2, 3]. Melon (*Cucumis melo* L.) is a member of the Pumpkin family and one of the most important tropical fruit crops on the world market. Melon seeds make up about 10% of the fruit's weight, but they remain an extremely underutilized resource and are usually discarded [4]. In recent years, it has been established that seeds contain a high amount of oil (from 30.7 to 44.5% by weight) [5, 6] and are rich in unsaturated

fatty acids and biologically active substances— primarily linoleic acid, retinol and tocopherols [7, 8].

Literary review

The work of Rabadán and co-authors analyzes the vitamin E content not only in oil, but also in other by-products of melon (seeds, peel, pulp). γ -tocopherol has been shown to be the dominant form of vitamin E in seeds, while other vitamin forms such as α -tocopherol and tocotrienols are also found, albeit in lower concentrations. This highlights the potential of melon byproducts as a source of vitamin E, which is relevant to the concept of circular economy of food systems [9].

Zhang, Li, Guo, and Charalampopoulos conducted a comparative analysis of three melon oil extraction methods: Soxhlet, cold pressing, and water-enzymatic extraction (AEE). They found that although the composition of fatty acids practically does not change between the methods, the extraction method significantly affects the content of biologically active components and the resistance of the oil to oxidation. It is especially important that the oil extracted by the AEE method demonstrated a higher tocopherol content and better oxidative stability compared to other methods [10].

In the Jalili and Rashidi experiment, oils of three varieties of melon (*Cucumis melo*) were analyzed, and it was demonstrated that γ -tocopherol makes up a significant part of all tocopherols (in the range of ~ 71.6–84.1 mg/100 g of oil). This confirms that different genotypes of melon can be a source of oil with a variable but always high content of vitamin E, which is important for breeding and industrial use [11].

A study by Mallek-Ayadi et al. (2019) showed that melon seed oil (*Cucumis melo* L.) contains about 2.43 mg/kg of carotenoids, which gives it its characteristic yellow color and provides provitamin-A activity. The carotenoids in the oil are able to convert into retinol in the human body, performing antioxidant functions and supporting vision. Thus, melon oil is a promising source of bioactive compounds for functional nutrition.

Methodology

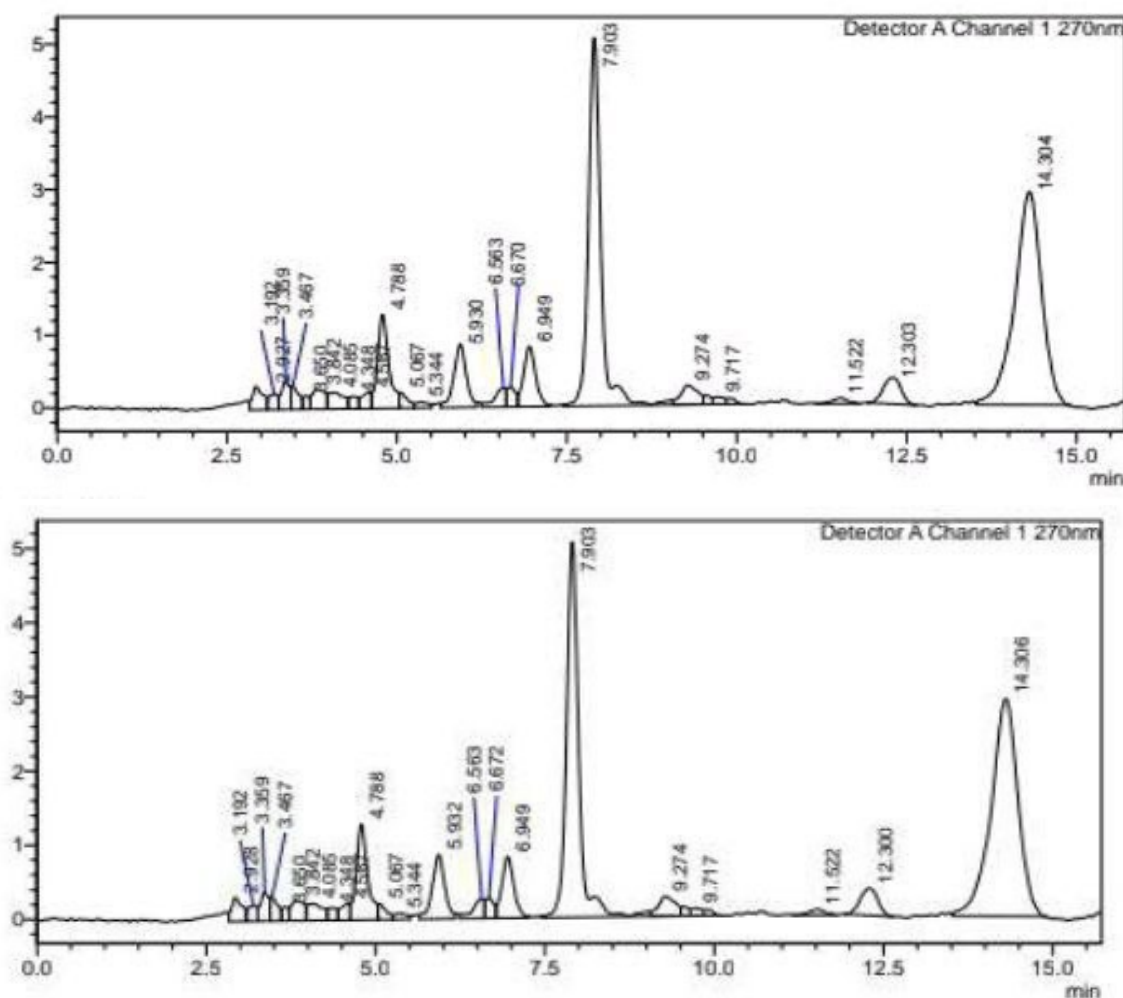
The quantitative determination of fat-soluble vitamins A (retinol) and E (α -tocopherol) in Mirzachul melon seed oil obtained by mechanical pressing was carried out using high performance liquid chromatography (HPLC). The analysis was performed under conditions providing selective registration of compounds with a developed conjugation system characteristic of carotenoids and tocopherols at a wavelength of 270 nm. Sample preparation The selected oil samples were sequentially saponified in order to isolate the non-identifiable fraction. The obtained extracts were dissolved in the mobile phase and filtered through a membrane filter (0.45 microns). Each sample was analyzed three times, which confirmed the stability of the chromatographic profile and reproducibility of quantitative results. Analytical measurements were performed on a reversed-phase column C18 (250 × 4.6 mm, 5 microns). A gradient mode based on a mixture of acetonitrile, methanol, and water was used as the mobile phase, ensuring effective separation of the components. The flow rate was maintained at 1.0 ml/min, the column temperature

was 30 °C, and the volume of the injected sample was 20 µl. The target vitamins were identified by retention time compared with standard retinol and alpha-tocopherol samples. The quantitative assessment was carried out by the area of the corresponding peaks using calibration graphs.

Results

The obtained chromatograms (n = 3) demonstrate stable separation and high reproducibility. Two groups of analytical signals are clearly distinguished on the profile, which can be observed in the chromatogram below, Figure 1. In the first zone (2.5–5.0 min), a series of low-intensity peaks are recorded, reflecting the presence of minor aromatic compounds of the non-personalized fraction. In later intervals, diagnostic peaks of the target vitamins appear: the vitamin A signal is recorded in the region of 6.6 min, while vitamin E is represented by a pronounced high-intensity peak at 7.60 min, which is the dominant component of the profile. The stability of retention times and peak areas in three consecutive injections confirms the correctness of the chosen technique and the reliability of the quantitative assessment. Based on three independent chromatographic analyses, the following vitamin content was determined:

- Vitamin A (retinol): 1.67 mg/100 g of oil
- Vitamin E (alpha-tocopherol): 9.79 mg/100 g of oil



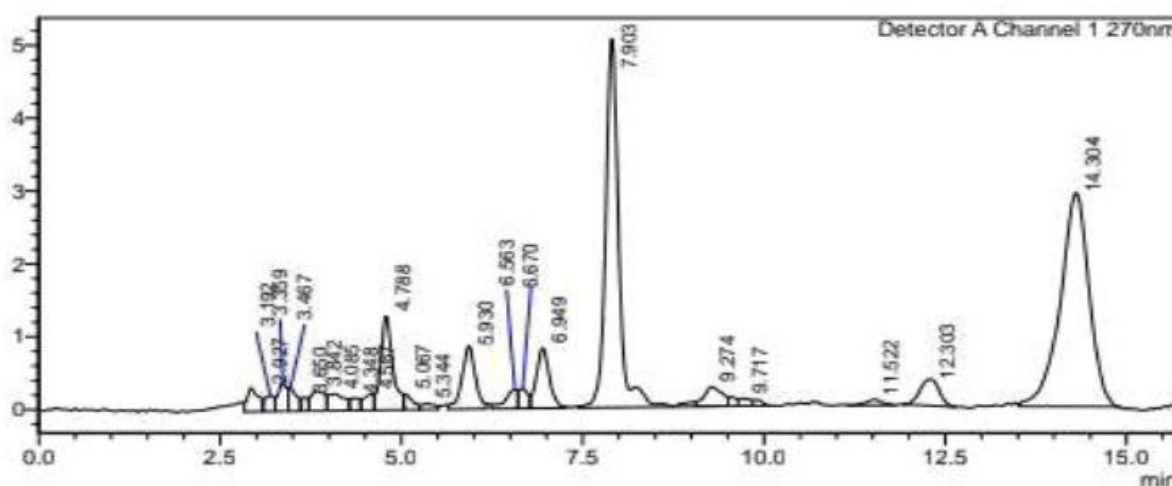


Figure 1. Triple HPLC analysis of vitamins A and E in Mirzachul grade oil

The obtained values indicate that Mirzachul melon seed oil is a natural source of biologically active antioxidants, and the content of alpha-tocopherol significantly exceeds the content of retinol, which is consistent with the typical profile of Cucurbitaceae family oils. The high concentration of vitamin E highlights the prospects of the oil under study as a functional component of food products and biologically active additives.

Discussion

A comparison of the obtained concentrations of vitamins A and E in Mirzachul melon seed oil with the literature data confirms the high biological value of the sample under study and demonstrates the advantage of the pressing method used. According to Mallek-Ayadi et al. (2019), the alpha-tocopherol content in melon seed oil ranges from 4.2–7.8 mg/100 g, depending on the variety and the oil extraction technology used. In a study by El-Adawy et al. (2001) noted that Cucurbitaceae family oils are characterized by an increased concentration of tocopherols, but their values rarely exceed 8 mg/100 g. In our study, the concentration of α -tocopherol was 9.79 mg/100 g, which is higher than most of the values described in the literature, which may be due to the varietal characteristics of the raw materials (Mirzachul), a milder pressing regime and minimal degradation of thermosensitive components. The vitamin A content in the oils of this group is usually much lower and varies in the range of 0.8–1.5 mg/100 g, according to Fokou et al. (2009). In our study, the retinol concentration reached 1.67 mg/100 g, which also exceeds the typical values described for rice oilseeds. This suggests that the seeds of the Mirzachul variety have an increased accumulation of carotenoid precursors, or the technology of mechanical pressing without intensive heating contributes to better preservation of vitamin A. Thus, a comprehensive comparison shows that Mirzachul melon seed oil contains higher levels of natural antioxidants compared to the published data, which emphasizes the functional value of the oil and also demonstrates the effectiveness of the chosen technological scheme for oil production.

Conclusion

According to the results of the conducted research, it can be concluded that the melon seed oil of the Mirzachul variety, obtained by pressing, is characterized by an increased content of biologically active substances. Certain concentrations of vitamin A (1.67 mg/100 g) and especially vitamin E (9.79 mg/100 g) indicate that this product is a promising source of natural antioxidants. The high level of α -tocopherol allows melon oil to be considered as a functional component capable of strengthening the antioxidant status of the body and maintaining metabolic health. Of particular importance is that the values obtained exceed the range described in the literature for most representatives of the Cucurbitaceae family. This indicates both the varietal potential of Mirzachul seeds and the correctness of the chosen technological approach, which ensures the preservation of thermolabile vitamins during pressing. It should be noted that not only the oil is valuable, but also the cake remaining after extraction. Due to its high content of vegetable protein, dietary fiber, and minor components, it has significant nutritional and technological potential. The cake can be used as a protein and fiber additive in the composition of flour products, dry mixes, dietary products, as well as in the production of protein supplements. Its structural features and moderate degree of protein denaturation after pressing make it suitable for both food and biotechnological processes. Thus, the complex processing of melon seeds of the Mirzachul variety makes it possible to obtain two valuable products — oil and cake, each of which has its own industrial significance. The high levels of vitamins in the oil and the favorable composition of the cake make this raw material base promising for the creation of functional foods, enriched ingredients and nutraceutical preparations. The data obtained confirm the need for further research aimed at expanding the use of melon oil and its processed products, as well as the development of technologies for deep processing of non-traditional oilseeds.

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ISSUES OF PASTURE LIVESTOCK IN THE REPUBLIC OF KARAKALPAKSTAN

***Abstract:** Pasture livestock farming plays an important role in the economic and social development of the Republic of Karakalpakstan. This sector plays an important role in ensuring the country's food security, creating jobs, and providing income for the local population. However, there are a number of problems related to pasture livestock farming, which negatively affect the development of the industry.*

***Keyword:** pasture, desert, infrastructure, intensive, degradation.*

Introduction: The territory of the Republic of Karakalpakstan is located mainly in the desert and semi-desert zone, and pasture livestock breeding is one of the main economic sectors here. However, in recent years, the efficiency of pasture use has decreased, and a number of problems have arisen. This article discusses these very problems, their causes and consequences, and solutions.

Main part: 1. The importance of pasture livestock farming

The Republic of Karakalpakstan is distinguished by unique natural conditions and resources. In this case, land resources can be recognized separately. The total land fund of the republic is 16.6 million hectares, including 419.5 thousand hectares of arable land; pastures - 4447.8 thousand hectares [3]. The population of our republic is growing day by day, and accordingly, the population's demand for livestock products is also increasing. Pasture livestock farming is aimed at satisfying these needs, that is, providing the population with affordable and high-quality products.

In Karakalpakstan, livestock farming is the main source of income for the population. Natural pastures are used for grazing goats, sheep, camels, and cattle. It is connected with the traditional way of life of the local population. Pastures are an important source of production of environmentally friendly livestock products, meeting the population's needs for meat and meat products, as well as medicinal milk and dairy products, as well as valuable and inexpensive raw materials for industry. The largest share in the total volume of livestock production in the republic fell on the Amu Darya (13.8%), Beruniy (13.3%) and Ellikkala (12.0%) districts. Analysis of the growth rates of livestock production by region showed that

high growth rates were noted in the city of Nukus (116.8%), Kegeyli (111.5%), Shumanay (109.2%) districts [7].

Despite this, the productivity of pastures in the Republic of Karakalpakstan has decreased by 42-43%, and there are several problems associated with this system. They are:

2. Major issues:

a) Pasture degradation

- Overgrazing (excessive pasture load).
- Decrease in vegetation cover due to dehydration and climate change.
- Sand drifts, wind erosion.

Excessive grazing of livestock on pastures is the main factor of desertification: 70% of pastures in Uzbekistan are degraded. Reducing or stopping livestock grazing contributes to grass regeneration, but some types of soil degradation are irreversible, such as pollution and spoilage by industry or waste [6].

As a result of improper management and overuse of pastures, erosion of lands and environmental degradation are occurring. This situation leads to a decrease in livestock productivity.

b) Water supply problems

- Obsolescence or absence of water infrastructure.
- Lack of artesian wells for watering livestock.
- Water scarcity due to climate warming.

The limitation of water resources for pastures and their misallocation, as well as the deterioration of irrigation systems, create problems. This situation complicates the water supply, which is important for livestock farming.

c) Infrastructure deficiency

- Poor condition of roads leading to pastures.
- Lack of modern livestock farms, shelters, and medical services.

The lack of modern technologies and management methods for pasture livestock farming, as well as the shortage of specialists, hinders the development of the industry.

d) Insufficient state support

- Insufficient subsidies and loans.
- Lack of training and knowledge for local livestock breeders.

Limited financial resources for pasture livestock farming, lack of credit and support programs, lead to financial difficulties for farmers.

e) development of pasture lands for other purposes;

f) insufficient fodder base;

In desert-pasture livestock farming, pastures serve as the main feed base for livestock. However, the use of pastures and their condition do not meet the requirements of today. Desert-pasture livestock farming, consisting of deserts and semi-deserts In the Republic of Karakalpakstan (total pasture area 4447.8 thousand ha) (as of 2025) 12.4% of pastures (430.0 thousand ha) are not provided with water, that is, 2498.4 thousand ha of pastures are not provided with water [2]. The decrease

in the productivity of desert pastures in the pastures of the Republic of Karakalpakstan is 27%. The main factor causing the crisis of pastures is their continuous and haphazard use as a result of the fact that pastures have not yet found their owner, and the main factor hindering the system of their rational use and seasonal use is the interruption of their water supply. Most water sources (mine wells and boreholes) and shepherd's houses, open and closed pens were put into operation 60-70 years ago, and today most of them are in need of repair or are completely out of order. Based on the experience of developed countries, it is necessary to modernize pastures, wells, sheep pens, open and closed pens, and other production facilities.

3. Consequences of issues

- Decline in livestock numbers.
- Decrease in productivity (meat, milk, wool).

Irregular grazing of livestock leads to the death of plants before the end of the growing season, which leads to pasture degradation and a decrease in productivity.

- Providing the population with poor-quality products
- A sharp increase in the price of products as a result of a decrease in the number of livestock;
- A decrease in the income of the population and migration.
- Disturbance of the stability of ecosystems (Ecological risk)

4. Solutions and suggestions: As a solution to the above-mentioned issues, we should mention the following:

- Introduction of a sustainable pasture management system: development of zonal pasture load standards.

- Improving water supply, i.e. improving the irrigation system: introduction of solar-powered pumps, water-saving technologies, as well as control of groundwater, selection of favorable areas for wastewater discharge;

- Organization of sufficient seed production;
- Organization of cooperation with other sectors;
- Effective use of available land and high yields;
- State support: subsidies, grants, farmer training programs and work with qualified specialists in this field, training of personnel with strong knowledge, cooperation with foreign countries;

- Development of livestock infrastructure: mobile veterinary stations, pasture monitoring systems, intensive use of pastures,

- Organization of cultural pastures, rotational and seasonal grazing of livestock on special pastures;

- Development of livestock breeds suitable for the climate: drought-resistant breeds (for example, Karakalpak camels, local goats).

- Conducting special registrations of pastures by the cadastral agency;

- Furthermore, the Law of the Republic of Uzbekistan "On Pastures" stipulates that pasture rotation should be carried out periodically and sequentially for the use of pasture plots, as well as for the organization of pasture rotation,

rational use of pastures, and their protection. This law defines the development, approval, and implementation of state and other programs in the field of pasture use and protection as the main directions of state policy for regulating pasture protection, establishing rules, norms, and standards aimed at preserving pastures, implementing state control, ensuring the reproduction and restoration of pastures, developing research activities and international cooperation, and protecting them as the main directions of state policy.

CONCLUSION. Despite the fact that pasture livestock farming in Karakalpakstan is an economically and environmentally important sector, it faces many systemic problems. A comprehensive approach and cooperation between the state and the local population are necessary to solve these problems. Only through modern technologies, sustainable management, and climate-adapted livestock farming can pasture resources be preserved and developed. Scientifically based production of pasture livestock products in the territory of our republic and providing the population with high-quality and affordable products, as well as the cultivation of environmentally friendly products, are becoming increasingly problematic.

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SHO'RO HUKUMATINING TURKISTONDA TA'LIM SIYOSATI

Annotatsiya. Ushbu maqolada sho'ro hukumatining Turkistonda olib borgan ta'lim siyosati, xususan milliy maorif, madrasa va maktablarning cheklanishi hamda bosqichma-bosqich tugatilishi jarayoni yoritilgan. Mustamlakachilik siyosatining mohiyati, ateistik mafkuraning joriy etilishi, eski maktab va madrasalarning faoliyatiga berilgan salbiy baholar tarixiy manbalar asosida tahlil qilingan. Shuningdek, jadidchilik harakati, yangi usul maktablarining shakllanishi va sho'ro davridagi ma'naviy-ma'rifiy siyosatning mahalliy aholiga ta'siri ilmiy asosda ko'rib chiqiladi. Maqola Turkiston ta'lim tizimi tarixini xolisona qayta baholash zarurligini ta'kidlaydi.

Kalit so'zlar: Turkiston, sho'ro hukmronligi, ta'lim siyosati, milliy maorif, madrasa, eski maktab, ateistik siyosat, jadidchilik, mustamlakachilik, savodxonlik.

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EDUCATIONAL POLICY OF THE SOVIET GOVERNMENT IN TURKISTAN

Abstract. This article examines the educational policy of the Soviet government in Turkestan, focusing on the restrictions and gradual elimination of the traditional national educational system, including madrasahs and old-style schools. It analyzes the features of colonial policy, the introduction of atheistic ideology, and the negative assessments given to traditional educational institutions based on historical sources. The study also explores the role of the Jadid movement, the development of new-method schools, and the impact of Soviet cultural-educational policy on the local population. The article emphasizes the need for an objective reevaluation of the history of the Turkestan education system.

Keywords: Turkestan, Soviet rule, educational policy, national education, madrasah, traditional school, atheistic ideology, Jadid movement, colonialism, literacy.

O'zbekiston mustaqilligining e'lon qilinishi respublikada demokratik va insonparvar jamiyat qurishga, bozor iqtisodiyotiga o'tishga keng yo'l ochib berdi. Mustaqillik sharofati bilan O'zbek xalqining o'tmish tarixi, ma'naviy qadriyatlari, qadimiy madaniyati tiklana boshlandi.

Ma'lumki, O'zbek xalqi qariyb 150 yil davom etgan Rossiya imperiyasining mustamlakachilik hamda sho'rolar hukmronlik davrining murakkab va ziddiyatli

davrini boshidan kechirdi. Prezident Shavkat Mirziyoyev mustamlaka davri haqida fikr bildirib, quyidagilarni bayon qilgan edi: “Xalqimiz tarixining og‘ir va murakkab davri, ya‘ni XX asr boshida jadid bobolarimiz Vatanimiz mustaqilligi yo‘lida fidoyilik bilan kurashganlar. Bu borada ular turkiyalik ma‘rifatparvarlar bilan faol hamkorlik qilganlari, bu diyorda ta‘lim olib, yangi g‘oya va qarashlarga ega bo‘lganlarini yaxshi bilamiz.”⁷. Yuqoridagi fikrlardan kelib chiqqan holda, haqli tarzda tahkidlash joizki, aynan mustaqillik davriga kelib O‘zbek xalqi mahrifatining taraqqiyoti, mahnaviyati va mahnaviy qadriyatlarining tiklanishi masalasi davlat siyosati darajasiga ko‘tarildi. Bugungi kunda tahlil sohasida olib borilayotgan ishlar o‘z navbatida, kelajakda mamlakatimiz taraqqiyoti uchun zamin bo‘lib xizmat qiladi.

Qadimdan o‘ziga xos madaniyat rivojlangan, shaharlari taraqqiy etgan, ko‘p sonli madrasa va maktablarga ega bo‘lgan Turkiston o‘lkasida o‘ziga xos tahlil tizimi mavjud edi. Qadimgi madrasa, qorixona, maktablar haqida ham qo‘lyozma arxiv xujjatlari to‘ilgan. Bu o‘z navbatida yosh avlodni milliy maorif tizimida ta‘lim olishi - ularning o‘zligini anglashga ko‘mak berar edi, shuning uchun sho‘ro hukumati milliy maorifni cheklash, maktab va madrasalarni vaqf yerlaridan mahrum qilish, shu yo‘l bilan ularni yo‘q qilish siyosatini olib bordi.

Chor Rossiyasi imperiyasining maorif sohasida boshlagan mustamlakachilik siyosatini sho‘ro hukumati, mafkuraviy niqoblar yaani ateistik siyosat orqali davom ettirdi. Sho‘ro hukumati milliy maorifni avval cheklash, so‘ngra tugatish siyosatini amalga oshirishga harakat qildi. Sho‘ro hukumatining milliy maorif sohasidagi siyosati o‘z vaqtida yuqori ijobiy baholandi; maorif tarixi esa soxtalashtirilib, uning ba‘zi sohalari esa umuman yoritilmadi. Turkistondagi madrasa va maktablarning ommalashishi mahalliy aholi savodxonligini oshirishga ko‘maklashdi. Shunga qaramay, sho‘ro hukumati birinchi kundan boshlab madrasa, maktablarning faoliyat ko‘rsatishiga qarshi bo‘lgan. Buning natijasida madrasa, maktablar soni yildan-yilga kamayib borgan.

XX asrning 20-yillari oxirlariga borib, ko‘p asrlardan buyon O‘zbek xalqi ma‘naviy-madaniy hayotida muhim o‘rin egallab kelgan madrasa, maktablar hamda qorixonalarga sho‘ro hukumati tomonidan tazyiq ko‘rsatildi, aksariyat xollarda majburan yopib qo‘yildi. Madrasa, eski maktablarning sho‘ro davridagi faoliyati shu vaqtga qadar to‘la o‘rganilmagan. Milliy maorif tizimining isloh qilinishi, ularning yangi usul maktablar va madrasalarga aylantirilishi masalalariga tegishli bo‘lgan hujjatlari haligacha ilmiy muomalaga kiritilmagan. Sho‘ro davridagi madaniyat tarixiga oid tarixiy asarlarda XIX-XX asrlarda madrasa va maktablar bo‘lganligi to‘g‘risida ma‘lumotlar bor. Lekin sho‘ro davri tarixchilariga qadimgi, mustamlakachilikdan oldingi davrni yozish mumkin emas edi. Sababi sho‘rolar davrida xalqimizning maorif va madaniyat sohasidagi faktlarni haqqoniy yoritish partiya va xukumatning siyosatiga mutlaqo to‘g‘ri kelmas va mustamlakachilar ham xoxlamas edi. Vatanimiz tarixini yaratish borasidagi sa‘y-harakatlarda milliy maorif tizimi tarixini o‘rganish va tadqiq etish muhim ahamiyatga molik masala

⁷ Mirziyoev Sh. Milliy tiklanishdan milliy yuksalish sari. Asarlar IV jild.-Toshkent: O‘zbekiston, 2020.-B. 326-327.

hisoblanadi. Sho'ro hukmronligi yillarida soxtalashtirilgan milliy maorif faoliyati tarixini tarixiy hujjatlar asosida xolisona yoritib berish va baholash muhimdir.

Chor Rossiyasi mustamlakachiligi va undan keyin davom etgan sho'rolar imperiyasi davrlarida mahalliy xalqlarning milliy madaniyatini, dinini, madrasa hamda maktablardan iborat islom o'quv yurtlarini turli yo'llar bilan yo'q qilishga qaratilgan "madaniy inqilob" va ateistik siyosat olib borilgan. Milliy madaniyati rivojlangan maxalliy xalqning maktab va madrasalari hamda o'ziga xos ta'lim tizimi mavjud bo'lgan.

O'zbekiston milliy maorifi tarixining XX asr boshlarida o'lka mahalliy aholisi hayotida sho'ro mustamlakachiligi davri boshlanib ma'lum tizimga solingan maktab ta'lim tizimi shakllantirildi. Sho'ro hokimiyatining O'zbekistondagi madrasa, maktablarga doir sho'rolashtirish siyosati va uning o'ziga xos jihatlarini mohiyati kommunistik mafkura nuqtai nazaridan yondashilganligidan darak beradi. Musulmon maktablari va madrasalari faoliyati haqidagi ma'lumotlar, sho'ro hukumatining ularga nisbatan salbiy munosabatini yorituvchi dastlabki maqolalar Turkiston ASSRda 1918-1924 yillarda chop etilgan gazeta va jurnallarda ehlon qilingan. Ilk bor maktab va madrasalar haqida 1918 yilda "просвещение" gazetasida N.S.Likoshin maqolalari ehlon qilingan⁸. Bu maqolalarda musulmon maktab va madrasalari haqida, ularning faoliyati to'g'risida xabar berilgan. "Hayka и просвещение" deb nomlangan Turkiston ASSRning Maorif xalq komissarligi jurnalida P.Serbov tomonidan maktab va madrasalar haqida bir qator maqolalar chop etilgan⁹. Ayni paytda ushbu maqolalarda o'lkadagi madrasa, maktablarning mahalliy aholi savodini chiqarishga ko'mak berganligi asossiz ravishda inkor etilgan.

XX asrning 20-yillarida o'zbek maorif tarixini, O'zbekistondagi milliy an'anaviy maktab, madrasalarning sho'ro tuzumi davrida mahalliy aholi xat-savodini chiqarishga bevosita ko'maklashgan. Turkistonda qadimdan o'zbek maorifi rivoj to'ganligi, madrasalardan mashhur shoir, yozuvchi, olimlar yetishib chiqqanligi, Rossiya imperiyasi hukumati davrida ham uning rivojlanib borgan.

Maktab va madrasalar sho'ro davrida sonining kamayib borgan, yuqorida tahkidlaganimizdek sho'ro hukumatining o'zbek milliy maorifini cheklash siyosati yildan-yilga kuchaytirib borilgan. Buni biz 1925 yil O'rta Osiyoda milliy-hududiy davlat chegaralanishi o'tkazilib, fevralda O'zbekiston SSRning tashkil bo'lgani, sho'ro tuzumi mustahkamlangani tufayli sho'ro hukumati dinga qarshi ateizmni ommalashtirishga harakat qildi, jumladan, islom diniga qarshi kurashni kuchaytirdi. Musulmon maktablari va madrasalari huquqlarini turli yo'llar bilan cheklash va ularni butunlay tugatishga qaratilgan chora-tadbirlar avj oldi. Musulmon maktab va madrasalari yoshlarga faqat diniy bilimlar berganligini, bunday taa'lim sho'ro hukumatining maorif sohasidagi siyosatiga mos kelmasligini va eski maktablarning

⁸ Лыкошин Н.С. История культуры в мусульманской школе // Просвещение. 1918. 10 сентябрь; Унинг ўзи. На пути к новой школе и жизни // Просвещение. 1918. 11 сентябрь.

⁹ Сербов П.И. Общая характеристика начального образования в Туркестане // Наука и просвещение.-Ташкент, 1922.-№ 2.-С. 17-21;

ta'lim tizimini tubdan o'zgartirish zarurligi haqida chora-tadbirlar ishlab chiqilgan. Buning uchun musulmon maktablarini sho'ro ruhida qayta qurish va sho'rolashtirishni boshlab yubordi. Bu davrda islom dini qoralanib, sho'ro hukumatining dinga qarshi siyosatini yoqlashgan. RSFSR hukumati tomonidan 1918 yil 23 yanvarda chiqarilgan "Cherkovni davlatdan, maktabni cherkovdan ajratish to'g'risida"gi dekreti e'lon qilinishi maktab va madrasalarning tugatilishini yanada tezlashtirdi. Masalan, I.M.Mo'minov ham madrasalar faoliyatini asosan salbiy tarzda tavsiflagan, baholangan. Sho'ro hukmronligi davrida O'zbekiston maorifi tarixiga bag'ishlangan qator tadqiqot olib borilgan bo'lib, ularda asosan sho'ro maktablari faoliyatiga ijobiy baholab o'tganlar. Mazkur tadqiqotlarda madrasa, maktablar faoliyati salbiy baholanib, ularning o'z vaqtida tugatilishi ijobiy voqea sifatida baholangan¹⁰.

Bu davrda chop etilgan ilmiy-fundamental adabiyotlarda ham masalaga asosan salbiy nuqtai nazardan yondashuv ruhi hukmron edi. Masalan, XX asrning 50-yillarida nashr etilgan "O'zbekiston SSR tarixi" kitobida: "... eski maktab domlalaridan sho'ro maktablarida foydalanib bo'lmas edi, chunki ular g'oyaviy jihatdan mos kelmas va deyarli chala savod bo'lib, kp'plari O'qishnigina bilar, lekin yoza olmas edilar",- degan soxta, tarixiy jihatdan noto'g'ri ma'lumotlar berilgan¹¹. SHuningdek, sho'ro hukumati davrida milliy maorif (maktab, madrasalar)ning sho'rolashtirilish masalalari haqida ham mahlumotlar berilgan. Turkistondagi maktab va madrasalarning faoliyati to'g'risida I.Alimov O'zining "Qo'qon xonligi madrasa va maktablari tarixi" nomli asarida milliy maorifning o'lka ma'naviy-madaniy hayotidagi o'rniga alohida ehtibor qaratilgan¹².

Turkiston ijtimoiy-ma'naviy hayotida katta rol o'ynagan jadidlarning mahrifatparvarlik faoliyatiga bag'ishlab T.Qozoqov Farg'onada jadid maktablarining faoliyati to'g'risida qator maqolalalar chop ettirgan.

Xulosamiz shuki, chorizm va sho'ro hukmronligi davrida maktab va madrasalar milliy maorifga xolisona baho berilmagan. Sho'ro davlatining madrasa va eski maktablarga nisbatan olib borilgan siyosati salbiy oqibatlarni jumladan, o'zbek xalqi oktyabr to'ntarishidan so'ng yanada savodsizligini keltirib chiqargan kabi fikr tug'iladi. O'zbekistonda eski maktab, madrasalarning tugatilishi aslida ruslashtirish siyosatining bir qismi hamda milliy qadriyatlarni tugatishga qaratilgan ochiqdan-ochiq qat'iy choralarining namunasidir.

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PEDIATRIC STROKE: EARLY DIAGNOSIS AND MODERN THERAPEUTIC APPROACHES

Abstract: *Pediatric stroke is a serious cause of long-term neurological disability in children. Early diagnosis and modern therapeutic approaches can significantly improve clinical outcomes. This article reviews the etiology, clinical presentation, and contemporary diagnostic tools for pediatric stroke, including magnetic resonance imaging (MRI), computed tomography (CT), biomarkers, and vascular studies. Therapeutic strategies such as anticoagulant and antiplatelet therapy, neuroprotective interventions, surgical options, and rehabilitation are discussed.*

Keywords: *pediatric stroke, early diagnosis, MRI, treatment, rehabilitation, anticoagulation*

Introduction Pediatric stroke is a rare but potentially devastating condition, differing from adult stroke in etiology, pathophysiology, and clinical presentation. Unlike adults, children present a unique set of challenges due to the ongoing development of the brain and vascular system. Neonates and infants have immature cerebrovascular networks, which increase their susceptibility to ischemic events and hemorrhage. Additionally, the clinical manifestations of pediatric stroke are often nonspecific, including seizures, altered consciousness, or focal neurological deficits, which can delay diagnosis. The spectrum of pediatric stroke encompasses arterial ischemic stroke, cerebral sinovenous thrombosis, and hemorrhagic stroke, each with distinct mechanisms and risk factors. Recognizing these differences is critical for timely intervention.

Early and accurate diagnosis is essential to minimize neurological sequelae and optimize rehabilitation. Advances in neuroimaging, including MRI, diffusion-weighted imaging, and MR angiography, allow for detailed assessment of ischemic regions, vascular anomalies, and hemorrhagic lesions. Biomarkers and genetic screening further enhance the identification of underlying risk factors. Pediatric stroke requires a multidisciplinary approach involving neurologists, hematologists, cardiologists, and rehabilitation specialists. This introduction highlights the importance of understanding developmental neurovascular physiology and the distinct etiologies of pediatric stroke, forming the foundation for effective management and improved long-term outcomes.

Etiology of Pediatric Stroke

- Congenital heart defects (e.g., single ventricle, hypoplastic left heart)

- Arteriopathies and vasculitis (e.g., Moyamoya disease, infection-related vasculopathy)

- Hematologic disorders (anemia, thrombophilia)
- Trauma and vascular dissection
- Genetic syndromes (COL4A1 mutations, others)

Early Diagnosis Early diagnosis is critical in reducing morbidity and improving outcomes.

Neurological Assessment

- Motor function evaluation
- Assessment of vision, speech, and cognitive abilities

Imaging Techniques

- MRI: identifies ischemic and hemorrhagic lesions
- CT: rapid detection of hemorrhage
- MR/CT angiography: evaluation of cerebral vessels

Biomarkers

- D-dimer, antiphospholipid antibodies, thrombophilia panels

Vascular Studies

- Echocardiography: detect cardioembolic sources
- Doppler ultrasound: assess cerebral blood flow

Modern Therapeutic Approaches

Pharmacological Therapy

- Anticoagulants: heparin, warfarin
- Antiplatelet agents: aspirin
- Neuroprotective agents: NMDA receptor blockers, antioxidants

Surgical Interventions

- Craniotomy for hemorrhage
- Endarterectomy or stenting for arteriopathies

Rehabilitation

- Early motor therapy
- Physical and occupational therapy
- Cognitive and speech rehabilitation

Conclusion Early diagnosis and modern therapeutic strategies are essential for pediatric stroke management. MRI, CT, and biomarker evaluation facilitate rapid and accurate diagnosis. Treatment must be individualized, combining pharmacologic, surgical, and rehabilitation approaches to optimize long-term neurological outcomes.

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IMPROVING EARLY DETECTION AND PREVENTION STRATEGIES FOR PEDIATRIC STROKE

Abstract: *Pediatric stroke is an uncommon but severe neurological emergency that often leads to long-term disability and substantial social and economic burden. Early recognition remains a major challenge due to atypical symptoms and limited awareness among caregivers and primary-care physicians. This article reviews current evidence on major risk factors, early clinical manifestations, diagnostic approaches, and preventive strategies for pediatric stroke. Based on recent literature, improved models for early screening, timely neuroimaging, and prevention in high-risk children are proposed. Strengthening interdisciplinary collaboration and increasing parental and community awareness are highlighted as essential steps toward reducing pediatric stroke morbidity and mortality.*

Keywords: *Pediatric stroke, early detection, prevention, risk factors, neuroprotection, screening.*

1. Introduction

Pediatric stroke, although significantly less common than adult stroke, remains one of the most devastating neurological conditions in childhood. Global incidence estimates indicate that 2–13 cases occur per 100,000 children annually, and despite improved neuroimaging technologies, many cases remain underdiagnosed. In low- and middle-income countries, including Central Asia, epidemiological data are limited, while perinatal complications, congenital heart diseases, and genetic syndromes are increasingly contributing to stroke risk among children.

Consequences of pediatric stroke are often more severe compared to adults. Studies show that more than 60% of affected children develop long-term neurological deficits, including motor impairment, epilepsy, cognitive decline, speech disorders, behavioral abnormalities, and limitations in social adaptation. These complications substantially affect a child's quality of life and increase the long-term burden on families and healthcare systems.

Early recognition of pediatric stroke is challenging. Children frequently present with non-specific symptoms such as headache, vomiting, irritability, lethargy, or subtle weakness. These signs are often misinterpreted as viral infections, migraine, or fatigue, causing delays in diagnosis. Furthermore, primary care physicians often lack structured clinical algorithms to identify stroke in children, which contrasts with well-established tools available for adults.

Currently, pediatric stroke screening protocols remain insufficiently standardized, and many countries lack specialized pediatric stroke pathways. Given these challenges, strengthening early detection systems and developing improved prevention strategies for high-risk pediatric populations are crucial.

This article focuses on the fundamental aspects of early recognition, diagnostic approaches, and effective preventive interventions for pediatric stroke. Emphasis is placed on strengthening screening protocols, enhancing physician training, and promoting awareness among parents to reduce stroke-related disability in children.

2. Materials and Methods

This narrative review is based on the analysis of published scientific literature from 2015–2025. Databases including PubMed, ScienceDirect, Scopus, and Google Scholar were searched using keywords such as “pediatric stroke,” “early diagnosis,” “childhood ischemic stroke,” and “stroke prevention in children.”

3. Results

3.1 Major Risk Factors

The analysis identified several key risk factors strongly associated with pediatric stroke:

Congenital heart disease: particularly those causing right-to-left shunting.

Coagulation disorders: including thrombophilia, protein C/S deficiency, and antiphospholipid syndrome.

Vascular abnormalities: such as Moyamoya disease, vasculitis, and arterial dissections.

Perinatal complications: birth asphyxia, prematurity, and neonatal infections.

Systemic infections: meningitis, encephalitis, and severe otitis.

3.2 Early Clinical Signs

Early symptoms were found to vary with age:

Infants: seizures, apnea, irritability, feeding problems.

Children: hemiparesis, facial asymmetry, speech disturbances, sudden headaches, vomiting, altered consciousness.

Due to nonspecific presentations, pediatric stroke is frequently misdiagnosed, causing delays in neuroimaging and treatment.

3.3 Diagnostic Improvements

Important findings include:

MRI and MRA remain the gold standard for early detection.

CT scan is useful for excluding hemorrhage but often misses early ischemic lesions.

Implementing a pediatric-adapted stroke scale such as FAST-Kids (Face, Arm, Speech, Time) significantly improves recognition rates.

Tele-neurology consultations enhance early triage in remote regions.

3.4 Prevention Strategies

Effective prevention measures identified include:

Screening of high-risk children (e.g., congenital heart disease, thrombophilia).

Early management of infections and inflammatory diseases.
Antithrombotic prophylaxis where indicated.
Educating parents and teachers about early warning signs.
Establishing national pediatric stroke pathways for emergency departments.

4. Discussion

This review highlights that pediatric stroke remains underrecognized despite its severe long-term consequences. Unlike adults, children typically present with subtle and atypical symptoms. Delayed diagnosis is often attributed to misinterpretation of early signs by caregivers and insufficient training of primary-care physicians.

The implementation of structured screening tools such as FAST-Kids can greatly improve early detection. However, many healthcare systems lack pediatric-specific neuroimaging protocols and multidisciplinary stroke teams. Early MRI access remains limited in some regions, further contributing to delayed diagnosis.

Prevention is most effective when targeting children with known risk factors. Routine screening of children with congenital heart anomalies, clotting disorders, or vasculopathies can significantly reduce stroke incidence. Additionally, perinatal care improvements play a crucial role in reducing neonatal stroke rates.

Education remains a key component. Increasing awareness among parents, teachers, emergency staff, and family physicians can dramatically reduce diagnosis time and improve outcomes. Collaboration among pediatricians, neurologists, cardiologists, and hematologists is essential for comprehensive stroke care.

5. Conclusion

Pediatric stroke is a serious, often underdiagnosed condition that leads to lifelong neurological complications.

Early detection requires improved screening tools, expanded MRI access, and enhanced physician training.

Prevention strategies should focus on high-risk groups, including children with congenital heart disease, coagulation disorders, and perinatal complications.

Increasing awareness among caregivers and healthcare professionals is critical to reducing morbidity and mortality.

Establishing national pediatric stroke guidelines will significantly improve outcomes in affected children.

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FUNDAMENTAL BASIS OF NEUROVASCULAR INTERACTION IN PEDIATRIC STROKE

Abstract: *Pediatric stroke represents a significant cause of long-term neurological disability in children and is increasingly recognized as a condition with unique pathophysiological mechanisms distinct from adult stroke. Unlike the mature brain, the developing nervous system demonstrates heightened vulnerability to disturbances in cerebral blood flow and altered neurovascular coupling. This article examines the fundamental mechanisms underlying neurovascular interaction in pediatric stroke, focusing on vascular pathology, neuronal injury cascades, inflammation, oxidative stress, and developmental differences in cerebrovascular regulation. Understanding these mechanisms is essential for designing age-specific diagnostic, therapeutic, and rehabilitation approaches for affected children.*

Keywords: *pediatric stroke, neurovascular unit, cerebral blood flow, neuronal injury, inflammation, neurodevelopment, ischemia.*

1. Introduction

Stroke in children, though less common than in adults, is a major cause of morbidity, lifelong disability, and cognitive impairment. The incidence of pediatric stroke ranges from 2 to 13 per 100,000 children annually, with neonates being the most vulnerable subgroup due to ongoing cerebral development. Unlike adults, in whom stroke is primarily associated with atherosclerosis, pediatric stroke is driven by congenital heart disease, infections, hematologic disorders, trauma, and genetic vasculopathies.

The neurovascular unit (NVU)—comprising neurons, endothelial cells, astrocytes, pericytes, and extracellular matrix—plays a vital role in regulating cerebral blood flow and maintaining blood–brain barrier integrity. In children, the NVU is structurally and functionally immature, making it more susceptible to ischemic injury. This article analyzes the fundamental biological interactions between neuronal and vascular components during pediatric stroke and highlights how these age-dependent mechanisms shape the clinical course and outcomes.

2. Neurovascular Unit in the Developing Brain

The neurovascular unit undergoes significant maturation during early childhood. Each component contributes uniquely to neurovascular coupling:

2.1. Endothelial Cells

In infants, endothelial cells express immature tight junctions, resulting in a more permeable blood–brain barrier (BBB). This increases the risk of cerebral edema and inflammatory infiltration during ischemia.

2.2. Astrocytes

Astrocyte end-feet, which regulate blood flow and metabolic support, are not fully developed in neonates. Their reduced ability to buffer glutamate predisposes the immature brain to excitotoxic neuronal injury.

2.3. Pericytes

Pericytes, crucial for vessel stabilization and BBB integrity, are reduced in number in early neurodevelopment, making cerebral microvasculature more fragile.

2.4. Neurons

Developing neurons exhibit high metabolic demand and low resistance to oxidative stress. Their susceptibility to ischemic injury is significantly greater compared with adults.

3. Pathophysiology of Pediatric Stroke

3.1. Vascular Factors

Pediatric stroke is predominantly driven by:
congenital heart defects (e.g., single ventricle physiology), arteriopathies (e.g., Moyamoya disease), sickle-cell anemia, infections (e.g., varicella vasculopathy),
trauma-related dissections.

These conditions lead to disrupted blood flow, vessel stenosis, or thromboembolism, causing cerebral ischemia.

3.2. Neuronal Injury Mechanisms

During ischemia, oxygen and glucose deprivation trigger:
ATP depletion, membrane depolarization, calcium influx, glutamate-mediated excitotoxicity, activation of proteases and lipases.

Because the neonatal NVU is immature, these cascades progress more rapidly than in adults.

3.3. Inflammation and Oxidative Stress

Microglial activation occurs early in the ischemic response in children. Excessive inflammatory cytokines (IL-1 β , TNF- α) increase BBB permeability, aggravating neuronal death.

Immature antioxidant systems (e.g., low superoxide dismutase activity) elevate susceptibility to oxidative damage.

4. Neurovascular Interaction During Ischemia

The neurovascular response to ischemia in children includes:

4.1. Impaired Neurovascular Coupling

Developing astrocytes cannot efficiently regulate blood flow in response to neuronal activity, worsening ischemic vulnerability.

4.2. BBB Breakdown

Due to immature tight junctions and astrocytic support, the BBB is prone to early breakdown, allowing infiltration of leukocytes and plasma proteins.

4.3. Cerebral Blood Flow Dysregulation

Autoregulation mechanisms are underdeveloped in young children. Even small reductions in systemic blood pressure significantly decrease cerebral perfusion.

4.4. Mitochondrial Dysfunction

Developing neurons rely heavily on mitochondrial energy production, making ischemic mitochondrial failure particularly damaging.

5. Clinical Implications

5.1. Diagnostic Considerations

MRI remains the gold standard for diagnosing pediatric stroke. Age-adjusted biomarkers and neurovascular imaging are essential due to the unique pathophysiology of the immature NVU.

5.2. Therapeutic Approaches

While thrombolysis is rarely used in children, treatment options include: correction of underlying disorders (e.g., heart defects), anticoagulation or antiplatelet therapy, aggressive management of inflammation and edema, neuroprotective strategies targeting excitotoxicity and oxidative stress.

5.3. Rehabilitation

Children demonstrate greater neuroplasticity than adults. Early, intensive neurorehabilitation significantly improves long-term motor and cognitive outcomes.

6. Conclusion

Pediatric stroke is fundamentally different from adult stroke due to the unique characteristics of the developing neurovascular unit. Immaturity of endothelial cells, astrocytes, neurons, and autoregulatory mechanisms increases vulnerability to ischemia and shapes the clinical presentation and prognosis. Understanding these fundamental neurovascular interactions is crucial for optimizing early diagnosis, designing age-specific treatments, and improving long-term functional outcomes in affected children.

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GEOGRAPHICAL FOUNDATIONS OF TRADITIONS AND CUSTOMS RELATED TO THE USE OF WATER (THE CASE OF THE SHOHIMARDONSOY BASIN)

***Annotation.** This article analyzes the geographical foundations of traditions and customs related to water use that have developed in the Shohimardonsoy basin of the Fergana Valley. Through historical, ethnographic, and ecological-geographical approaches, the study highlights the traditional views and practices of local communities in preserving and rationally using the Shohimardonsoy River and dammed mountain lakes, particularly the hazardous Qurbonko'l Lake. It is demonstrated that rituals such as visiting sacred sites, performing ceremonies, and tying "alam" (cloth strips) on trees functioned not only as spiritual practices but also served ecological-monitoring purposes, including observing changes in water levels and predicting hazardous natural processes. The research findings confirm that local communities established a sustainable system for protecting water resources, preserving natural landscapes, and maintaining social cohesion through unique traditions and customs. The article emphasizes the relevance of creatively applying this traditional knowledge and experience in modern water-management practices.*

According to a report published by the United Nations, currently 2 billion people worldwide do not have direct access to safe drinking water, and by 2030 at least 700 million people will be forced to migrate to other regions due to water scarcity [15]. In recent years, more than a thousand regulatory documents have been adopted globally concerning the accounting, management, and rational use of water resources. Notably, by the decision of the United Nations General Assembly at the 1992 Rio de Janeiro Conference, March 22 was declared "World Water Day." Since 1997, the international community has been holding the World Water Forum—the largest global event in the field of water—once every three years [14]. At international conferences, one of the emphasized measures to prevent water shortages in arid regions and ensure the rational use of water is the need to "fully utilize limited water resources and improve new, including local, technologies to protect these resources from pollution" [16]. The issue of water scarcity and its solutions are of great importance for the Republic of Uzbekistan as well, which is located in an arid region under conditions of global climate change.

During the years of independence, more than 500 resolutions and decrees have been adopted in Uzbekistan regarding the protection of water resources, the provision of quality drinking water to the population, and the rational use of water in various sectors of the economy. In particular, goals 62, 63, and 64 of the

“Uzbekistan–2030” Strategy, adopted on September 11, 2023, outline tasks such as enhancing the culture of water use in the country and ensuring the efficient utilization of water in agriculture. These objectives are also reflected in the concept of the Ministry of Water Management — the organization responsible for implementing a unified water policy in Uzbekistan — where “strengthening the responsibility of water users for the rational use of water resources and improving the culture of water use” have been included among the main priorities [1]. In our opinion, addressing these issues requires studying the traditions and customs of our ancestors aimed at the rational use and protection of water based on an ecological–geographical approach, and creatively applying this knowledge without rejecting innovative development, as it may lead to significant practical results. As S.A.Arutyunov noted, “...traditions may exist without innovations, but not vice versa.” [6].

In the Fergana Valley, river basins fed by surrounding mountains in their upper reaches have formed lake systems of various origins, including dammed, moraine, and karst lakes. In most mountain lakes, large volumes of water accumulate, which can cause dangerous flash floods. According to R.Pirnazarov and F.Hikmatov, there are currently more than 350 dammed lakes in Uzbekistan and the adjacent regions [10]. I.Dergacheva notes that in this region there are 320 lakes with a risk of bursting, 221 of which are located in the river basins on the periphery of the Fergana Valley, including 28 in the Shohimardonsoy basin [8].

One of these lakes is Qurbonko‘l, which administratively belongs to the Qadamjoy district of the Batken region in the Kyrgyz Republic. According to the prominent scholar H. Hasanov, Qurbonko‘l was originally called Xubbonko‘l and was referred to as “Xubbi,” a water deity, in pre-Islamic times [12]. The annual precipitation in the basin ranges from 400 to 700 mm. Sometimes during the hot season, cold air masses entering the area are blocked by mountain ranges, leading to a drop in temperature and hail precipitation. In some cases, such precipitation causes severe flash floods.

The water level in Qurbonko‘l begins to rise in May and reaches its maximum in June–July. At this time, water begins to seep through the upper part of the dam, specifically at the depth formed on the III generation of the dam, creating what locals call the “third lake.” This phenomenon was observed in June–July of 1964, 1987, 1988, and 1998. R. Pirnazarov considers the formation of a new lake on the dam as a “specific warning of nature” and emphasizes that the risk of dam failure or overflow is most likely in June–July [10]. If the Qurbonko‘l dam fails, the 3.5 million m³ of accumulated water could first damage recreational facilities in the Shohimardonsoy basin and additionally cause significant harm to villages in the lower part of the basin, such as Shohimardon, Oqqiya, Qumbuloq, and Langar, as well as major population centers including Qadamjoy, Vodil, Chimyon, Oltiariq, Fayzobod, Margilan, and Fergana.

Based on the above, hydrologists suggest conducting studies on lakes in the periphery of the valley as separate research objects, assessing their condition through a comprehensive study of the region’s natural conditions and

hydrometeorological regime, and carrying out continuous monitoring [6, 10]. At the end of the 19th and the beginning of the 20th centuries, such issues were rationally addressed by our ancestors based on centuries of phenological observations, and the water bodies were “monitored” in their own unique ways. Religious and legal customs, as well as traditions and rituals, were widely used to protect nature, predict adverse changes, and prevent potential hazards.

Every people has its own traditions and unique customs. In the scientific literature, a tradition is defined as “a means of transmitting the accumulated experience of ancestors to future generations,” while a custom consists of “rules, norms, and rituals accepted by the entire community as a tradition” [13, pp. 32, 416]. Traditions and customs reflect the culture of a particular people, perfectly adapted to their “native landscape,” and they evolve as society develops: some disappear over time, while new ones emerge. Those traditions and customs that have a strong geographical basis are preserved over centuries and passed down from generation to generation.

Throughout historical development, in the Fergana Valley, traditions and customs have formed to ensure the rational use of water resources, including practices such as careful water conservation, rotational water use, respecting the water needs of neighboring peoples, and conducting economic activities in accordance with the direction and regime of flowing waters. Shrines and sacred sites have played a particularly important role in preserving these traditions and passing them down from generation to generation. According to statistical data, there are more than a thousand shrines in the valley, most of which are located in water basins [2, 4]. Ethnographer R.Y. Rassudova notes that in the valley, shrines can be found from the sources of rivers to their lower reaches, across areas with diverse natural and economic conditions (mountains, foothills, and plains). She classifies them into three groups based on their regional location:

1. Shrines located in the valley periphery;
2. Shrines situated on the upper parts of conical plateaus and at the heads of irrigation canals;
3. Shrines found at the lower reaches of canals, near springs and water sources.

Seven shrines located near the sources of rivers flowing from the periphery into the valley—Kogart, Karadaryo, Oqboyra, Aravon, Isfayram, Shohimardon, and Sokh—are included in the first group (Jalalabad, Osh, Kampirravot, Duldulota, Qadamjoy, Shohimardon, and Yigitpirim). The valley’s population considered it necessary for a person to visit these shrines at least seven times during their lifetime. Shrines located on the upper parts of the conical plateaus were traditionally visited by the valley population every spring, as it was believed that only then would water abundance and prosperous harvests occur in that year. The third group consists of shrines located in the lowest parts of the water basins—so-called “dayrovod” or “qoradayrovod” (riverbanks) and “xokob” (water-rich soil) areas [11].

According to Y.Ahmadaliyev, the Fergana Valley is divided into four ethnolandscape regions, comprising 17 ethno-ecological districts, based on

landscape, ethnic, economic, and other characteristics. It is noted that in almost every ethnolandscape region, separate ethno-ecological districts have formed along river basins from upper to lower reaches, each performing distinct ecological functions and having its own center and sacred sites [4]. Notably, more than 80% of these sacred places are located in the mountainous areas of river basins where water accumulates. One such sacred site is the Shohimardon shrine.

Shohimardon is a settlement located in the upper part of the Shohimardonsoy basin, with more than ten sacred sites in the village and its surrounding areas. Russian scholars describe Shohimardon as "the most sacred place in the Kokand Khanate" according to A.P. Fedchenko, and as "the patron protecting Fergana from calamities" according to L. Kostenko. N. Abdulahadov and T. G'oziyev note that "at the beginning of the 20th century, more than 15,000 pilgrims visited Shohimardon annually in July and August" [3, p. 320].

Pilgrims offered sacrifices to Hazrat Ali at water sources, particularly at the confluence of the Koksuv and Oqsuv rivers and along Qurbonko'l. Each participant in the ritual first prayed for abundant water that year, divine protection from water-related disasters, and for good harvests and prosperity, before making other personal wishes [11].

It is worth noting that although there is no historical evidence of Hazrat Ali visiting Central Asia, local traditions mention places such as "the spot where Hazrat Ali's foot touched Qadamjoy." Legends frequently feature rivers, describing how Hazrat Ali blocked overflowing rivers, joined two rivers to bring water to arid lands, and cut through mountains with his sword to create lakes. V.L. Ogudin reports that there are 18 natural monuments in the valley associated with the name of Hazrat Ali [9].

One of the pilgrimage practices in Shohimardon involves visiting Qurbonko'l, located 7 km southeast of the village at an altitude of 1,738 meters above sea level, along with sacred sites on the way such as the Oqsuv shrine, Beshpanja, and Oltinbeshik. While ascending to the lake along mountain paths and rocky trails, pilgrims express their sincere wishes to the trees and shrubs near the lake and tie pieces of cloth called "alam" (from the Arabic *alāmat*, meaning "sign" or "symbol"). Tying alam is one of the main rituals at sacred pilgrimage sites and is still practiced in many Eastern countries, including India, Pakistan, Iran, and others.

Qurbonko'l was formed as a result of a massive landslide in the Ko'ksuv tributary valley of Shohimardonsoy following a strong earthquake. Water flowing through the collapsed natural dam emerges as springs over a stretch of 80–100 meters at a distance of 900–1,100 meters from the lake, and their confluence forms the Ko'ksuv River anew. Locals explain the lake's formation and the re-creation of the Ko'ksuv River as follows: "Hazrat Ali, with his Zulfiqar sword, cut through the mountain to form the lake, and as soon as he struck with his five fingers to allow water to flow, eighteen irrigation channels began to carry the water" [6]. On the eastern side of Qurbonko'l, there is a steep cliff with a cave considered a sacred site called Oltinbeshik. According to legend, Hazrat Ali's golden cradle once swung there.

From an ecological-geographical perspective, these traditions can be understood as unique religious-ecological methods for “monitoring” Qurbonko‘l. Considering that the full water period of Shohimardonsoy occurs in June, and that the risk of the Qurbonko‘l dam breaking or water overflowing also falls in June–July, it is no coincidence that locals primarily undertake pilgrimages in June–August. Sacred sites in the lake area, such as the Oqsuv shrine, Beshpanja, and Oltinbeshik, effectively served as “observation posts” for this purpose.

Through the Beshpanja shrine, people observed how water would flow from under the dam and reform the Ko‘ksuv River, and by ascending to the Oltinbeshik cave, they monitored erosion phenomena on the northern and southern slopes of the Qurbonko‘l basin, as well as water seeping into the dam-created depression to form the so-called “third lake.”

We believe that tying alam served the following functions in monitoring changes:

1. Marking the path for future visitors: Pilgrims left visible markers for those who came after them. In certain periods, trails to the lake could be washed away by hail or floods, and the cloth pieces on shrubs served as orientation markers. Religious and spiritual rituals ensured that these cloths were periodically renewed and protected from being lost under varying weather conditions.

2. Protecting vegetation: Shrubs and trees where alam were tied were considered sacred, so people avoided damaging them, which helped maintain the stability of the slopes.

3. Observing water level changes: By tying alam to trees and shrubs around the lake, pilgrims effectively monitored changes in the lake’s water regime.

These religious-legal practices not only cultivated the ability to follow existing norms and customs but also motivated people to adhere to them. This encouraged all individuals, regardless of age, gender, or social background, to participate in lake pilgrimages. The participation of elders further ensured the continuity of this tradition for subsequent generations.

In summary, until the late 19th and early 20th centuries, efforts in the Fergana Valley were focused on minimizing exploitation of river catchment areas and preserving the natural landscape. The upper parts of rivers were protected as sacred pilgrimage sites. Agricultural activities and any actions that could harm the local flora and fauna were prohibited within these sacred areas. Each river was treated as a distinct natural system, and a unified socio-economic system developed along its course from source to mouth. Religious-ecological methods were developed for “monitoring” water bodies, including Qurbonko‘l, in a unique way. Through such prudent practices, our ancestors maintained ecological balance over centuries, timely detecting and preventing negative changes in nature.

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IMPROVING THE METHODOLOGY FOR DEVELOPING DESIGN-ENGINEERING COMPETENCE OF FUTURE ENGINEERS THROUGH AUTOMATED DIGITAL SOFTWARE

Abstract. *This article examines the pedagogical and technological foundations for developing the design-engineering competence of future mechanical engineering specialists through automated digital software. It analyzes the necessity of integrating CAD/CAM/CAE systems into engineering education, the relevance of qualification requirements for the “Mechanical Engineering Technology, Equipment and Automation” field, and the structural characteristics of design-engineering competence as part of professional competence. figures, and a formalized competence-development function.*

Keywords: *automated digital software, CAD/CAM/CAE, engineering education, design-engineering competence, professional skills development, digital methodology.*

Introduction. Rapid technological progress in Industry 4.0 and widespread digital transformation demand that future engineers possess strong design-engineering competencies. Modern enterprises increasingly rely on automated digital tools—including CAD (Computer-Aided Design), CAM (Computer-Aided Manufacturing), CAE (Computer-Aided Engineering), PLM (Product Lifecycle Management), and simulation platforms—to accelerate production cycles, reduce design errors, enhance product quality, and improve decision-making accuracy [1].

The Need for Automated Digital Software in Engineering Education. Automated digital software (ADS) supports all stages of the engineering workflow—concept design, modeling, simulation, verification, and documentation. The integration of ADS into educational practice is essential for several reasons:

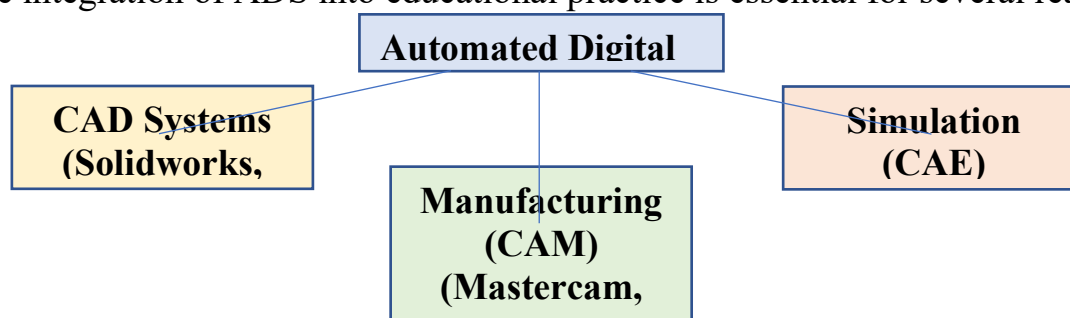


Figure 1. Role of Automated Digital Software (Conceptual Diagram)

Key pedagogical advantages:

- Enhances visualization of complex engineering objects
- Develops spatial thinking and 3D-modeling skills
- Increases accuracy and reduces human-based design errors

- Allows students to experience real industrial workflows

Table 1

Comparison of Traditional and Automated Approaches in Engineering Education

Criteria	Traditional Method	Automated Digital Method
Design speed	Low	Very high
Error detection	Manual, time-consuming	Automated, intelligent
Visualization	2D drawings	Realistic 3D/AR/VR
Integration with industry	Weak	Strong and seamless
Required competence level	Medium	High (digital literacy + engineering)

Competence-Development Function

To mathematically describe the competence development process, the following simplified function is proposed:

$$C_{dev} = f(D_s, P_t, S_m, A_i)$$

where: D_s – digital software proficiency;

P_t – project based training intensity;

S_m – simulation and modeling skills;

A_i – academic-industrial integration.

Competence increases when these our parametres grow harmoniously.

Qualification Requirements and Their Role in Developing Design-Engineering Competence. The curriculum of the “Mechanical Engineering Technology, Equipment and Automation” program emphasizes:

- Product design and modeling
- Engineering graphics
- Machine components and mechanisms
- Production automation
- Manufacturing process simulation
- Mechatronics and robotics
- Digital engineering technologies
- PLC Programming and Industrial Automation Control Systems
- Robotic Systems Design and Kinematics
- Product Lifecycle Management (PLM)

Design-engineering competence (DEC) represents a complex, multidimensional construct that forms one of the core elements of the professional competence of future engineers. This competence reflects the graduate’s ability to independently design, model, analyze, optimize, and justify engineering solutions using modern digital tools and methodological approaches. In essence, DEC ensures that the future mechanical engineer is capable not only of understanding theoretical principles but also of transforming these principles into practical, innovative, and technically sound product designs [2,3].

From a structural point of view, design-engineering competence incorporates several interrelated components. The **cognitive component** includes the student's theoretical knowledge of machine design, engineering materials, engineering

graphics, and digital modeling principles [4]. It enables the learner to understand the fundamental laws of mechanics, design logic, engineering analysis, and the technological structure of machine elements. This knowledge base forms the foundation upon which practical engineering decisions are built [5].

Moreover, the cognitive component ensures that students can **interpret engineering documentation**, understand **state and international standards**, and apply **calculation methodologies** necessary for solving complex design problems. Mastery of these theoretical foundations allows learners to effectively integrate scientific principles into practice, foresee potential design errors, and select optimal structural and technological solutions.

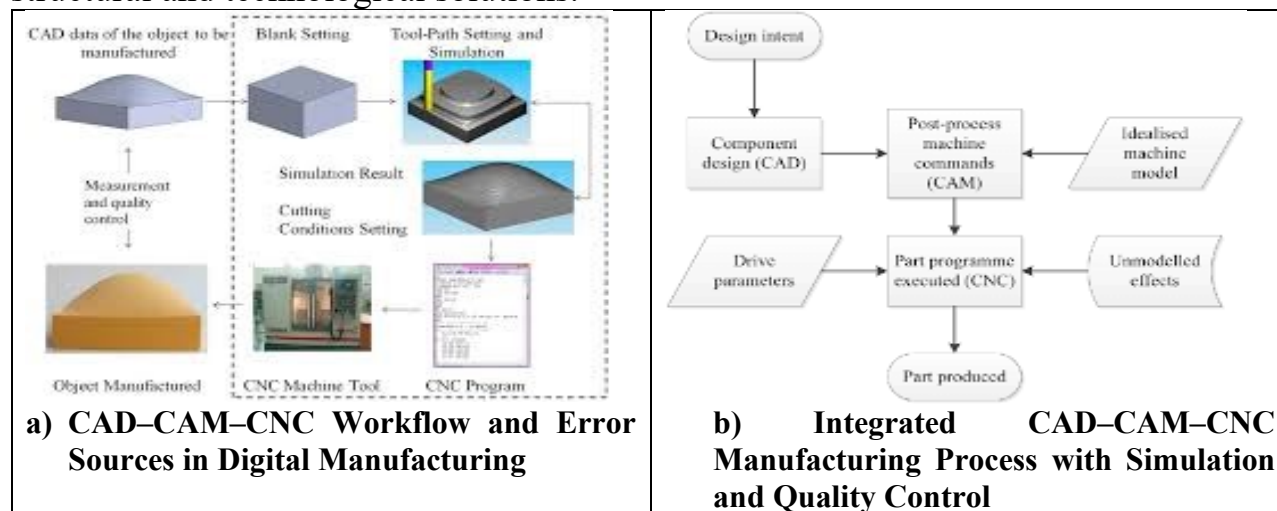


Figure a. CAD–CAM–CNC Workflow and Error Sources in Digital Manufacturing. This diagram illustrates the overall digital manufacturing workflow starting from the *design intent* and ending with the *produced part*. The process begins with Component Design (CAD), where the geometry and technical specifications of the part are created. This digital model is then converted into post-processed machine commands through CAM software, which generates toolpaths based on an *idealized machine model*.

Figure b. Integrated CAD–CAM–CNC Manufacturing Process with Simulation and Quality Control. This figure shows a detailed sequence of how a 3D model is transformed from a digital concept into a manufactured physical object. The process starts with CAD data of the object to be manufactured, where geometry is defined. A raw material block (blank) is prepared, followed by tool-path setting and simulation using CAM software.

The creativity and innovation component reflects the student's ability to generate new engineering ideas, propose unconventional design solutions, and apply modern technological trends in product development. It stimulates innovative thinking, enhances design originality, and supports the integration of advanced engineering approaches such as additive manufacturing, digital twins, generative design, and Industry 4.0 technologies [7,8].

Finally, the professional–personal component integrates qualities such as responsibility, accuracy, teamwork ability, engineering ethics, digital culture, and self-development skills. These attributes ensure that a future engineer can work effectively in multidisciplinary teams, communicate clearly, follow engineering standards, and demonstrate professional behavior that meets industry expectations [9].

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HYPERTENSION IN PREGNANT WOMEN: A STUDY CONDUCTED AT THE SAMSMU CLINIC

Abstract: Hypertension during pregnancy is a significant health issue, posing risks to both the mother and fetus. This study aims to evaluate the prevalence, clinical features, and management of hypertension in pregnant women treated at the Samarkand State Medical University 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.

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HOMILADOR AYOLLARDA GIPERTENSIYA: SAMSMU KLINIKASIDA O'TKAZILGAN TADQIQOT

Annotatsiya: Homiladorlik davrida yuzaga keladigan gipertenziya sog'liq uchun jiddiy muammo bo'lib, ona va homila uchun xavf tug'diradi. Ushbu tadqiqotning maqsadi — Samarqand Davlat Tibbiyot Universiteti klinikasida davolangan homilador ayollarda gipertenziya holatlarining uchrash tezligi, klinik xususiyatlari va davolash usullarini baholashdir. Retrospektiv ma'lumotlar tahlili orqali bemorlarning demografik ko'rsatkichlari, qon bosimi o'zgarishlari, davolash yondashuvlari va homiladorlik natijalari o'rganildi. Tadqiqot natijalari asoratlarni kamaytirish uchun erta diagnostika va individual yondashuvning muhimligini ta'kidlaydi.

Kalit so'zlar: gipertoniya, homiladorlik, preeklampsiya, gestatsion gipertoniya, onalik salomatligi

Introduction

Hypertension during pregnancy remains one of the leading causes of maternal and perinatal morbidity and mortality worldwide. Elevated blood pressure in pregnant women can manifest as chronic hypertension, gestational hypertension, or complicated preeclampsia — a condition characterized not only by high blood pressure but also by dysfunctions of organs such as the kidneys and liver. These

conditions significantly increase the risk of serious complications, including premature birth, fetal growth restriction, placental insufficiency, and even fatal outcomes for both mother and child. Modern medicine pays special attention to the timely detection and effective treatment of hypertensive conditions in pregnant women, as the well-being of both mother and fetus depends on it. Despite advances in diagnostic and therapeutic technologies, hypertension remains a serious problem requiring a comprehensive approach to the management of pregnant women. At the Samarkand State Medical University clinic, regular monitoring and treatment of pregnant women with hypertension are conducted, allowing for the study of disease progression features and the effectiveness of therapeutic approaches. This study analyzes the clinical characteristics, treatment methods, and pregnancy outcomes in patients with various forms of hypertension.

Research Objective:

To study the characteristics of hypertension in pregnant women diagnosed and treated at the SamGMU clinic, and to evaluate the effectiveness of the diagnostic and treatment methods used. To assess the prevalence and types of hypertension in pregnant women at the SamGMU clinic. To study clinical manifestations and risk factors. To analyze treatment methods and their impact on pregnancy outcomes. The study was conducted at the clinic of Samarkand State Medical University from January 2025 to June 2025. Forty-five pregnant women diagnosed with hypertension were examined.

Inclusion Criteria:

- Pregnant women with arterial blood pressure $\geq 140/90$ mmHg
- Age from 18 to 45 years
- Confirmed diagnosis of chronic or gestational hypertension

Methods:

- Medical history collection and clinical examination
- Regular monitoring of blood pressure
- Laboratory tests (complete blood count, urine analysis, biochemistry)
- Fetal ultrasound and Doppler assessment of placental vessels
- Statistical analysis using SPSS

Results:

Out of 45 examined patients:

Type of Hypertension	Number (n)	Percentage (%)
Gestational	26	57.8
Chronic	12	26.7
Preeclampsia	7	15.5

Average age of patients: **32.1 ± 4.5 years**

Frequency of Pregnancy Complications (%)

Complications	Chronic (%)	Gestational (%)	Preeclampsia (%)
Preterm Births	8.3	7.7	21.4
Fetal Growth Restriction	4.2	3.8	14.3
Fetal Death	0	0	7.1

Treatment: Antihypertensive Drugs.

Drug	Usage Frequency (%)	Effectiveness (%)	Side Effects (%)
Methyldopa	62	87	9
Labetalol	29	89	7
Nifedipine	9	78	4

Discussion

The study results confirm that gestational hypertension remains the most common form of hypertensive disorders in pregnant women — 57.8%. The proportion of chronic hypertension is 26.7%, and preeclampsia is 15.5%, reflecting the severity of this complication associated with the highest risk of perinatal complications.

The frequency of complications in patients with preeclampsia was significantly higher, especially in terms of preterm births and fetal growth restriction, which corresponds to global trends and requires special attention in the management of such pregnancies. The use of modern antihypertensive drugs, such as methyldopa and labetalol, demonstrated high effectiveness and good tolerability, contributing to improved clinical outcomes.

These data emphasize the need for early detection and continuous monitoring of hypertensive conditions during pregnancy to reduce risks and improve maternal and child health.

Conclusion

The conducted study of hypertension in pregnant women at the SamSMU clinic involving 45 patients confirmed the high prevalence of gestational hypertension. Despite its lower frequency, preeclampsia remains a serious threat to the health of both mother and fetus, accompanied by a higher rate of complications such as preterm births and fetal growth restriction.

Early detection, regular blood pressure monitoring, and individually tailored antihypertensive therapy including drugs with good efficacy and tolerability allow for a significant reduction in the risks of adverse pregnancy outcomes.

The study data emphasize the importance of a comprehensive approach to managing pregnant women with hypertension to ensure a favorable course of pregnancy and the birth of a healthy child.

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FEATURES OF NEONATAL JAUNDICE AMONG NEWBORNS IN THE BUKHARA REGION

ABSTRACT: *This article studies and analyzes the condition of infants admitted to the Neonatology Department of the Bukhara Regional Children's Multidisciplinary Medical Center with a diagnosis of "Neonatal Jaundice" during January-June 2024-2025.*

Keywords: *neonatal jaundice, hyperbilirubinemia, newborns, risk factors, Bukhara region*

INTRODUCTION

Neonatal jaundice is a frequently encountered clinical condition characterized by elevated serum bilirubin levels and yellow discoloration of the skin and mucous membranes. Each year, approximately 1.1 million newborns worldwide are affected by hyperbilirubinemia, with over 20 million infants remaining at risk for complications.[1]

Although physiological jaundice accounts for up to 60–70% of neonatal jaundice cases, early identification of pathological forms is crucial due to the risk of bilirubin encephalopathy. Despite modern diagnostic capabilities, cases of kernicterus still occur, often related to delayed diagnosis or insufficient monitoring after early postnatal discharge.[2,3]

This study aims to assess the epidemiological characteristics, risk factors, and laboratory indicators of neonatal jaundice among newborns in the Bukhara region.

MATERIALS AND METHODS

A retrospective study was conducted based on the medical records of newborns diagnosed with neonatal jaundice and hospitalized in the Neonatology Department of the Bukhara Regional Multidisciplinary Medical Center from January to June 2024–2025.

A total of **96 newborns** were included and divided into two groups:

- **Group 1 (2024):** 34 newborns
- **Group 2 (2025):** 62 newborns

The analysis included demographic data, place of residence, gestational age, mode of delivery, maternal obstetric history, maternal comorbidities, and biochemical blood parameters (total, conjugated, and unconjugated bilirubin; ALT; AST).

RESULT: DEMOGRAPHIC CHARACTERISTICS

• **Sex distribution:** Group 1: 64.7% male, 35.3% female Group 2: 58% male, 42% female

• **Residence:** Group 1: 58.8% rural, 41.2% urban Group 2: 64.5% rural, 35.4% urban

• **Gestational age:** Term newborns predominated in both groups (91.1% and 79%, respectively).

Age at Admission: **Group 1: mean age 26.6 days (4–61) Group 2: mean age 31.4 days (4–65)**

The diseases that the mothers of babies with neonatal jaundice had during pregnancy were also analyzed.

The most common maternal comorbidities were:

Maternal Condition	Group 1 (%)	Group 2 (%)
Anemia	27.9%	42.8%
Acute respiratory infections	27.9%	12.5%
Pre-eclampsia	16.3%	4.5%
Pregnancy toxicosis	16.3%	22.3%
Diffuse goiter	4.6%	14.2%

The results of the analysis showed that anemia, acute respiratory diseases, pregnancy toxicosis and preeclampsia were more common in mothers of babies of group 1, while mothers of babies of group 2 had a higher percentage of diseases such as anemia, toxicosis of pregnancy, diffuse toothache, acute respiratory disease.

A weight category for infants has been developed. When the blood of infants with neonatal jaundice was biochemically collected (total bilirubin, conjugated and unconjugated bilirubin, ALT, AST), the following results were obtained.

Indicator	Group 1 (mean)	Group 2 (mean)
Total bilirubin (mmol/L)	185	187.8
Conjugated bilirubin (mmol/L)	28.5	25.6
Unconjugated bilirubin (mmol/L)	158	162.4
ALT (U/L)	36.2	32.4
AST (U/L)	48.5	48.8

Most infants demonstrated moderate hyperbilirubinemia.

DISCUSSION

The study revealed that neonatal jaundice was more common among male infants, consistent with global data. Rural populations exhibited higher hospitalization rates, likely related to reduced access to timely outpatient assessment.

Maternal anemia, pregnancy toxicosis, and thyroid disorders were significant risk factors, emphasizing the importance of maternal health optimization during pregnancy. Laboratory indicators showed predominantly moderate hyperbilirubinemia, suggesting that most cases were manageable with timely intervention.

CONCLUSION

1. Male newborns were more frequently affected by neonatal jaundice in the Bukhara region.
2. Maternal anemia, toxicosis, and diffuse goiter were identified as major contributing factors to neonatal jaundice.
3. Laboratory findings indicated moderate hyperbilirubinemia in the majority of cases.
4. Early diagnosis and appropriate management of perinatal complications are essential to prevent severe neonatal hyperbilirubinemia and neurological complications.

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HISTORICAL AND PROGRESSIVE DEVELOPMENT OF COMMUNICATION

Annotation: *This article analyzes the formation and stages of development of communication in the history of mankind. The historical foundations of the transmission of information through the first forms of communication - oral expression, cave paintings, symbols and writing are highlighted. Also, the transmission of cultural heritage, historical memory and social experience from generation to generation through the oral form of communication is shown as an important factor. The article highlights the educational, didactic and psychological aspects of pedagogical communication and their significance in the modern education system based on scientific and theoretical sources. At the same time, the role of "soft skills", in particular, the culture of communication, in personal and professional success is emphasized.*

Keywords: *Communication, oral speech, historical development, symbol, writing, cultural heritage, pedagogical communication, soft skills, didactics, communicative competence.*

The development of communication in human history is closely linked to the emergence of speech, which is believed to have begun around 100,000 BC. The use of signs and symbols in communication appeared about 30,000 years ago. Although the initial form of oral speech was imperfect, it was precisely this imperfection that made it possible to spread ideas easily and quickly. This, in turn, led to the emergence of new forms of communication, the expansion of information exchange, and the extension of the life of stored information.[1]

The earliest symbols created as a means of communication date back to the Upper Paleolithic era, where they appeared as cave paintings - the first form of rock art. It is known that one of the oldest cave paintings was found in the Chauvet Cave in France, and it dates back to about 30,000 BC. These images are distinguished by the fact that they were not only an aesthetic expression, but also a means of transmitting information. According to research, humanity may have created the first calendar system about 15,000 years ago.

The historical and semantic connection between drawing and writing has also been proven from a linguistic point of view. For example, in Ancient Egypt and Ancient Greece, the concepts of drawing and writing and the terms that express them had the same basis: in Egyptian, they were expressed by the verbs "s-sh" (to mark, write), and in Greek, "graphein" (to write, draw). This indicates the

inseparable connection between image and writing as early forms of communication.[2]

Oral communication is one of the earliest forms of human communication, and the tradition of oral storytelling dates back to ancient times. Oral expression has played an important role in transmitting human thoughts and experiences from generation to generation. The development of oral communication is closely related to historical processes, and it has been formed and enriched at different stages of human society.

Oral history is a method of collecting and preserving the direct testimonies of individuals and groups who have experienced past periods. Through this process, historical memory, cultural values, traditions, and social experience have been continuously transmitted between generations. [3] Oral communication, with its complexity, has always been shaped by the social, cultural, and historical circumstances of a particular period. It has never been limited to a specific field or type of activity, but has existed globally as a common tradition of communication of humanity and has retained its significance to this day. Oral communication has served not only as a means of interpersonal communication, but also as an important means of preserving and transmitting cultural heritage in societies. [4] In ancient times, people widely used oral forms of communication. In particular, they expressed their thoughts through poetry and singing. People shared spiritual experiences during collective gatherings by telling stories, legends, and historical events. This process paved the way for the widespread development of oral creativity.

In particular, the oral creators of the Indo-European cultural region, namely poets, were called "word-weavers" because of their ability to skillfully express oral speech. They played an important role in transmitting historical and cultural heritage to future generations by remembering events and expressing them in artistic form. [6] Nomadic peoples also had oral traditions, in which they told stories to pass on the history of their people to the next generation.

Oral communication has been one of the most natural and effective ways for people to convey their thoughts, historical memories, and cultural traditions to the general public. This form of communication has developed throughout human history not only as a means of communication, but also as an important form of preserving and transmitting social memory. Oral communication, rather than recording events using technical means, has served to express their echo in the human mind, that is, their memorable and spiritual interpretation.[7]

The fundamental changes taking place in various spheres of life in the modern world and the commonality of global problems are causing new approaches and fundamental issues in the education system. In particular, the need for lifelong learning for the development of individuals and society is increasing day by day (Nevdakh, 2015).

A number of scientific studies (Attila & Enikő, 2018; Volger et al., 2018; Cronin & Cronin, 1992) emphasize that employers value not only the "hard skills" acquired in higher education institutions, but also additional qualities formed

outside the university - "soft skills" such as responsibility, creativity, and communication culture.

Research conducted by Harvard University and the Stanford Research Institute shows that while technical (hard) skills account for only 15 percent of a person's professional success, the remaining 85 percent depends on "soft skills" (Madsen, 2018). This further reinforces the role of continuing education, especially adult education, as a means of developing not only knowledge, but also personal and social competencies.

A.N. Leontiev[8], defining the educational and didactic significance of pedagogical dialogue, interprets it as an integral and important component of the pedagogical process. In his opinion, active pedagogical dialogue is a means for the teacher and the pedagogical team as a whole to study students and understand their personal characteristics, and forms a favorable psychological and emotional environment for the creative nature of educational activities and the comprehensive development of the student's personality. It also prevents psychological barriers between the student and the teacher, plays an important role in coordinating socio-psychological relations in the children's team, and in the effective use of the teacher's pedagogical skills.

Communication in pedagogical activity is recognized not only as a means of implementing modern methods of imparting knowledge, but also as a means of effectively organizing the educational process in socio-pedagogical terms. Based on the analysis of advanced pedagogical experiences, in particular, the work of such famous thinkers as A.S. Makarenko [9] and V.A. Sukhomlinsky [10], it can be noted that communication between a teacher and a student plays a decisive role in pedagogical influence. Communication serves as the basis of pedagogical skills and plays an important role in increasing the effectiveness of the educational process.

Conclusion

In conclusion, communication is an integral and fundamental factor in the development of humanity, which initially began with symbols and oral speech, and later improved through writing and cultural forms of expression. Communication has served as a continuous transmission of human memory, historical heritage and social experience. Today, it is emerging not only in social life, but also in pedagogical activity as a key tool for educating students, increasing the effectiveness of the teacher and ensuring the effectiveness of education. In particular, the role of the culture of communication in the formation of personal and social competencies is incomparable.

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FOREIGN EXPERIENCE IN ENSURING THE FINANCIAL SUSTAINABILITY OF SMALL BUSINESS ENTITIES

Abstract. *The article examines advanced global approaches to strengthening the financial sustainability of small business entities in both developed and emerging economies. International practice demonstrates that small businesses act as a foundation for economic growth, innovation, and employment, and their long-term stability depends on diversified financing mechanisms, government support, and effective financial management strategies.*

Keywords: *financial sustainability, small business, SMEs, international experience, credit guarantees, venture capital, government support, risk management, entrepreneurship*

Introduction. The financial sustainability of small business entities has become a central priority for policymakers and economists across the world, as this sector plays a crucial role in forming a dynamic, innovative, and competitive economy. In most advanced and emerging countries, small and medium-sized enterprises (SMEs) constitute the overwhelming majority of registered businesses, provide the largest share of employment, and contribute significantly to national GDP growth. Their ability to remain resilient in the face of economic instability, financial shocks, supply chain disruptions, and tightening credit conditions largely determines the stability of the broader economic system. For this reason, leading global economies have developed targeted models and policy instruments to fortify the financial capacity of SMEs and support their long-term development ambitions.

Despite their strategic importance, small businesses are structurally more vulnerable than large corporations. They often lack sufficient internal capital reserves, possess limited collateral for obtaining long-term loans, and face higher borrowing costs due to perceived risks and information asymmetry in financial markets. Moreover, volatile business environments—characterized by digital transformation, geopolitical pressures, and global market competition—demand quicker adaptation and greater investment in technology, workforce training, and modernization. In countries where the institutional framework remains underdeveloped, SMEs frequently struggle to access equity financing, innovation grants, export credits, and financial consulting services. As a result, their growth potential is restricted, and many remain confined to low-productivity segments of the market. A comparative analysis of international best practices shows that foreign governments adopt a proactive economic strategy to enhance SME financial sustainability by creating a supportive business ecosystem. This includes national credit guarantee schemes, state-backed development banks, venture capital

promotion, tax incentives, simplified financial reporting, and export support programs. In addition, the digitalization of financial services—such as fintech platforms, alternative lending tools, and crowdfunding—has opened new opportunities for SMEs to secure quick and flexible financing without traditional banking barriers. Countries like the United States, Germany, South Korea, and Singapore demonstrate how the combination of financial policy reforms, innovative financial instruments, and entrepreneurial education fosters a competitive and resilient SME sector. Studying foreign experience in ensuring the financial stability of small enterprises is especially relevant in the context of modern economic transformation. Continuous global shocks, such as the COVID-19 pandemic and energy price fluctuations, have shown that only those economies with an adaptable and financially empowered SME sector are capable of achieving sustainable recovery and stable growth dynamics. Therefore, analyzing successful foreign strategies and identifying their transferable elements are essential tasks for countries striving to build a strong private sector, diversify their economy, and reduce dependency on large industrial enterprises.

This article aims to explore the most effective tools and mechanisms used internationally to support the financial sustainability of small business entities. By examining the approaches of leading economies, the study provides insights that may guide the development of national policy frameworks, enhance financial inclusion, and stimulate innovative entrepreneurship. Ultimately, foreign experience offers valuable lessons on how comprehensive, well-structured support can transform small business from a vulnerable sector into a powerful driver of economic competitiveness and societal welfare.

Methodology. The study is based on a comparative analysis of foreign policy frameworks and financial instruments aimed at strengthening the sustainability of small business entities. A qualitative research approach is applied, using academic literature, policy reports, statistical data from international organizations, and case studies of successful SME support programs. The research employs systemic analysis and cross-country benchmarking to identify key factors of financial sustainability, including access to financing, risk management, and institutional support. Special attention is given to the balance between market mechanisms and state intervention, as well as to the effectiveness of public–private cooperation. The analysis also considers policy responses during global crises, including the COVID-19 pandemic, in order to assess the adaptability of financial support measures and identify best practices applicable to different national contexts.

Research Results indicate that foreign experience in ensuring the financial sustainability of SMEs is most effective when diverse financial instruments are integrated into a cohesive ecosystem. In the United States, government-guaranteed lending has proven to be one of the strongest tools in mitigating credit risks for small enterprises. The operations of the Small Business Administration (SBA) demonstrate that partial loan guarantees can significantly expand the willingness of commercial banks to finance young and high-potential firms. Moreover, the U.S. model incorporates venture capital development and innovation-driven tax

mechanisms, which increase internal investment capabilities and foster technological progress among SMEs. In the European Union, the combination of structural funds, digital financing channels, and enterprise advisory services has reinforced SMEs' financial resilience. The European Investment Fund (EIF) plays a central role by mobilizing private capital toward high-innovation and sustainability-oriented business sectors. EU member states emphasize financial transparency, export promotion, and strong investor protection, which collectively enhance the financial credibility and competitiveness of small firms in the global market.

Results from advanced Asian economies demonstrate the importance of targeted industrial financing and innovation acceleration. South Korea, for instance, implements life-cycle financing: start-ups receive grants and concessional loans in early stages, followed by equity investments and export support during commercialization. Singapore's SME development strategy highlights digital transformation, with subsidies for adopting fintech tools, automation, and supply-chain financing solutions. These interventions significantly improve liquidity, reduce operational costs, and expand SMEs' international market presence. The study also reveals that financial education and professional advisory support are essential components of sustainability. Foreign governments actively sponsor programs that strengthen managerial competencies, budgeting discipline, and long-term investment planning. Countries with a well-structured consulting infrastructure report lower bankruptcy rates and higher innovation output among their small firms.

A universal trend observed across global case studies is the increasing reliance on digital finance technologies. Crowdfunding, peer-to-peer lending, digital credit scoring, and mobile-based financial management platforms reduce transaction costs and broaden financial inclusion. This digital shift has become a strategic catalyst for resilience, enabling SMEs to rapidly secure working capital and respond effectively to external shocks. Overall, the results confirm that foreign experience demonstrates a multi-layered approach: financial sustainability is not only about providing funds but also about creating an enabling environment that empowers SMEs to thrive in competitive and uncertain economic landscapes.

Discussion. The analysis of foreign experience reveals that the financial sustainability of small business entities cannot be ensured by a single policy tool or isolated financial intervention. Rather, it is achieved through the interaction of a comprehensive institutional structure, an innovative financial system, and a supportive business environment. Countries that demonstrate the highest resilience of SMEs are those that continuously refine their policy frameworks to reflect global economic dynamics, market competition, and technological shifts. This raises a fundamental point for developing economies: the success of foreign strategies lies not only in financial support itself but in their strategic design and the adaptability of government institutions.

The global patterns discussed in this study illustrate that ensuring SME sustainability requires reducing financing barriers while promoting responsible economic behavior. Governments in developed countries operate on the principle

that state involvement should complement market forces without replacing them. This balanced governance model underlines the importance of improving credit infrastructure — including collateral registries, credit information systems, and guarantee funds — which minimize information asymmetry and facilitate more favorable lending conditions. Weaknesses in any of these elements predictably result in fragmented support and persistent dependency on government subsidies instead of genuine financial stability.

Another critical discussion point is the evolving role of technology in shaping SME financial resilience. In advanced economies, digitalization has emerged as an equalizing force that enables small enterprises to gain faster access to financial services previously available only to large firms. Digital scoring technologies reduce subjective decision-making in credit evaluation, while alternative financial platforms expand the range of instruments available to entrepreneurs. However, adopting such technologies requires sufficient digital literacy, cybersecurity measures, and legal protection frameworks, highlighting that technology alone cannot guarantee financial sustainability. Countries lacking technological infrastructure must prioritize capacity building to avoid deepening inequalities between digitally empowered and underserved entrepreneurs. Foreign experience also underscores the significance of innovation-oriented financing. SMEs tend to be more agile and creative but traditionally face difficulties accessing capital due to the high risk and intangible nature of innovation. Therefore, targeted interventions such as venture capital incentives, incubators, and technology commercialization programs are vital. The case of South Korea demonstrates that when innovation policies and financial tools function in synergy, the result is not only increased competitiveness of small businesses but also national technological advancement. This suggests that countries aiming to develop knowledge-based economies must move beyond traditional bank lending and embrace hybrid financing models tailored to innovation-driven SMEs. Moreover, a recurring theme across successful economies is the strategic focus on export readiness. Small firms that integrate into global value chains achieve higher growth rates, accumulate foreign currency earnings, and diversify financial risks. Export insurance mechanisms, foreign trade financing, and diplomacy-driven market access initiatives provide SMEs with stability against regional market slowdowns. European and Asian experiences confirm that export promotion is a powerful determinant of financial resilience, transforming SMEs from domestic-dependent entities into internationally competitive players.

A notable insight from foreign experience is the role of managerial competence in determining the ultimate success of financial interventions. Even when adequate financing is available, SMEs may misuse funds or fail to anticipate market threats due to limited accounting skills, budgeting capabilities, and strategic planning. Therefore, governments have incorporated financial literacy programs, consultancy services, and mentorship networks into their SME development strategies. This approach reflects a deeper understanding — the sustainability of a business is fundamentally linked to the skills and foresight of the entrepreneur.

Countries that ignore managerial education often face high SME failure rates, despite substantial financial assistance programs. Global crises such as the 2008 financial crash and the COVID-19 pandemic provide an empirical testing environment for the effectiveness of these systems. Economies with strong SME support mechanisms demonstrated faster recovery due to the resilience built prior to crises. Emergency financing packages, tax deferrals, and wage subsidies prevented mass bankruptcies; however, recovery was strongest where pre-existing financial literacy, technological readiness, and risk-management infrastructures were already in place. This reinforces the argument that financial sustainability must be developed systematically before crisis conditions emerge, not as a reactive measure.

Collectively, the global experience shows that financially resilient SMEs are not merely beneficiaries of state assistance — they are long-term partners in national development. Strengthening them requires vision, consistent reforms, and a deep understanding of modern economic challenges.

Conclusion. The study of foreign experience in ensuring the financial sustainability of small business entities highlights the fundamental importance of comprehensive, well-coordinated support systems designed to enhance resilience, innovation, and long-term development. Small enterprises constitute the backbone of modern economies, generating employment, stimulating regional growth, and driving technological progress. Therefore, their ability to withstand financial shocks and operate competitively in global markets must remain a strategic national priority.

The research findings demonstrate that the most successful economies — including the United States, Germany, South Korea, and Singapore — adopt a multi-layered approach combining credit guarantees, venture capital development, export promotion, digital finance integration, and targeted advisory services. These mechanisms work not only to reduce financing constraints, but also to strengthen managerial capacity, improve transparency, and promote efficient risk management practices. Additionally, the digitalization of financial processes has significantly improved accessibility, speed, and inclusion, making it possible for SMEs to secure capital more independently and strategically than ever before. Global crises have further proven that financial sustainability must be proactively developed, not merely restored during emergency situations. Countries with established SME support ecosystems recovered faster, demonstrating that sustainable growth is a result of foresight, structural reforms, and ongoing institutional innovation. The lessons drawn from foreign models underscore the need for countries in transition to adopt a strategic, context-adapted framework that harmonizes government support with market mechanisms and entrepreneurial initiative. Ultimately, financial sustainability is not solely determined by the volume of financial resources available, but by the quality of institutional coordination, financial literacy, and innovative capacity within the SME sector. By studying and selectively adapting leading international practices, countries can unlock the full potential of small businesses as key drivers of economic diversification, global competitiveness, and

societal welfare. Strengthening this sector means investing in the future of the national economy.

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COMPARATIVE ANALYSIS OF LINGUISTIC EXPERTISE IN THE ENGLISH AND UZBEK LANGUAGES: PRINCIPLES, METHODS, AND APPLICATION AREAS

Abstract: *This study investigates the principles, methodological approaches, and application domains of linguistic expertise in English and Uzbek. The research highlights theoretical foundations of linguistic analysis, including structural, semantic, and pragmatic components, and evaluates their relevance in forensic linguistics, authorship attribution, and discourse assessment. Through comparative analysis, the study reveals key similarities and differences between the two languages in expert evaluation practices. The findings demonstrate that English linguistic expertise relies heavily on established forensic methodologies and corpus-based analysis, while Uzbek linguistic expertise is still developing its standardized procedures. Recommendations are provided to improve methodological consistency and increase the reliability of linguistic examinations in both languages.*

Key words: *linguistic expertise, forensic linguistics, authorship attribution, English language, Uzbek language, discourse analysis, comparative linguistics.*

Introduction. Linguistic expertise has become an essential component of modern legal, social, and communicative processes. It provides analytical tools for evaluating texts, identifying authorship, interpreting speech acts, and detecting manipulative or harmful discourse¹³. In global practice, particularly in English speaking countries, forensic linguistics has developed a systematic framework supported by extensive corpora, computational methods, and institutionalized standards¹⁴. In Uzbekistan, linguistic expertise has gained significance in recent decades due to the rising demand for legal-linguistic evaluations, media monitoring, and authorship verification¹⁵ (Solijonov, 2020; Tursunova & Rakhimova, 2021). However, the methodological foundations and standardized protocols remain in progress. This study aims to conduct a comparative analysis of linguistic expertise in the English and Uzbek languages, focusing on theoretical principles, methodological approaches, and practical applications. The goal is to identify the

¹³ Gibbons, J. (2003). *Forensic Linguistics: An Introduction to Language in the Justice System*. Blackwell Publishing (Language in Society, vol. 32). <https://www.wiley-vch.de/de/fachgebiete/geistes-und>.

¹⁴ Olsson, J. (2008). *Forensic Linguistics* (2nd ed.). Continuum International Publishing

¹⁵ Solijonov, S. (2020). Tilshunoslik ekspertizasi va uning zamonaviy ko'rinishlari. O'zbek tilshunosligi jurnali, 4(2), 55–63.

strengths and limitations present in each linguistic environment and propose recommendations for enhancing expert evaluation.

Methods. This research employs a qualitative comparative methodology consisting of the following components:

Theoretical analysis: Examination of existing scholarly literature on linguistic expertise, forensic linguistics, and text evaluation practices in English and Uzbek¹⁶.

Comparative structural analysis: Comparison of phonological, morphological, syntactic, and pragmatic features of both languages relevant to expert assessment¹⁷.

Case review method: Analysis of selected examples from legal, journalistic, and academic texts pending linguistic examination¹⁸ (Shuy, 2005).

Descriptive analytical method: Interpretation of linguistic markers, discourse features, authorship indicators, and ambiguity patterns.

No experimental procedures were involved; instead, the study relies on systematic observation, textual comparison, and theoretical synthesis.

Results.

1. Principles of Linguistic Expertise in English and Uzbek

English: Guided by established forensic linguistic frameworks emphasizing corpus-based evidence, probabilistic reasoning, and pragmatic interpretation. Uzbek: Principles are emerging and largely based on general linguistic theory, with limited specialized forensic guidelines.

2. Methodological Differences

English linguistic expertise relies on: large digital corpora¹⁹, stylometric tools for authorship attribution²⁰, detailed discourse-pragmatic models, legal precedents shaping expert responsibilities.

Uzbek linguistic expertise often uses: manual linguistic analysis, semantic interpretation, morphological examination, fewer computational tools due to limited corpus resources²¹.

3. Application Areas

The study identifies three main domains where linguistic expertise plays a central role in both languages:

a. Forensic Linguistics Used to determine authorship, resolve meaning disputes, analyze threats, and evaluate defamatory statements.

English: well-developed case law.

Uzbek: increasing use in court investigations and media regulation b. Authorship Attribution

¹⁶ Coulthard, M., & Johnson, A. (2010). *An Introduction to Forensic Linguistics: Language in Evidence* (2nd ed.). Routledge.

¹⁷ Fillmore, C. J., Kay, P., & O'Connor, M. C. (1988). Regularity and idiomaticity in grammatical constructions: The case of let alone. *Language*.

¹⁸ Shuy, R. W. (2005). *Creating Language Crimes: How Law Enforcement Uses (and Misuses) Language*. Oxford University Press.

¹⁹ Sinclair, J. (1991). *Corpus, Concordance, Collocation*. Oxford University Press.

²⁰ Tiersma, P. M., & Solan, L. (2012). *The Oxford Handbook of Language and Law*. Oxford University.

English uses stylometry, vocabulary richness measures, and syntactic patterns.

Uzbek relies mainly on qualitative analysis of style and lexical markers .

Discourse and Text Evaluation

Both languages use linguistic expertise for: identification of extremist or harmful language, political and media discourse analysis, clarity and coherence assessment of official texts.

4. Key Comparative Findings

English linguistic expertise is more standardized, diverse, and technology driven.

Uzbek linguistic expertise is growing rapidly but lacks unified frameworks and corpus-based tools .

Both languages share similar goals and theoretical foundations but differ in practical implementation .

Discussion

The comparative findings reveal that the divergence between English and Uzbek linguistic expertise stems largely from differences in research traditions, technological access, and legal infrastructure. English speaking countries benefit from decades of scholarly development, institutional support, and digital linguistic resources . Meanwhile, Uzbekistan faces challenges in building corpora, training forensic linguists, and standardizing expert procedures . Nevertheless, significant progress is being made, particularly in legal linguistic expertise and media discourse analysis . To strengthen linguistic expertise in both contexts, three strategies are recommended: Developing multilingual corpora for Uzbek to support quantitative approaches . Integrating computational linguistics, including machine learning tools for text analysis . Establishing standardized methodological guidelines for court-oriented linguistic evaluations . Such improvements would enhance objectivity, reduce subjectivity in expert assessments, and align Uzbek linguistic expertise with international best practices.

Conclusion. This study demonstrates that linguistic expertise in English and Uzbek shares foundational principles but differs significantly in methodological depth and technological integration English linguistic expertise is characterized by corpus based methods, advanced forensic tools, and institutionalized standards, where as Uzbek expertise remains primarily qualitative and theory driven. The comparative insights emphasize the need for methodological modernization, resource development, and interdisciplinary collaboration to advance linguistic expertise in Uzbekistan. Enhancing these areas will contribute to more accurate, reliable, and globally aligned linguistic expert practices.

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THE COGNITIVE AND CULTURAL SIGNIFICANCE OF DIVERSE LITERARY GENRES IN THE EDUCATIONAL PROCESS

Abstract: *This study explores the multidimensional cognitive and cultural significance of diverse literary genres within the educational process. It synthesizes existing literature to demonstrate how engagement with various literary forms such as fiction, poetry, drama, and folklore profoundly shapes learners' analytical thinking, imagination, emotional intelligence, and cultural awareness. The research highlights that exposure to a rich array of literary genres enriches students' linguistic competence, supports the development of critical reading skills, and fosters a deep understanding of cultural diversity. Furthermore, the study emphasizes the pivotal role of genre-based instruction in promoting creative expression, intercultural communication, and holistic personality development. By integrating findings from psychology, education, and literary theory, this paper offers a holistic framework that positions reading as both a cognitive exercise and a transformative life practice. The findings suggest that incorporating multiple literary genres into the curriculum significantly enhances both cognitive growth and cultural literacy, thereby making the educational process more dynamic, meaningful, and conducive to developing well rounded, empathetic global citizens.*

Key words: *diverse literary genres, cognitive development, cultural significance, educational process, critical thinking, cultural literacy, interdisciplinary learning, genre-based instruction.*

Introduction. Reading is a foundational activity that underpins academic achievement and personal growth. Beyond its immediate role in language acquisition, regular reading habits are intrinsically linked to improved concentration, memory, and analytical skills, which are critical tools for success across various subjects²². It not only enhances comprehension and fluency in language but also equips individuals with the capacity to grasp complex concepts across diverse disciplines, fostering a versatility in learning essential for overall academic success. This engagement with varied topics and writing styles is instrumental in developing a child's overall academic success. Moreover, reading serves as an empathetic journey, inviting individuals, particularly children, to step into the shoes of characters from varied backgrounds and circumstances. This process cultivates a profound sense of empathy and understanding, which is vital

²² Gillian Lazar. Literature and Language Teaching. Cambridge University Press 1993. –P.268 .

for developing emotional intelligence²³. Through narratives, learners encounter situations that impart valuable life lessons about love, loss, joy, and resilience, enriching their emotional experience and cultivating essential social skills necessary for building positive, empathetic relationships. The emotional benefits of reading also manifest in a child's social interactions and selfreflection. Literature acts as both a mirror and a window, enabling self reflection on one's own actions and feelings while simultaneously offering glimpses into diverse ways of life. This duality nurtures well rounded, socially adept individuals, fostering tolerance and inclusivity qualities increasingly important in today's globalized world. Reading thus becomes a powerful tool in shaping not just informed individuals, but also compassionate citizens. In an era dominated by digital screens and fleeting attention spans, reading emerges as a crucial counterbalance. Unlike the transient engagement demanded by digital media, books necessitate sustained attention, thereby fostering patience and a robust attention span²⁴. This practice nurtures a focused mindset that is increasingly rare yet essential in a multitasking world. Reading also serves as a counterbalance to the overstimulation from digital devices, providing a calm and immersive experience. It encourages individuals to slow down, absorb, and reflect, which are invaluable qualities for developing a mindful and balanced approach to life. Reading is a cornerstone of intellectual and emotional development, contributing significantly to cognitive flexibility, empathy, and lifelong learning. However, despite numerous studies affirming the general educational value of reading, there remains a significant gap in the integrated understanding of how systematic exposure to diverse literary genres specifically fosters creativity and cognitive growth. The existing literature often addresses these benefits in a fragmented manner, lacking a comprehensive framework that elucidates the multidimensional impact of various literary forms on intellectual and personal enrichment. This research aims to address this gap by exploring the cognitive and cultural significance of diverse literary genres in the educational process, thereby offering a holistic perspective on their transformative potential. The primary objective of this study is to synthesize existing knowledge to elucidate how engagement with varied literary genres strengthens neural connectivity, enhances verbal intelligence, cultivates empathy, and improves theory of mind. It seeks to demonstrate how genres such as science fiction expand imaginative boundaries, while poetry deepens interpretive skills and emotional reflection. Furthermore, this paper will highlight how consistent reading across genres promotes language proficiency and cultural literacy, which are essential for effective communication. By integrating insights from psychology, education, and literary theory, this study intends to provide a holistic framework that positions genre diverse reading as a strategic tool in education and professional development. This framework will emphasize how

²³ Dr. Halima Benzoukh. The Relevance of Teaching Different Literary Genres in the EFL Classroom.

Psychological & Educational Studies, Laboratory Of Psycho-Educational Practices. Algeria: 2017. –P.247

²⁴ . Enikő Nagy-Kolozsvári – Katalin Lizák – Ilona Huszti. A guide to english literary genres and literary periods. Berehove: 2021. –P.21

promoting genre-diverse reading habits can enhance mental agility, resilience, and socio emotional competence in students and lifelong learners alike. Ultimately, this paper underscores the pedagogical value of incorporating a wide array of literary genres into educational curricula to foster a more dynamic, meaningful, and comprehensive learning experience. communication and global awareness.

Methods. This study employs a qualitative, descriptive, and analytical approach, synthesizing existing literature and theoretical frameworks to explore the cognitive and cultural significance of diverse literary genres in the educational process. Given the conceptual nature of the inquiry, the methodology focuses on a comprehensive review and thematic analysis of scholarly works rather than primary data collection.

Research Design

The research design is primarily a literature review and conceptual analysis. It systematically examines academic articles, books, and educational theories from various disciplines, including literary studies, educational psychology, linguistics, and cultural studies. The aim is to integrate disparate findings into a coherent framework that elucidates the multidimensional impact of literary genre engagement. This approach allows for a broad exploration of the topic by drawing upon established knowledge and theoretical perspectives.

Data Collection.

Information was gathered from a range of scholarly sources relevant to the intersection of literature, education, and human development. The selection criteria for the literature focused on studies and theoretical discussions that addressed:

- The cognitive benefits of reading, including its impact on analytical thinking, memory, and problem-solving.
- The role of literature in fostering emotional intelligence, empathy, and social skills.
- The contribution of diverse literary genres to cultural understanding, awareness, and literacy.
- The pedagogical implications and best practices for incorporating various genres into educational curricula.
- Specific characteristics and unique impacts of different literary forms, such as fiction, poetry, drama, folklore, and non-fiction.

Data Analysis

The collected literature was subjected to a rigorous thematic analysis. This process involved several stages:

1. Initial Coding: Each piece of literature was read thoroughly, and key concepts, arguments, and findings related to cognitive development, emotional awareness, cultural significance, and linguistic competence as influenced by literary engagement were identified and coded.
2. Categorization: Similar codes were then grouped into broader, overarching themes. For instance, discussions on improved concentration, enhanced memory, and sharpened analytical skills were categorized under Cognitive Enhancements.

Similarly, insights into empathy, emotional resilience, and social understanding were grouped under Emotional and Social Development.

3. Synthesis: The categorized themes were then integrated to construct a comprehensive understanding of the multidimensional impact of diverse literary genres. This involved identifying interconnections and synergistic effects between different aspects of development .

4. Framework Development: Based on the synthesis, a holistic framework was developed to illustrate how genre diverse reading acts as a strategic tool for comprehensive student development, emphasizing its role in fostering well-rounded individuals.

5. Identification of Genre-Specific Contributions: A detailed analysis was conducted to pinpoint how distinct literary forms contribute uniquely to specific learning outcomes. For example, the analysis highlighted poetry's role in fostering phonological awareness and sensitivity to figurative language, prose's contribution to discourse-level comprehension and syntactic ability, and drama's encouragement of dialogic fluency and pragmatic sensitivity.

Scope and Limitations of the Method

It is important to acknowledge that this study is conceptual and relies exclusively on the synthesis of existing secondary data. It does not involve primary empirical research, such as experiments, surveys, or interviews conducted by the author. Therefore, while it provides a robust theoretical framework and integrates existing knowledge into a coherent argument, it does not present new empirical findings or statistical data from a novel study. The conclusions drawn are based on the convergence of evidence and theoretical perspectives found in the reviewed scholarly literature. The Methods section, in this context, describes the systematic approach taken to review and analyze the existing body of knowledge to construct a comprehensive argument regarding the cognitive and cultural significance of diverse literary genres.

Results

The systematic review and synthesis of the literature reveal a profound and multifaceted impact of diverse literary genres on the educational process, extending across cognitive, emotional, cultural, and linguistic domains. The findings underscore that literary genres are not merely categories for texts but serve as fundamental cognitive and pedagogical templates that significantly contribute to holistic student development.

Cognitive Enhancements

Engagement with diverse literary genres is strongly linked to enhanced cognitive functions. Regular reading habits improve concentration, memory, and analytical skills, which are critical for academic success across various subjects. The process of interpreting complex narratives and varied writing styles strengthens neural connectivity and fosters cognitive flexibility. Genres such as science fiction are particularly effective in expanding imaginative boundaries, while philosophical essays stimulate intellectual enrichment and critical reasoning. Poetry, with its nuanced language patterns and stylistic choices, deepens interpretive skills and

encourages abstract thought. This consistent cognitive exercise is instrumental in developing mental agility and problem solving capabilities, equipping children with the ability to grasp complex concepts across different disciplines.

Emotional and Social Development

Literature serves as a powerful tool for fostering emotional intelligence and empathy. By immersing themselves in stories, readers encounter diverse characters and situations, learning to recognize and process a wide spectrum of emotions, both their own and those of others. This emotional connection cultivates empathy and improves the theory of mind the ability to understand others' mental states. Literature also acts as a mirror and a window, facilitating self reflection and offering insights into different ways of life, thereby nurturing tolerance and inclusivity. The emotional benefits manifest in improved social interactions and the development of compassionate citizens, fostering qualities increasingly important in today's globalized world.

Cultural Significance and Global Awareness

Diverse literary genres play a crucial role in enriching cultural understanding and promoting global awareness. The synthesis of literature highlights several key aspects of this cultural significance, demonstrating how literature functions as a cultural broker within the educational system. These findings are summarized in Table 1.

Cultural Significance	Description
Understanding different cultures and perspectives	Genres like historical fiction, folklore, and cultural narratives provide insights into various cultures, traditions, and ways of life, fostering appreciation for diversity.
Preserving cultural heritage	Traditional genres such as epics, myths, and folktales help students connect with their cultural roots and understand foundational societal values and beliefs.
Promoting intercultural dialogue	Studying literature from different cultures encourages conversations around shared human values and experiences, enhancing intercultural understanding.
Developing global citizenship	Engaging with diverse literary perspectives supports the development of a global mindset and a sense of responsibility as informed and empathetic global citizens.

Discussion

The findings from this comprehensive literature review strongly underscore the multidimensional cognitive and cultural significance of diverse literary genres in the educational process. This study provides an integrated understanding that addresses the previously identified lack of a holistic framework, demonstrating how varied literary engagement systematically fosters creativity, cognitive growth, emotional intelligence, and cultural literacy.

Interpretation of Cognitive Impact

The results clearly indicate that engaging with diverse literary genres is not merely a passive activity but an active cognitive exercise. The act of deciphering complex narratives, understanding varied linguistic structures, and interpreting

figurative language directly strengthens neural connectivity and enhances verbal intelligence. This aligns with the concept of reading as a cognitive workout that improves concentration, memory, and analytical skills²⁵. The unique demands of different genres contribute distinctly; for instance, the imaginative leaps required by science fiction expand creative thinking, while the precise language and emotional depth of poetry hone interpretive skills. Prose, with its extended narratives, builds discourse-level comprehension and syntactic ability, crucial for understanding complex information across disciplines. Drama, through its focus on dialogue and character interaction, encourages dialogic fluency and pragmatic sensitivity, which are vital for effective communication.

Interpretation of Emotional and Social Impact.

The role of literature in cultivating empathy and emotional intelligence is profound. By providing a mirror and a window, literary genres allow students to reflect on their own experiences and emotions while simultaneously gaining insights into the lives and perspectives of others. This process is fundamental to developing a robust theory of mind and fostering compassionate citizens. Exposure to diverse emotional landscapes within narratives promotes tolerance and inclusivity, preparing students for an increasingly globalized world. The positive attitudes of students towards literary works, as evidenced by studies like the one conducted in Yogyakarta, Indonesia²⁶ where students found literary works enjoyable and beneficial for language improvement and imagination, further validate the emotional and motivational impact of genre-diverse reading. This suggests that literature-based instruction, which involves students at both linguistic and psychological levels, encourages emotional investment and more extended cognitive processing.

Interpretation of Cultural Literacy and Global Awareness.

The findings presented in Table 1 highlight how literary genres function as essential cultural brokers within the educational system. By offering insights into various cultures, traditions, and ways of life, genres like historical fiction and folklore foster an appreciation for diversity and help preserve cultural heritage. Studying literature from different cultures encourages intercultural dialogue, promoting conversations around shared human values and experiences. This is critical for developing a global mindset and a sense of responsibility as informed and empathetic global citizens. The integration of literary genres into language curricula thus makes intercultural communication feasible and protects intangible cultural heritage, encouraging global consciousness.

Implications for Language Proficiency and Communication.

Consistent engagement with a variety of literary genres directly supports language proficiency and cultural literacy, which are essential for effective

²⁵ Lukmonovna, O. N. Exploring Diverse Literary Genres and Styles: The Impact of Regular Reading on Creativity and Cognitive Growth. *Excellencia: International Multi-Disciplinary Journal of Education* (2994-9521), 3(5), 2025 -P.60.

²⁶ Arifah Mardiningrum, Gita Fitri Larasati, and Eka Indah Nuraini. The Use of Literary Works in EFL Classroom. *SHS Web of Conferences* 202. 2024.-P.57

communication and global awareness. Each literary genre is characterized by its own language patterns, stylistic choices, and cultural orientations, providing rich, authentic material for language learning. Novels and short stories, for example, leverage setting and plot to expand realism and vocabulary. Plays, centered on characters and interactions, enhance understanding of dialogue and performance. Poetry, with its diverse forms, controls standard expectations about usage, fostering a deeper appreciation for linguistic nuance. This exposure enriches students' linguistic competence, supports the development of critical reading skills, and fosters an understanding of cultural diversity.

Holistic Personality Development and Pedagogical Implications.

The synthesis of findings strongly supports the idea that genre diverse reading is a strategic tool for holistic personality development. It enhances mental agility, resilience, and socio emotional competence. In contrast to conventional divisions between natural sciences and humanities, there is a compelling argument for methodological syncretism in literary studies, advocating for the borrowing of empiricist methods. This epistemological renewal, through evidence-based approaches like stylometry and corpus analysis, can ground abstract literary theories in empirically verifiable pedagogical tools. The integration of multiple literary genres into the curriculum enhances both cognitive growth and cultural literacy, making the educational process more dynamic and meaningful. Literature based instruction encourages emotional investment and extended cognitive processing, leading to improved memory and sharpened critical thinking within linguistically authentic and culturally embedded contexts. Promoting genre diverse reading habits can serve as a strategic tool in education and professional development, preparing students not only to learn a language but also to cultivate ethical, reflective, and cosmopolitan human beings.

Limitations

This study is a conceptual review and synthesis of existing literature. As such, it does not present new empirical data or primary research findings. Its conclusions are based on the interpretation and integration of previously published scholarly works. Therefore, while it provides a comprehensive theoretical framework, it does not offer quantitative evidence or experimental validation of the proposed benefits.

Future Research

Future research could build upon this conceptual framework by conducting empirical studies to quantitatively measure the impact of specific genre based interventions on cognitive, emotional, and cultural outcomes in diverse educational settings. Longitudinal studies could track the long-term effects of genre diverse reading habits on student development. Comparative studies across different cultural contexts could also provide valuable insights into the universality and specificity of these benefits. Furthermore, research exploring the optimal integration strategies for various literary genres into different curricula levels would be highly beneficial for educators and curriculum developer.

Conclusion. This study has thoroughly explored the cognitive and cultural significance of diverse literary genres in the educational process, synthesizing a

broad range of scholarly literature. The findings unequivocally demonstrate that engagement with varied literary forms is indispensable for holistic student development, encompassing significant cognitive, emotional, cultural, and linguistic growth. Diverse literary genres serve as powerful catalysts for enhancing analytical thinking, imagination, emotional intelligence, and cultural awareness, moving beyond mere linguistic resources to become profound cognitive, emotional, and cultural devices. The research highlights that exposure to a rich array of literary genres enriches students' linguistic competence, supports the development of critical reading skills, and fosters a deep understanding of cultural diversity. It provides a crucial counterbalance to the distractions of the digital age, cultivating sustained attention and mindful engagement. Furthermore, the study emphasizes the pivotal role of genre based instruction in promoting creative expression, intercultural communication, and the development of well rounded, empathetic global citizens. By integrating findings from psychology, education, and literary theory, this paper offers a holistic framework that positions reading across diverse genres as both a fundamental cognitive exercise and a transformative life practice. In conclusion, the systematic incorporation of multiple literary genres into the curriculum is not merely an enrichment activity but a strategic imperative. It significantly enhances both cognitive growth and cultural literacy, making the educational process more dynamic, meaningful, and effective in cultivating ethical, reflective, and cosmopolitan human beings who are well-prepared for the complexities of the modern world.

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**CLASSICAL THEORIES OF URBANIZATION PROCESS
DEVELOPMENT (BASED ON THE IDEAS OF E. BURGESS, H. HOYT, C.
HARRIS AND E. ULLMAN)**

***Annotation:** This article analyzes the classical theories explaining urbanization processes, focusing on E. Burgess's concentric zone model, H. Hoyt's sector model, and the multiple nuclei model proposed by C. Harris and E. Ullman. It provides a comparative assessment of urban socio-economic structure, functional zoning, and territorial organization. The strengths and limitations of each model are identified, with emphasis on their relevance for understanding modern urban development. The study highlights the role of transportation, economic factors, and historical stages of urbanization in shaping urban form.*

***Keywords:** urbanization, city model, concentric zones, sector model, multiple nuclei model, spatial development.*

Introduction. With the continuous growth of the world's population and the improvement of living standards, the spatial form and structure of human settlements have undergone significant transformations. These processes became especially pronounced during the period of industrialization and capitalism, accompanied by the rise of modern cities and the development of theoretical frameworks explaining population distribution patterns. The scientific-theoretical study of human settlement development includes the analysis of population distribution, territorial evolution, socio-economic factors, and environmental conditions. In this regard, the classical theories and models proposed by J. von Thünen, W. Launhardt, A. Weber, W. Christaller, A. Lösch, and F. Perroux hold particular significance.

Main Part. As globalization and rapid urbanization intensified, new theoretical approaches to the formation and development of human settlements emerged. One of the scholars who made a substantial contribution to this field is Ernest Watson Burgess (1886–1966) — an American sociologist and urban theorist known for his research on the social structure of cities.

Burgess's most influential work is the Concentric Zone Model, proposed in 1925. Based on an empirical analysis of Chicago, he examined the spatial expansion of cities and their internal socio-economic organization. The model divides the city into five functional zones, each representing a distinct stage in urban development and socio-economic structure (Figure 1):

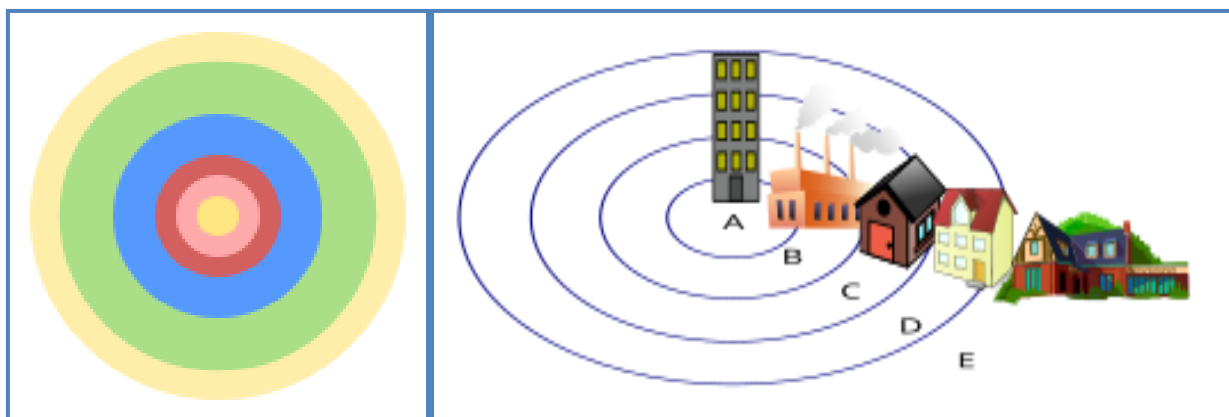


Figure 1. The Concentric Zone Model of the City

Source: https://commons.wikimedia.org/wiki/File:Burgess_model1.svg?uselang=ru

Zone A – Central Business District (CBD). The economic core of the city, characterized by high land value, dense development, administrative buildings, financial institutions, offices, hotels, and major commercial facilities.

Zone B – Transition Zone. An area combining industrial and retail activities, deteriorated residential buildings, and low-income neighborhoods. It is often subject to redevelopment and land-use transformation.

Zone C – Working-Class Residential Zone. Densely populated districts inhabited by lower- and middle-income groups, including apartment blocks and small private houses, closely connected to the CBD by transport networks.

Zone D – Middle-Class Residential Zone. Relatively quiet and developed residential areas occupied by middle-income populations, with improved infrastructure, schools, parks, and commercial facilities.

Zone E – Commuter/Suburban Zone. Low-density peripheral districts inhabited by higher-income households, featuring large private residences and daily commuting to the city center.

Burgess's model played a foundational role in urban sociology and paved the way for the Chicago School's theoretical framework. His studies greatly contributed to our understanding of the social ecology of cities, internal migration, poverty patterns, and the evolution of urban form.

Another of his colleagues, the American scholar Robert Park, co-authored with him the well-known work *"The City: Suggestions for Investigation of Human Behavior in the Urban Environment"* (commonly referred to simply as *The City*). Overall, Burgess's contributions greatly enhanced the understanding of urban life and laid the foundation for modern methods used in analyzing social structure, economic issues, and urbanization processes.

Another influential American urban scholar, Homer Hoyt, introduced the Sector Model in 1939, offering a new perspective on the spatial development of cities. His theory focuses on the socio-economic zoning of urban territories and highlights the crucial role of transportation and economic factors in shaping the city structure.

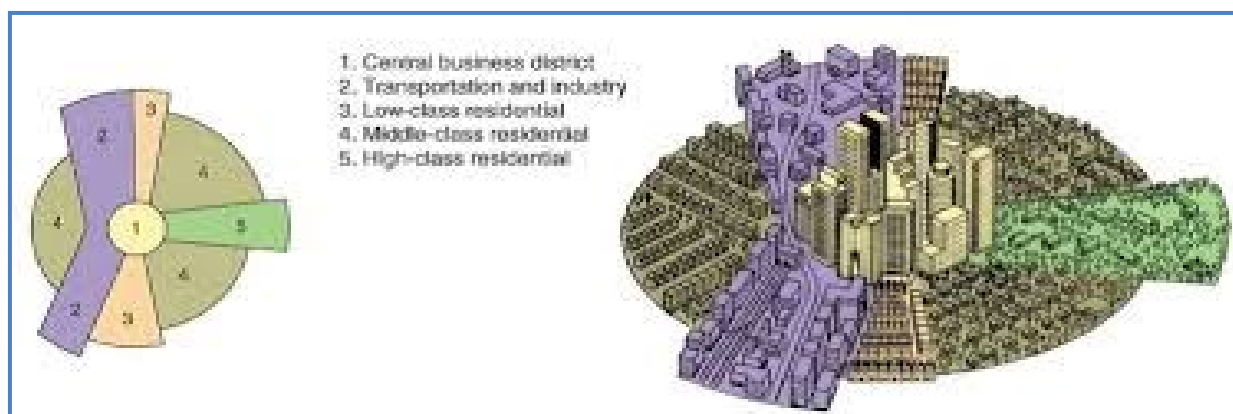


Figure 2. Shahrning sektor modeli

Source: <https://planningtank.com/settlement-geography/sector-model-hoyt-model>

Hoyt's model emerged as a critique of Burgess's concentric zone concept. According to Hoyt, urban zones do not expand in uniform circular rings. Instead, they develop as sectors radiating outward from the Central Business District (CBD), primarily along major transportation routes or natural corridors of development.

This sectoral expansion reflects variations in land values, infrastructure quality, population income levels, and industrial activities.

According to the Sector Model (Figure 2), the city is divided into the following zones:

1. Central Business District (CBD). The commercial and administrative heart of the city, serving as the starting point for sectoral growth.

2. Low-Income Residential Sector. Areas largely occupied by lower-income residents, often located near industrial districts or major transportation routes.

3. Working-Class Residential Sector. Moderately developed neighborhoods inhabited by workers and low-to-middle income families.

4. Middle-Class Residential Sector. Comfortable, well-developed residential zones with improved infrastructure, services, and favorable environmental conditions.

5. High-Class Residential Sector (Elite Zone). Affluent districts located far from industrial pollution and noise, often situated in ecologically attractive parts of the city.

Hoyt argued that transport systems – particularly railways and major roads – play a decisive role in determining the direction of urban growth. Sectors tend to expand along these corridors because transportation enhances both accessibility and land value.

Key characteristics of the Sector Model include:

1. Dominance of Transport Infrastructure
 - ✓ The direction of urban expansion is strongly influenced by transport routes.

High-quality infrastructure accelerates sectoral development.

2. Socio-Spatial Segregation

- ✓ Population groups with different income levels cluster in distinct sectors.

✓ High-income areas grow along the most favorable transport or environmental corridors.

3. Economic Factors

✓ Employment opportunities, income distribution, and industry placement significantly shape sector formation.

Hoyt's model provides important insights into the tendencies of urban spatial development, particularly in rapidly industrializing cities. It also highlights the connection between urban planning, infrastructure investment, and social differentiation.

However, the model has limitations. It does not fully account for cultural, historical, or political influences, and many modern cities exhibit mixed or polycentric patterns that do not strictly conform to sectoral growth. Nevertheless, the Sector Model remains a foundational component of urban geography and city planning theory.

In 1945, American geographers Chauncy Harris and Edward Ullman developed the Multiple Nuclei Model, offering a new theoretical framework for understanding the spatial organization of modern cities. Unlike the models proposed by Burgess and Hoyt, which emphasize mono-centric development, Harris and Ullman argued that cities evolve around several independent centers or "nuclei", each specializing in particular functions.

According to this theory, the urban landscape is not shaped by a single dominant core (CBD) but by a complex system of activity nodes that emerge over time. These nuclei represent functional centers such as industrial zones, residential districts of varying social status, commercial centers, educational campuses, and transportation hubs. Key principles of the Multiple Nuclei Model include:

1. Existence of Several Specialized Centers. Cities grow around multiple nuclei, each serving different economic or social functions. For example:

- industrial centers develop near transport corridors,
- high-income residential districts emerge in environmentally favorable areas,
- commercial centers cluster where accessibility is high.

2. Functional Differentiation of Urban Space. Each nucleus influences the land uses and spatial development of surrounding areas. This leads to the formation of specialized districts such as:

- manufacturing zones,
- wholesale markets,
- low-income housing clusters,
- elite residential neighborhoods.

3. Interconnectedness of Urban Areas. The nuclei are linked by a network of transportation systems that facilitate economic interaction, commuting patterns, and everyday mobility. As cities expand, new nuclei emerge, while older ones may decline or transform.

4. Historical Evolution of Urban Structure. The model acknowledges that urban form evolves through historical stages. With time, new centers may develop due to changing economic activities, technological progress, or demographic shifts.

Advantages of the Model:

- a. Accurately reflects the structure of large, modern, and rapidly expanding cities.
- b. Recognizes the multiplicity and diversity of urban functions.
- c. Explains polycentric development trends commonly observed in contemporary metropolises.
- d. Demonstrates the dynamic nature of urban growth and specialization.

Limitations:

- a. The model may not apply to smaller or highly centralized cities.
- b. It does not fully incorporate cultural, historical, or political factors.
- c. The nature of interactions between nuclei is not always clearly defined.
- d. Spatial complexity sometimes exceeds the simplified representation of the model.

Despite these limitations, the Multiple Nuclei Model has become one of the most influential frameworks in urban geography. It provides a comprehensive understanding of how diverse functional centers contribute to the spatial and socio-economic organization of modern cities.

Conclusion. The analysis of classical theories explaining the development of urbanization processes demonstrates that urban growth is influenced by a complex interplay of socio-economic, spatial, historical, and infrastructural factors. The models proposed by E. Burgess, H. Hoyt, and C. Harris & E. Ullman each provide unique conceptual frameworks for understanding the internal structure of cities and the dynamics of their territorial organization.

Burgess's concentric zone model highlights the patterned expansion of urban functions in ring-like forms, reflecting socio-economic gradients. Hoyt's sector model underscores the determining influence of transportation corridors and economic forces on the directional development of urban sectors. The Multiple Nuclei Model, introduced by Harris and Ullman, presents a more flexible and realistic interpretation of modern urban form, emphasizing polycentric development and the diversification of functional centers.

Together, these theories offer valuable insights into the evolution of urban spaces and remain foundational tools for contemporary urban studies, regional planning, and spatial analysis. Although modern cities often display more complex and hybrid structures than those suggested by classical models, the core principles formulated by these scholars continue to assist researchers and planners in interpreting spatial patterns, forecasting development trajectories, and designing effective urban planning strategies.

In conclusion, the classical models of urban structure serve as essential methodological frameworks for understanding the historical stages and mechanisms of urban development. Their theoretical contributions remain significant for

analyzing today's rapidly transforming urban environments and for shaping sustainable and well-balanced urban planning policies.

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STUDY OF ADSORPTION OF HIGH-SILICA ADSORBENTS OBTAINED FROM NAVBAHOR BENTONITE

Abstract. *Silicon-based adsorbents (SBA) were synthesized from Navbahor bentonite using sol-gel technology with the participation of various organic compounds (templates). For this, crystals were formed by adding hexamethylenediamine and alcohol fraction as templates to the liquid glass (29% SiO₂, 9% Na₂O, 62% H₂O) and Al(NO₃)₃·9H₂O. After the crystallization process was completed, the resulting solid phase was separated from the solution using a Büchner funnel, dried in a SShU-M1 dryer at 120 °C, and calcined for 8 hours in a SNOL 30/1100 muffle furnace at 550 °C to remove the template. The crystallization of Navbahor bentonite lasted 8–9 hours. The element and oxide composition (mass %) of the obtained SBA samples was studied by X-ray fluorescence, and the thermal behavior of bentonite was studied by derivatographic analysis.*

Keywords: *Sol-gel, template, bentonite, derivatography, silicate module, hexamethylenediamine, crystallization, X-ray fluorescence.*

Introduction. In the chemical industry, adsorption methods are the most common in the purification of hydrocarbons from various mixtures and sulfur compounds, and the use of these methods allows to return to production a number of valuable compounds. Adsorbents are widely used in petrochemicals as sorbents and catalysts in the processing of oil, natural gas, and petroleum-associated gases, in the separation and purification of liquid and gaseous media [1,2]. In recent years, natural and artificial adsorbents have been widely used in the treatment of hydrocarbon raw materials [3].

Currently, one of the most important topical directions is the creation of environmentally safe sorbents, retainers and catalysts based on local raw materials [4].

Today, the world is paying great attention to the creation of waste-free or low-waste, energy and resource-efficient technologies. In successfully solving these problems, the level of purity of the substances used and produced for the technological process is important. The most important requirements for adsorbent materials are: high specific surface area, selectivity and easy regeneration. It is also

necessary for the adsorbent to be cheap and harmless, to be able to maintain its adsorption properties for a long time, and to have high mechanical strength [6]. Among the sorbents used in adsorption processes and catalysis, adsorbents have a special place with acid tolerance, thermostability and acidity properties[7]. Today, the main problem in the production of adsorbents is to reduce their cost and simplify the synthesis technology, and extensive scientific research is being conducted in this priority direction[8-10]. Today, among the technologies for purifying oil and natural gas from water vapors and sulfur compounds, adsorption processes of drying and purification using adsorbents with high absorption property at low partial pressure of mixtures, selectivity of adsorption of polar substances, etc. occupy an important place [11].

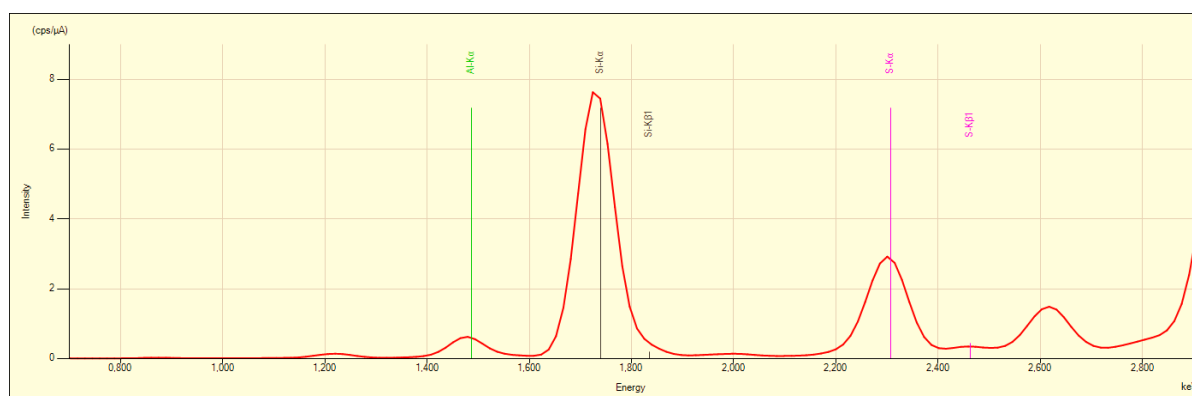
Experimental part High silica adsorbents (YuKA) were synthesized in a stainless steel autoclave at 175-200 ° C for 6-8 days according to the following method.

was prepared by adding hexamethylenediamine and alcohol fraction as a template to liquid glass (29% SiO₂, 9% Na₂O, 62% H₂O) with rapid mixing. The value of the Al(NO₃)₃ · 9H₂O reaction mixture was monitored by adding a pH0.1 N HNO₃ solution to it. Navbahor bentonite was added to the resulting mixture. After the completion of the crystallization process, the solid phase was separated from the solution using a Buchner funnel and dried for 12 hours in a ShSU-m1 drying cabinet at 120 ° C and fired in a SNOL 30/1100 muffle furnace at 500-550 ° C for 8 hours to remove the template.

Colloidal sol consists of macroparticles (solid dispersed phase particles).

100 g of 25% ammonium chloride was added to 10 g of adsorbents for decationization of the obtained high silicon adsorbent. The solution was kept in a water bath at 90-100 ° C with constant stirring for 2 hours, then the precipitated NH₄⁺/adsorbent was filtered, washed with distilled water, dried and calcined at 550 ° C for 8 hours. The decationized sorbent powder was then pressed into tablets and obtained as granules. Catalysts with modified adsorbents are prepared by absorbing certain salts or acids into the adsorbents. 50 hours at 115 ° C to form powdered YuKA with 100% crystallinity , at 150 ° C and about 10 hours is enough time.

In Figure 2



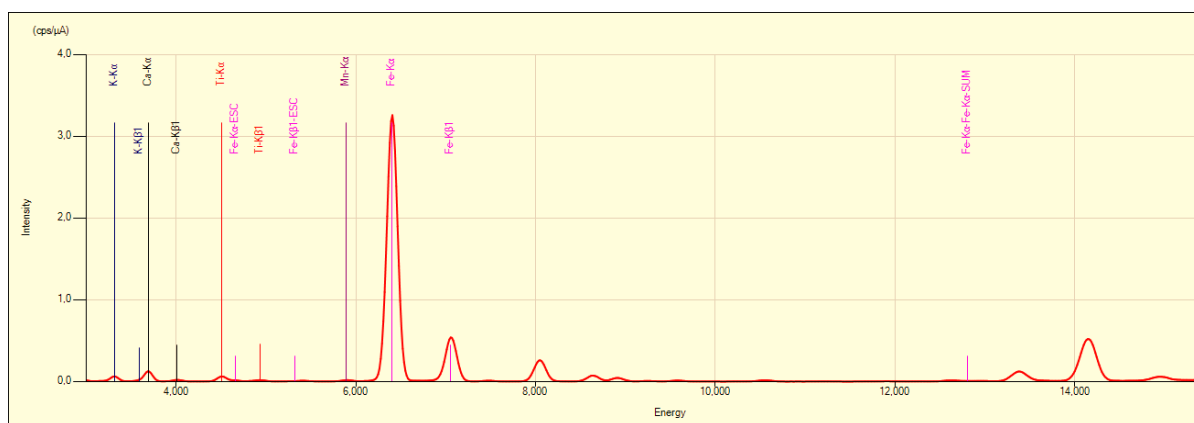


Figure 2. a) 6; b) 7 ; X-ray fluorescence results of YuKA samples obtained after crystallization for 9 hours

Figure 2 shows X-ray images of the synthesized samples after crystallization for 6.7 hours. It can be seen from the radiographs that when crystallization is carried out for 6, 7 hours, the amount of adsorbents in them is 50, 96 (respectively). Navbahor district of bentonite chemical composition and structural characteristics are listed in Table 1.

Table 1

Name	SiO ₂	TiO ₂	Al ₂ O ₃	Fe ₂ O ₃	MgO	CaO	Na ₂ O	K ₂ O	P ₂ O ₅	SO ₃
Alkaline bentonite soil wt. %	57.91	0.35	13.69	5.10	1.84	0.48	1.53	1.75	0.43	0.75
Alkaline-earth bentonite soil wt. %	56.23	0.61	13.56	6.50	3.76	0.69	0.98	2.20	0.92	0.49

In order to study the chemical, physico-chemical and structural characteristics of bentonite, we placed 100 g of bentonite granules in a 250 cm³ glass flask and added 150 cm³ of distilled water. Flask **PE-6410** for 24 hours mixed in the device at a speed of 120. We added heated 40 ml to ground soil H₂SO₄ and heated with stirring in a water bath. After the treatment, the soil was filtered with a paper filter in a Buchner funnel and washed again with distilled water until pH=5.4-5.7. Bentonite together with filter paper was dried in a drying cabinet at 120°C for 5 hours.

Table 2

Acidic from activation then , sample mass %:

Name	SiO ₂	TiO ₂	Al ₂ O ₃	Fe ₂ O ₃	MgO	CaO	Na ₂ O	K ₂ O	MnO
Alkaline, Alkaline-earth bentonite soil mass. %	70.17	1.63	9.49	1.39	0.64	0.20	0.17	1.27	0.01

2 - As can be seen from the table, the silicate modulus of the bentonite sample by acid treatment is 7:1 increased to go to fight can _

The analysis of bentonite derivatographic curves was carried out (Fig. 3) shows that TG thermal logarithmic gravimeter lines are depicted, it is noted that the decrease in the mass of bentonite in the initial definite time interval over a certain period of time, DTG - differential thermal gravimeter temperature curves are depicted.

The resulting derivativeogram is presented in the figure, which consists of 4 curves. Analysis of the dynamic thermogravimetric analysis (DTGA) curve (Curve 2) shows that the DTGA curve mainly occurs in the 2 intensive decomposition temperature ranges. The 1st decomposing interval corresponds to the temperature of 106-294 °C, and the 2nd decomposing interval corresponds to the temperature of 302-950 °C.

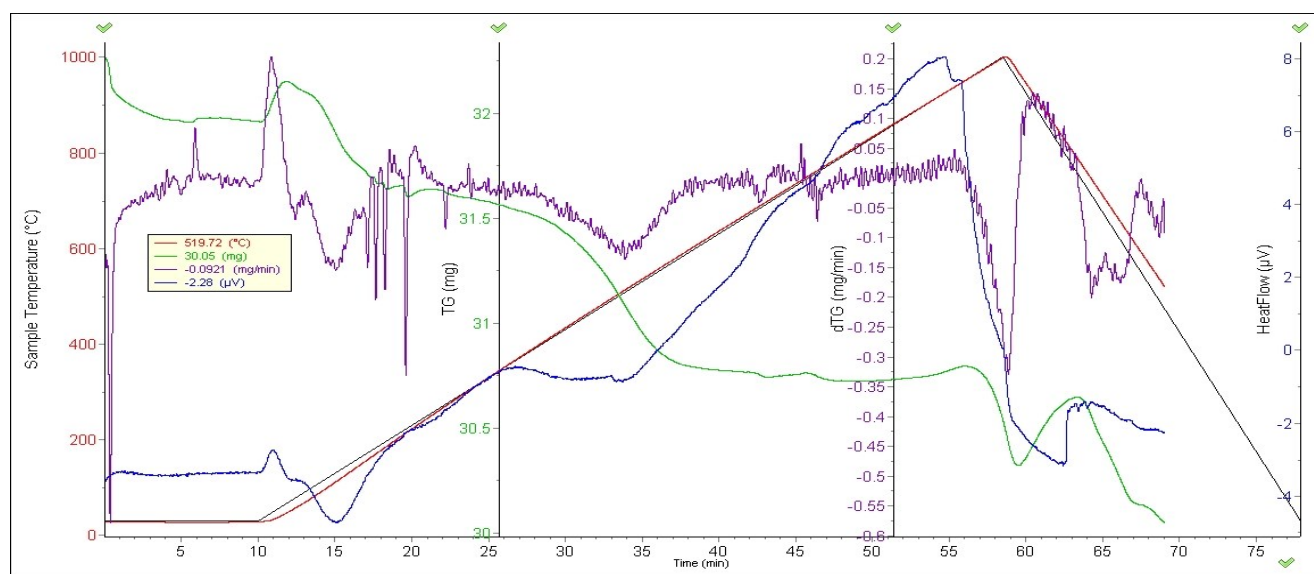


Figure 3. Activated bentonite derivativeogram

1-Temperature curve; 2- dynamic thermogravimetric analysis curve line (DTGA); 3- dynamic thermogravimetric analysis curve derivative (DTGP); 4-DSK curve.

Analysis shows that intensive decay occurs in the 2nd decay interval. In this interval, the amount of decomposition, i.e. 5.8% of the decomposition takes place.

detailed analysis of the dynamic thermogravimetric analysis curve and DSK curve is given in Table 3 below.

Table 3

Bentonite is active Analysis of DTGA and DSK curve results

No	Temperature , °C	Mass loss, %	of substance decay speed , mg/min	Amount of energy consumed ($\mu V \cdot s / mg$))
1	50	0.225	0.136	1.46
2	100	0.885	0.555	2.54
3	200	1,055	0.653	2.21
4	300	1,135	0.487	3.22
5	400	1,685	1,147	2.02
6	500	2,069	0.455	3.03
7	600	1,815	1,499	1.65
8	700	1,521	2,156	1.21
9	800	1,812	1,244	1.77
10	900	1,958	2,622	2.02
11	1000	2,041	1,235	2.25

This derivatograph As a result of these efforts, it appears that the main mass loss takes place in the range of 160-912 °C, in which 7.25% of the main mass, i.e. 3.21 mg of the mass, is lost.

Bentonites are small crystals of medium weight and powder with a scattering index. According to the adsorbent description, bentonite is an adsorbent consisting of a combination of meso-macro-microporosity, where mesopores make up the majority. Since the specific surface area is an average description of the internal pore size, its high value is determined by the average pore size, which is 4.9 nm for bentonite clays. [176; 24. - p. 57-61]. In conclusion, the swelling, colloidal, sorption ability of Navbahor bentonite to water and petroleum gases was studied.

Conclusions. Navbahor bentonite was obtained from clay soil, chemically treated, and high silicon adsorbents (YuKA) were prepared. A number of technological processes were implemented for the preparation of YuKA.

High silicon adsorbents were synthesized in a stainless steel autoclave at 175-200°C for 6 days according to the following method.

was prepared by adding hexamethylenediamine and alcohol fraction as a template to liquid glass (29% SiO₂, 9% Na₂O, 62% H₂O) with rapid mixing. Al(NO₃)₃ · 9H₂O After the process was completed, the solid phase was separated from the solution using a Buchner funnel and dried at 120°C for 12 hours and calcined at 500-550°C for 8 hours to remove the template.

For decationization of the high silica adsorbent obtained, it was treated by adding 25% ammonium chloride and washed several times in distilled water, then

calcined at 550-600°C for 8 hours. The decationized adsorbent powder was then pressed into tablets and granulated.

The chemical composition of synthesized YuKA samples, mass %, changes upon heating and structural characteristics of adsorbents (total specific surface area and volume of pores, surface-surface area corresponding to micro- and mesopores, size, crystallization conditions and physico-chemical properties of the samples) were studied based on the table information is provided.

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BENTONIT VA KAOLINNING SORBSION BA TEKSTUR XOSSALARINI ANIQLASH

Annotatsiya: Ushbu tadqiqotda bentonit va kaolin namunalarning sorbsion, tekstur hamda fizik-kimyoviy xususiyatlari o'rganildi. Namunalarning solishtirma sirt maydoni Branauer–Emmet–Teller (BET) usuli yordamida, g'ovaklarning hajmi va o'lcham bo'yicha taqsimlanishi esa Barrett–Joyner–Halenda (BJH) usuli bilan aniqlandi. Olingan izotermalardan foydalanib, adsorbsiyalangan gaz hajmi bilan nisbiy bosim o'rtasidagi hamda g'ovak radiuslariga bog'liq bo'lgan munosabatlar tahlil qilindi. Aniqlanishicha, $P/P_0 = 0-0,05$ oralig'ida mezog'ovaklarda monomolekulyar adsorbsiya, $P/P_0 = 0,05$ da mono- va polimolekulyar adsorbsiya, $P/P_0 = 0,05-0,4$ oralig'ida esa polimolekulyar adsorbsiya jarayoni ustunlik qiladi.

Kalit so'zlar: bentonit, kaolin, kolloidlik, bo'kuvchanlik, adsorbsiya hajmi, adsorbsion sig'im, mezo va mikrog'ovaklar.

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DETERMINATION OF SORPTION AND TEXTURAL PROPERTIES OF BENTONITE AND KAOLIN

Abstract. *In this study, the sorption, textural, and physicochemical properties of bentonite and kaolin samples were studied. The specific surface area of the samples was determined using the Branauer–Emmet–Teller (BET) method, and the volume and size distribution of the pores were determined using the Barrett–Joyner–Halenda (BJH) method. Using the obtained isotherms, the relationships between the volume of adsorbed gas and the relative pressure and the pore radii were analyzed. It was found that in the range of $P/P_0 = 0-0.05$, monomolecular adsorption in mesoporous materials prevails, in the range of $P/P_0 = 0.05$, mono- and polymolecular adsorption, and in the range of $P/P_0 = 0.05-0.4$, polymolecular adsorption.*

Keywords: *bentonite, kaolin, colloidity, permeability, adsorption volume, adsorption capacity, meso- and micropores.*

Kirish. Sanoat jarayonlarida uglevodorodlarni tozalashda adsorbent usullar keng qo'llaniladi. Bu usullar qimmatbaho komponentlarni ajratib olish, texnologik samaradorlikni oshirish hamda resurslardan oqilona foydalanishni ta'minlaydi. Adsorbentlarga qo'yiladigan asosiy talablar — yuqori solishtirma sirt maydoni, tanlab ta'sirchanlik, regeneratsiyalanish imkoniyati, arzonlik, ekologik xavfsizlik hamda mexanik mustahkamlikdir [1–4]. Hozirgi vaqtda tabiiy va sun'iy zeolitlar hamda boshqa alumosilikat asosidagi materiallar adsorbent sifatida keng tadqiq qilinmoqda. Mahalliy xomashyolar asosida ekologik xavfsiz sorbentlar, katalizatorlar va ushlab turuvchi materiallar yaratish dolzarb yo'nalishlardan biridir [5–7].

TAJIRIBA QISMI. Kimyoviy va fizik-kimyoviy xarakteristikalarini aniqlash uchun 100 g massadagi namuna granulalarini 250 sm³ hajmli shisha kolbaga joylashtirib ustiga 150 sm³ dan distillangan suv soldik. Kolba 24 soat davomida AVU-6 qurilmada 120 tezlikda aralashtirildi. Quritilgandan so'ng adsorbent 0,5 va 0,25 mm o'lchamli g'alvirdan o'tkazildi va 0,5 mm o'lchamli g'alvirdan o'tgan 0,25 mm li g'alvirda qolgan namunalarining mexanik va fizik-kimyoviy xarakteristikalari o'rganildi. Tuproqlarga kislotali ishlov berishdan oldin 0,08 mm o'lchamda maydaladik. 10 g maydalangan tuproqqa qizdirilgan 40 ml H₂SO₄ qo'shdik va suv hammomida aralashtirgan holda qizdirdik. Ishlov berish tugaganidan so'ng tuproq Byuxner voronkasida qog'oz filtr bilan filtrlab olindi va pH=5,4-5,7 oralig'ida distillangan suvda yuvildi. Keyin tuproq filtr qog'oz bilan birgalikda 120°C da 5 soat davomida quritish shkafida quritildi. Solishtirma sirt-yuzasi va o'lchamlari bo'yicha g'ovaklarning taqsimlanishi avtomatik adsorbentometr "ASAB 2010" da azotning quyi haroratli desorbsiyasi usulida topildi. Sedimentatsion tahlil Oden metodi bo'yicha suvda va suv-glitserin aralashmasida turli xil dispersion muhitlarda o'tkazildi.

Rentgenofazali tahlil (Co-K_α-nurlanish) kobalt rentgen trubkali DRON-4 difraktometrida amalga oshirildi. Difraktogrammlar tahlili uchun difraksion

ma'lumotlar bo'yicha xalqaro markazining (JCPDS,1999) PDF-2 ma'lumotlar bazasidan foydalanildi. Namunalarning g'ovaklik strukturasi parametrlari azotning quyi haroratli desorbsiyasi Quanchrome NOVA (AQSh) analizatorida aniqlandi. Har bir namuna o'lchasidan oldin vakuum ostida 250⁰C da 2 soat davomida gazzizlantirildi.

Qattiq namunalarning solishtirma sirt-yuzasini aniqlash uchun Branauer-Emmet-Taylor (BET) usulidan foydalanildi. Bu usulda quyidagi BET tenglamasidan qo'llanildi:

$$\frac{1}{W \cdot \left(\frac{P_0}{P} - 1\right)} = \frac{1}{W_m \cdot C} + \frac{C-1}{W_m \cdot C} \cdot \frac{P}{P_0}$$

bunda $W \cdot P/P_0$ nisbiy bosimda adsorbilangan gaz massasi, W_m -monoqatlam hosil qilib qoplangan sirtida adsorbilangan modda massasi; S-adsorbentlar adsorbat ta'sirlashuv qiymatini ko'rsatuvchi, birinchi adsorbsion qatlamning adsorbsiya energiyasiga bog'liqligini ifodalovchi BET konstantasi

G'ovaklarning hajmini va o'lchami bo'yicha taqsimlanishini aniqlash uchun Barrett-Jouner-Halenda (BJH) usulidan foydalanildi. Hisoblashlarda boshlang'ich ma'lumotlar uchun izotermaning 0,967-0,4 P/P_0 bosim intervalidagi desorbsion va adsorbsion sohalari ishlatildi.

Uyma zichlikni aniqlash uchun 500 gr massadagi sorbentni olib quritish shkafida 2 soat davomida 60⁰C da ushlab turildi. Quritilgan namunadan 400 g tortib olindi va sig'imi 500 ml bo'lgan o'lchov silindriga solib, uning hajmi V_1 o'lchandi. Keyin silindrning tagini yengilgina taqirlatib (tiqillatib) o'zgarmas darajagacha sorbentni zichlashtirdik va yana hajmini V_2 o'lchab oldik.

Sorbentning uyma zichligi quyidagi formula bo'yicha aniqlandi:

$$\gamma_1 = \frac{P}{V_1}; \gamma_2 = \frac{P}{V_2}; \text{ g/sm}^3$$

bunda P-sorbentning massasi; γ_1 , γ_2 -sorbentning zichlashishigacha va keyingi uyma zichligi, g/sm³.

TAJIRIBA NATIJALARI VA ULARNING MUHOKAMASI

Tadqiqot ob'ekti sifatida Navbahor bentoniti va Paxtachi kaolini olindi.

1-jadval

Navoiy viloyati Navbahor tumanidagi bentonitning kimyoviy tarkibi

Nomi	SiO ₂	TiO ₂	Al ₂ O ₃	Fe ₂ O ₃	MgO	CaO	Na ₂ O	K ₂ O	P ₂ O ₅	SO ₃
Ishqoriy bentonit tuproq	60,91	0,45	11,69	6,11	2,84	0,46	1,56	1,76	0,56	0,75
Ishqoriy-yer tuproq	59,23	0,72	12,46	6,51	2,76	0,75	0,86	2,22	0,69	0,49

Bentonit yoki kaolinni kislotali faollashtirishdan avval suvni yo'qotish uchun namuna 150⁰ C da 30 minut davomida qizdirildi.

Kislotali faollashtirishdan so'ng, massa %:

SiO₂ – 70,17, Al₂O₃-9,49, Fe₂O₃-1,39, MgO-0,64, Na₂O-0,17, K₂O-1,27, CaO-0,20, TiO₂-1,63, MnO-0,01.

2-jadval

Tuproqlarning fizik-kimyoviy xossalari faollash rejimiga bog‘liqligi

Tuproqlarning xossalari	Faollash vaqti, sekund								
	0	10	20	40	60	80	100	120	180
Navbahor bentoniti									
Bo‘kuvchanlik, mg/g	16	18	18,6	22	24	26	27	28	25
Kolloidallik, %	48	52,6	56	62,2	67,7	70,2	74,7	80	70,9
Suv yutishi,	2,6	2,56	2,42	2,38	2,36	2,34	2,32	2,3	2,45
Paxtachi kaolini									
Bo‘kuvchanlik, mg/g	25	28	29,6	30	33	36	38	42	44
Kolloidallik, %	89	90	92	94	96	96	99	100	100
Suv yutishi,	10	12	14	16	18	20	22	28	30

3-jadval

Tabiiy tuproqlarning fizik xarakteristikalar

Nomlanishi		
	Paxtachi kaolini	Navbahor bentoniti
Solishtirma sirt-yuza, m ² /g	250-350	125-250
Uyma zichlik, kg/m ²	600-750	570-620
G‘ovakning hajmi, sm ³ /g	0,028-0,041	0,048
G‘ovak o‘lchami, nm	2,6-2,8	3,4-4,3

Muvozanatdagi rejimda adsorbsiyani tekshirish adsorbsiyalangan moddaning maksimal miqdorini aniqlash va haroratning kam o‘zgarish oralig‘ida adsorbsiyaning termodinamik parametrlarini hisoblash imkonini beradi.

Adsorbsion muvozanatni adsorbsiya izotermalarini eksperimental tuzish yordamida aniqlash qabul qilingan. Adabiyotlarda adsorbsiyani Lengmyur va Freyndlix modellari yordamida ifodalash keng tarqalgan:

$$\frac{a}{a_{\infty}} = \frac{K_L \cdot C^0}{1 + K_L \cdot C^0}; \quad a = K_F \cdot C^{0n}; \quad \frac{a}{a_{\infty}} = \frac{K_L \cdot C^{0n}}{1 + K_L \cdot C^{0n}}; \quad \frac{C/C^0}{a(1-C/C^0)} = \frac{1}{a_{\infty} \cdot C} + \frac{k-1}{a_{\infty} k C^0}$$

Bunda $k = e^{\frac{Q-\lambda}{RT}}$, Q-λ-adsorbsiya issiqligi

$$\frac{a}{a_{\infty}} = \frac{K_R \cdot C^0}{1 + a \cdot C^{0\beta}}$$

α, β-Redmix –Peterson tenglamasi parametrlari

Adsorbsiyaning muvozanat koefitsienti bilan adsorbsiya entalpiyasi va entropiya o‘zgarishi o‘rtasida quyidagicha bog‘liqlik mavjud:

$$K_{\text{адс}} = e^{\frac{\Delta S_{\text{адс}}}{R}} \cdot e^{\frac{\Delta H_{\text{адс}}}{RT}}$$

Adsorbsion jarayon tezligini adsorbentning massa birligida adsorбилangan modda miqdorining o‘zgarishi orqali vaqt birligida quyidagicha ifodalash mumkin:

$$r_{\text{адс}} = \frac{da}{d\tau} \left(\frac{\text{мг}}{\text{г}} / \text{с} \right)$$

Bunda a-1 g adsorbentga adsorбилangan modda massasi, -vaqt.

Ochiq sistemada dinamik rejim uchun, masalan, oqimli adsorberda jarayon tezligi uchun quyidagi ifoda o‘rinli bo‘ladi:

$$V = \frac{W}{S} \frac{dC}{dL} = \frac{W \cdot dC}{dV_{\text{adc}}}$$

Bunda V –adsorbsion jarayon tezligi, W -oqimning hajmiy tezligi; S -reaktor kesimi yuzasi, L -adsorbent qatlamining balandligi; V_{adc} -adsorbentning hajmi.

Tadqiqotlar shuni ko‘rsatdiki adsorbsiya jarayoni 2-tartibli reaksiya tenglamasiga bo‘ysunadi:

$$\frac{da}{d\tau} = \frac{k_2 \cdot (a_{\infty} - a_{\tau})^2}{1 + k_2 \cdot (a_{\infty} - a_{\tau})} \approx k_2 \cdot (a_{\infty} - a_{\tau})^2$$

Yoki buning integrallangan ko‘rinishi quyidagicha bo‘ladi:

$$\frac{\tau}{a_{\infty}} = \frac{1}{k_2 \cdot a_{\infty}^2} + \frac{\tau}{a_{\tau}}$$

Adsorbsion jarayon tezligi uchun diffuzion model

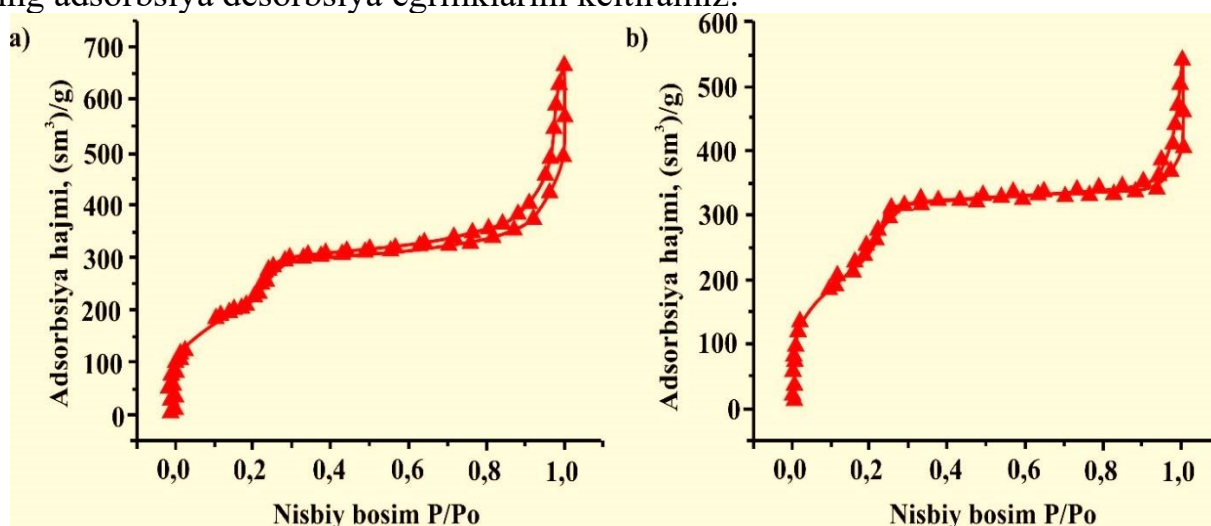
$$a_{\tau} = k_{\text{диф}} \cdot \tau^{1/2} + S$$

$k_{\text{диф}}$ -adsorbsiya tezligining diffuziya konstantasi, S -o‘zgarmas son ko‘rinishga ega.

Adsorbentning dinamik sig‘imi quyidagi formula bilan aniqlanadi:

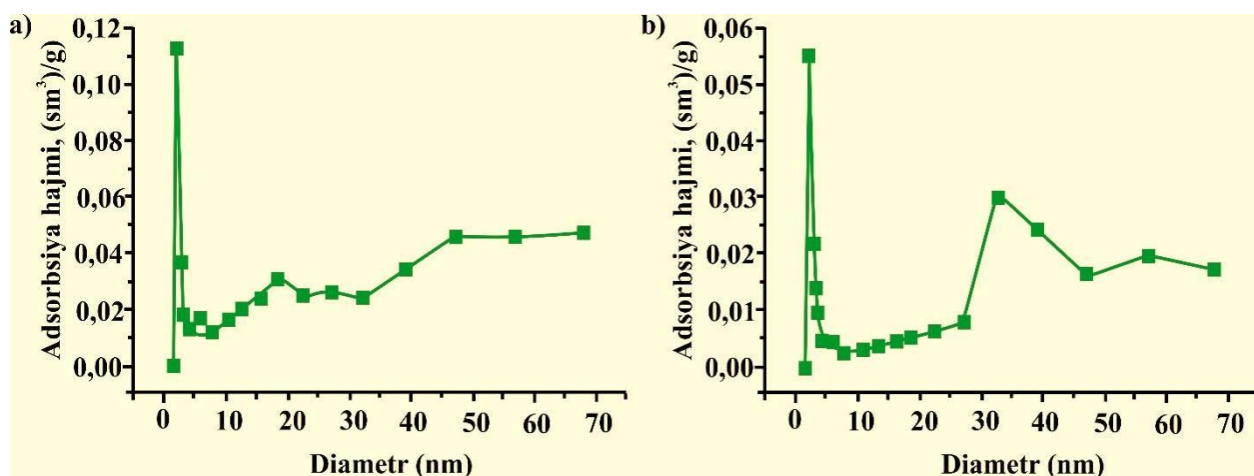
$$a_d = \frac{P_m \cdot V \cdot [S]}{m_{\text{adc}}}$$

Solishtirma sirt-yuza va mikrog‘ovaklarning hajmi mezog‘ovakli sorbentlar uchun BET usulida, mezog‘ovakli sorbentlar uchun Dubinin usulida hisoblandi. Sorbentlarning strukturalarini tasdiqlash uchun mezog‘ovakli sorbentlar uchun azotning adsorbsiya desorbsiya egriliklarini keltiramiz:



1-Rasm. Sintez qilingan sorbentlarning mezog‘ovaklarida azotning adsorbsiya-desorbsiya izotermalari

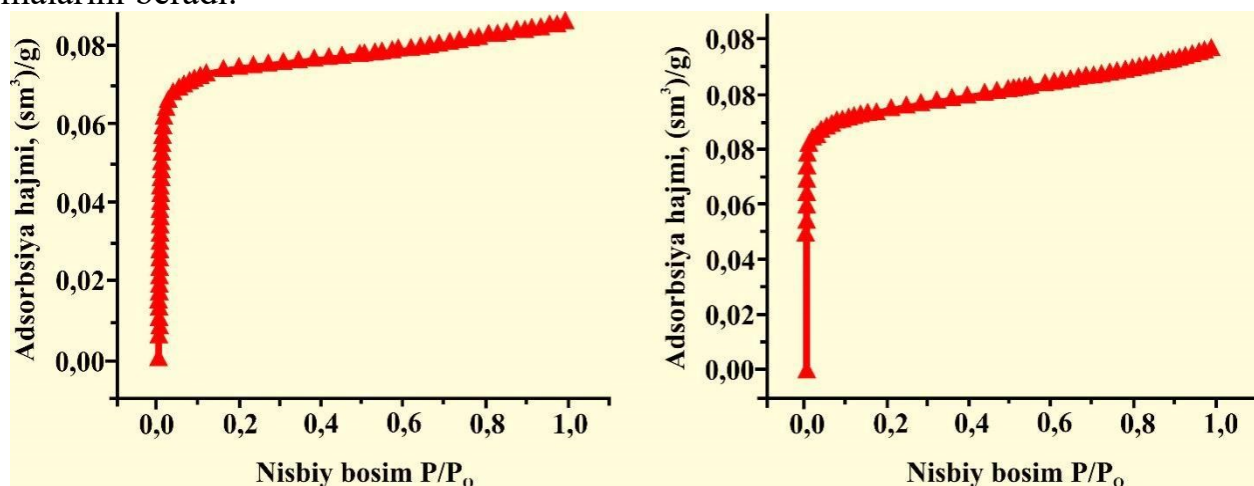
1-rasmda ko‘rinib turibdiki, keltirilgan adsorbsiya-desorbsiya izotermalari IV tur izotermalarga xos. Sintez qilingan mezog‘ovakli sorbentlar uchun diametriga bog‘liq holda g‘ovaklar hajmining taqsimlanishini qarab chiqamiz (BJH metodi bo‘yicha hisoblangan).



2-rasm. Mezog'ovakli sorbentlarda ularning diametriga bog'liq holda g'ovaklar hajmlarining taqsimlanishi

2-rasmdan ko'rinib turibdiki, sintez qilingan mezog'ovakli sorbentlar asosan 2 nm atrofidagi g'ovaklardan tashkil topgan.

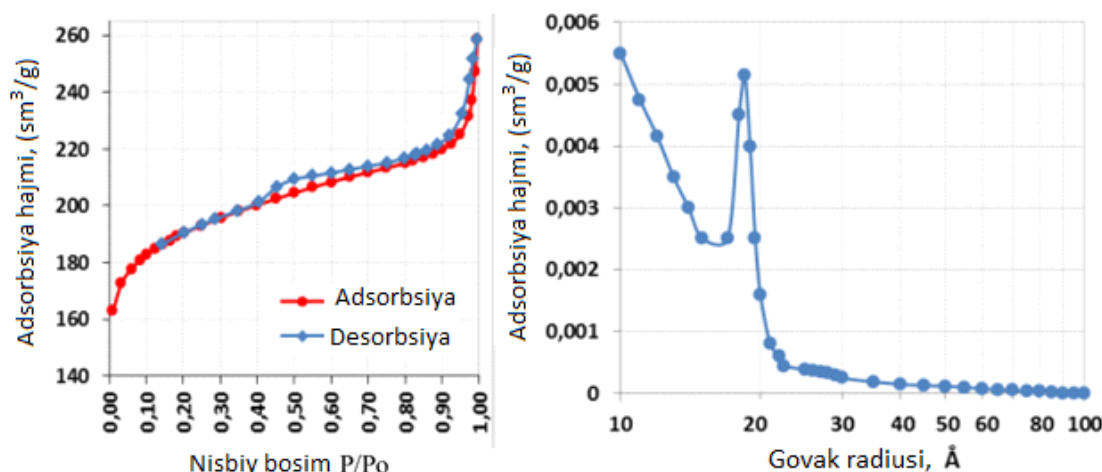
Mikrog'ovakli sorbentlar azot adsorbsiya-desorbsiyasining xarakterli izotermalarini beradi.



3-rasm. Mikrog'ovakli sorbentlarning mikrog'ovaklarida azotning adsorbsiya-desorbsiya izotermalari

3-rasmdan ko'rinib turibdiki, keltirilgan izotermalar 1 tur izotermalarga mansub (gorizontal yassiliklar borligi).

4-rasmda sintez qilingan YuKS ning adsorbsiya-desorbsiya izotermalari va radiuslar bo'yicha g'ovaklarning taqsimlanish differensial egriliklari keltirilgan. Adsorbsiya izotermalari de Bur klassifikatsiyasi bo'yicha IV turga xos bo'lib, mezog'ovak moddalarning adsorbsiyasini xarakterlaydi. Izotermada $P/P_0 = 0-0,05$ oraliqda mezog'ovaklarda monomolekulyar adsorbsiya va mikrog'ovaklarda adsorbsiya-mikrog'ovaklarning hajmiy to'lishi kuzatiladi. $P/P_0 = 0,05$ da mezog'ovaklarda mono- va polimolekulyar adsorbsiya kuzatiladi. $P/P_0 = 0,05-0,4$ soha polimolekulyar adsorbsiyani ifodalaydi, bu BET tenglamasida solishtirma sirt-yuza (S_{sol}) ni aniqlashda ishlatiladi. Adsorbsiya izotermasida $P/P_0 = 0,4-1,0$ oraliq mezog'ovaklarda kapillyar kondensatsiya sodir bo'lishini xarakterlaydi.



4-rasm. Sintez qilingan sorbentlarning adsorbsiya-desorbsiya izotermalari va radiuslar bo'yicha g'ovaklarning taqsimlanish differensial egriliklari

XULOSA

1) Bentonit va kaolinning sorbsion, tekstur va fizik-kimyoviy xarakteristikallari o'rganildi.

2) Namunalarning solishtirma sirt-yuzasini aniqlash uchun Branauer-Emmet-Teller (BET) usulidan, g'ovaklarning hajmini va o'lchami bo'yicha taqsimlanishini aniqlash uchun Barrett-Jouner-Halenda (BJH) usulidan foydalanildi.

3) Tadqiqot natijasida adsorbsiya hajmi bilan nisbiy bosim va g'ovaklar radiuslari orasidagi bog'liqlik o'rganildi.

4) $P/P_0 = 0 - 0,05$ oraliqda mezog'ovaklarda monomolekulyar adsorbsiya, $P/P_0 = 0,05$ da mezog'ovaklarda mono- va polimolekulyar adsorbsiya, $P/P_0 = 0,05 - 0,4$ sohada polimolekulyar adsorbsiya kuzatilishi isbotlandi.

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MAHALLIY BYUDJETNI SHAKLLANTIRISHDA DAVLAT HOKIMIYATI ORGANLARINING TUTGAN O‘RNI

***Annotatsiya.** Maqolada, davlat moliya tizimining asosiy bo‘g‘inlaridan hisoblangan mahalliy byudjetlarni shakllantirishda hududiy davlat boshqaruv hokimiyati organlarining ahamiyati, bunda asosan mahalliy byudjet daromadlarini oshirish va ularni rivojlantirish asnosida yuqori byudjetga qaramligini hamda mahalliy byudjetlarning boqimandalik kayfiyatini kamaytirishdan iborat. Bu bilan mahalliy byudjetlarning o‘z manbalari hisobiga byudjet xarajatlari va daromadlarini o‘zaro balanslashtirishda moliyaviy omillarni amalga oshirish yuzasidan tegishli takliflar berilgan.*

***Kalit so‘zlar.** Moliya tizimi, mahalliy byudjet, byudjet xarajati, byudjet daromadi, byudjet transferti, dotatsiya, subvensiya, byudjet ssudasi.*

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THE ROLE OF STATE AUTHORITIES IN THE FORMATION OF THE LOCAL BUDGET

***Annotation.** The article discusses the significance of territorial public authorities in the formation of local budgets, which are considered one of the main components of the public finance system. The focus is primarily on increasing local budget revenues, promoting their development, reducing dependence on higher-level budgets, and minimizing the tendency toward budgetary dependency. Based on the analysis, relevant proposals are provided to ensure a balance between local*

budget revenues and expenditures through their own financial resources and the implementation of financial mechanisms.

Keywords: *financial system, local budget, budget expenditure, budget revenue, budget transfer, subsidy, subvention, budget loan.*

Kirish.

Ma'lumki, davlatimizning moliyaviy-iqtisodiy siyosatida katta islohotlar olib borilishi natijasida davlatning moliya tizimi ham tobora rivojlanib, yangicha dunyo qarash bilan shakllanib bormoqda. Moliya tizimining muhim bo'g'inlaridan biri bo'lgan hududlardagi mahalliy byudjetlar ham mamlakat ichida olib borilayotgan moliyaviy-iqtisodiy islohotlarning samarli olib borilishida va aholi farovonligini oshirishning moliyaviy tayanchi bo'lganligi sababli, mahalliy byudjetlar daromadlarini takomillashtirish va ularni barqarorlashtirish, yuqori byudjetga qaramligini kamaytirish hamda mahalliy byudjetlarni o'z manbalari yordamida balanslashtirishga erishish bugungi kunning muhim vazifalaridan biri bo'lib qolmoqda. Ushbu vazifalarni hisobga olib, mahalliy byudjetlar daromadlari tarkibida soliqlarning rolini o'rganib, tegishli taklif va mulohazalar taqdim qilish maqsadga muvofiqdir.

Maqolaning bugungi kundagi dolzarbligi, asosan, quyidagilar bilan izohlanishi mumkin;

- O'zbekiston Respublikasida turli sohalaridagi islohotlar o'tkazilayotgan bir paytda mahalliy byudjetlar mas'uliyatini oshirish, ularning daromad manbasini mustahkamlash va undan moliyalashtirilayotgan tarmoqlarni xalqaro andozalarga muvofiq keladigan tarzda rivojlantirish hamda mahalliy byudjetni samarali shakllantirishda mahalliy hokimiyat organlarini vakolatlarini kengaytirish va takomillashtirish zarurati paydo bo'lmoqda.

Davlat byudjeti daromadlari manbalari hozirgi kunda mahalliy byudjet daromadlari manbalari sifatida ham asosiy o'rin egallaganligi oqibatida mahalliy hokimiyat organlarining byudjet daromadlarini shakllantirishdagi vakolatlariga o'z ta'sirini ko'rsatishi bilan birga mahalliy hokimiyatlarning boqimandalik kayfiyatiga tushib qolishi va bu muammoni hal qilish muhim vazifa bo'lib qolmoqda.

Maqolaning asosiy maqsadi Davlat byudjeti tarkibidagi mahalliy byudjetlarni o'rni va mustaqilligini yanada oshirishda mahalliy hokimiyat organlari tomonidan mahalliy byudjet daromad manbalarini barqarorligini ta'minlash va umumdavlat soliqlari tarkibida ko'p qismini mahalliy byudjetlar daromadlar manbasiga aylantirish masalasi yuzasidan amaliy jihatdan o'rganib chiqish va ularni takomillashtirish bo'yicha takliflar berishdir.

Bugungi kunda, amalga oshirilayotgan islohotlar mahalliy davlat hokimiyati organlarining birinchi darajali xarajatlarni va hududlarni ijtimoiy-iqtisodiy rivojlantirish bo'yicha tadbirlarni o'z vaqtida moliyalashtirish borasida javobgarligini oshirishni, manbasi aniq bo'lmagan tadbirlarni amalga oshirmaslikni hamda byudjet intizomini yanada qat'iylashtirishni taqozo etadi. Davlat moliyasini shakllantirish jarayonidagi muammolardan biri bu – mahalliy byudjet daromadlarini shakllantirish va ularning barqarorligini ta'minlash bo'lib, bu borada iqtisodchi

olimlar mahalliy byudjet moliyaviy barqarorligini ta'minlashda soliqlarning ahamiyatini oshirishga bog'liq ekanligini e'tirof etishgan.

Mavzuga oid adabiyotlar taxlili.

Mamlakatimizning iqtisodchi olimlari tomonidan davlat byudjetining hududlardagi mahalliy byudjetlarini shakllantirishda davlat soliqlarining o'rni va ahamiyatini oshirish bo'yicha bir qancha tadqiqotlar olib borishgan.

Jumladan; A.Mamanazarovning tadqiqot ishi mahalliy byudjetlarni barqarorlashtirishda soliqlarning rolini oshirish[7], H.Qobulov hududiy iqtisodiyot va mahalliy byudjetlar imkoniyatlarini oshirish[8], A. Burxanov va X.Qurbonovlar mahalliy byudjetlar daromadlarini ko'paytirish va ularning barqarorligini ta'minlash chora-tadbirlarini amalga oshirish bo'yicha amaliy tavsiyalarni ishlab chiqib amalda qo'llash orqali ushbu masalaga tizimli yondashish lozimligini qayd etganlar[9].

Iqtisodchi olimlarimizdan biri N.Xaydarovning fikriga qaraydigan bo'lsak, mahalliy byudjetlarning daromad manbalarini ko'paytirish va viloyatlarda yangi ish o'rinlarini yaratish uchun xorijiy investorlarni jalb etishni rag'batlantirish zarur. Buning uchun mamlakat bo'yicha xorijiy investorlar qanday turdagi tadbirkorlik va tijorat faoliyati bilan shug'ullana olmaydigan soha va tarmoqlar ro'yxati ishlab chiqilib, qolgan barcha soha va tarmoqlarga yashil yo'l borligi ko'rsatilish lozim[10].

MDX davlatlari iqtisodchi olimlaridan rus olimi Yu.Tumanskayaning fikricha mahalliy o'zini o'zi boshqarish organlarining rolini kuchaytirish va mahalliy ahamiyatga molik muammolarni hal etish samaradorligini oshirish zarurati mahalliy byudjetlarga daromadlarni shakllantirish tizimini ham byudjetni boshqarish nuqtaiy nazaridan, ham hududiy daromadlar bazasini baholashning ishonchiligi nuqtaiy nazaridan takomillashtirishni taklif etadi[11].

I. Shvesova va T. Naydenovalarning fikrlariga qaraganda mahalliy hokimiyatlarning moliyaviy asosini mahalliy byudjetlar tashkil etishini va mahalliy byudjetlarning daromadlari soliqlar va soliqsiz daromad turlari, shuningdek, qaytarilmaydigan daromadlar hisobidan shakllanishini e'tirof etgan[12].

Xorij olimlaridan E. Gorinaning fikricha moliyaviy barqarorlik – bu mahalliy hokimiyatning aholiga xizmat ko'rsatish bo'yicha o'z majburiyatlarini doimiy ravishda bajarishi, mahalliy byudjetning qoniqarli moliyaviy holatini qisqa va uzoq muddatda ta'minlash qobiliyatidir[13]. Muallifning fikriga ko'ra, mahalliy davlat hokimiyati organlari byudjetlarining xarajatlar qismini o'z daromadlari hisobidan bajarilishini ta'minlash qobiliyati mahalliy byudjetlarning moliyaviy barqarorligini saqlashning asosiy shartidir deb aytib o'tgan.

Yuqorida keltirilgan iqtisodchi olimlar tomonidan ilgari surilgan fikr va mulohazalarda mahalliy byudjetlar daromadlarini shakllantirish va barqarorligini ta'minlashning amaldagi holati tadqiq etilgan. Fikrimizcha, bugungi kunda mahalliy byudjet daromadlarining asosiy manbai bo'lgan mahalliy soliqlar mahalliy byudjetlar daromadlarini to'liq shakllantira olmaydi. Shu o'rinda respublika soliqlaridan ajratmalar hamda yuqori byudjetdan quyi byudjetlarga berilayotgan

moliyaviy yordamlar ajratish mexanizmini ham qaytadan o'rganib chiqqan holda tegishli tartibda tadqiqot ishlarini amalga oshirish lozim.

Tadqiqot metodologiyasi

Davlat byudjetining mahalliy byudjetlarini shakllantirish va ularning moliyaviy barqarorligini ta'minlashda, asosan mahalliy byudjetlar daromadlarining shakllanish mexanizmi, ularni tarkibi va ulushini tahlil qilish, hududlar iqtisodiyotini rivojlantirish va undan samarli foydalanish bo'yicha tegishli chora-tadbirlarni ishlab chiqish hamda ularni amaliyotda qo'llash bugungi kunning muhim vazifalaridan hisoblanadi.

Davlat byudjeti intizomini yanada mustahkamlash, soliq siyosati va davlat byudjeti tizimining shaffofligini oshirish, mahalliy davlat hokimiyati organlarining byudjet daromadlari prognoz ko'rsatkichlarini bajarilishida manfaatdorligini kuchaytirish maqsadida quyidagilar belgilanadi:

solliq-byudjet siyosatiga strategik yondashuvni tatbiq etish maqsadida o'rta muddatli byudjet asoslarini ishlab chiqish hamda yillik byudjetni shakllantirishning yangi «natijaga yo'naltirilgan byudjet» tizimini joriy etish;

makrofiskal prognozlar ishonchliligini ta'minlash bo'yicha institutsional salohiyatni va byudjet jarayoni ishtirokchilarining mas'uliyatini oshirish;

byudjet mablag'larini taqsimlovchilar va mahalliy davlat hokimiyati organlarining byudjet sohasidagi vakolatlarini va hisobdorligini oshirish hamda ularning mas'uliyatini kuchaytirish;

fiskal tavakkalchiliklarni baholash, moliyaviy aktivlar va majburiyatlar hisobini yuritish hamda ularni samarali boshqarish tizimini joriy etish;

byudjet ma'lumotlarining ochiqligi, to'liqligi va xalqaro standartlarga mosligini ta'minlash;

byudjet jarayoni ustidan parlament va jamoatchilik nazoratini kuchaytirish[6].

Yuqorida qayd etilgan vazifalardan kelib chiqqan holda mahalliy davlat hokimiyati organlarining soliqlar va yig'imlar bo'yicha vakolatlarini kengaytirishga qaratilgan islohotlar olib borish respublikamiz solliq tizimini takomillashtirishning muhim yo'nalishi qilib belgilanishi lozim. Bu bir tomondan mahalliy davlat hokimiyati organlarining mahalliy byudjet daromadlar bazasini mustahkamlashga xizmat qilsa, ikkinchi tomondan soliqlarning rag'batlantiruvchi funksiyasini yanada kengaytirish imkonini beradi. Bu esa mahalliy byudjetlar daromadlarini barqarorligini tobora oshirib boradi.

Tahlil va natijalar.

Bugungi bozor iqtisodiyoti sharoitida byudjet masalasi juda muhim va murakkab masala bo'lib hisoblanadi. Bunda har bir ma'muriy hududlarning rivojlanishi, u yerda yashovchi aholining turmush sharoiti, kam ta'minlangan oila va shaxslarni yetarli darajada ijtimoiy himoya qilish, ma'muriy hududlardagi davlat hokimiyati organlarining moliyaviy masalalarini to'g'ri hal qila bilishga bog'liqdir. Bunda mahalliy byudjetlarga tushadigan solliq va yig'imlarning turi, miqdorini belgilash alohida ahamiyat kasb etadi.

Soliq tizimini takomillashtirishda davlat hokimiyati organlarining soliqlar va yig'img'lar bo'yicha vakolatlarini yanada aniqlashtirish va bunda mahalliy davlat hokimiyati organlarining bu boradagi vakolatlarini yanada oshirishda muhim yo'nalish qilib belgilanishi lozim. Davlat byudjeti tarkibida ma'muriy hududlarning mahalliy byudjetlari daromadlarini mustahkamlash va ularning xarajatlarini barqarorlashtirish hamda ularning daromad bazalarini yanada kengaytirib borish bugungi kunning dolzarb masalalardan biri hisoblanadi.

Avvalo, tahlil va tadqiqot jarayonlarini olib borishda davlat byudjeti daromadlari tarkibi to'g'risida tushuncha va shu tarkibdagi soliq va yig'img'lardan bir moliya yili davrida qancha mablag' davlat byudjetiga kelib tushushishi bo'yicha ma'lumotlarni ko'rib chiqish lozim deb bilaman. Ushbu ma'lumotlarni quyidagi jadval asosida O'zbekiston Respublikasining davlat byudjeti daromadlar ko'rsatkichlari keltirilgan, mazkur ko'rsatkichlarning tarkibida davlat byudjetining asosiy daromad manbalari negizida shakllantirilgan bo'lib, byudjet daromadlarining 5 yillik solishtirma ma'lumotlarini 1-jadvalda kuzatishimiz mumkin.

1-jadval

O'zbekiston Respublikasi Davlat byudjeti daromadlarining ko'rsatkichlari to'g'risida

MA'LUMOT

(mlrd.so'm)

№	Ko'rsatkichlar	2020 yil		2021 yil		2022 yil		2023 yil		2024 yil	
		summa	foiz	summa	foiz	summa	foiz	summa	foiz	summa	foiz
I. Daromadlar jami		132 938,0	100%	164 799,4	100%	201 863,7	100%	231 721,3	100%	274 423,0	100%
1.	Bevosita soliqlar	45 206,9	34%	58 930,4	36%	64 447,1	32%	73 103,6	32%	90 833,0	33%
1,1	Foyda solig'i	28 712,2	64%	38 363,3	65%	37 649,9	58%	40 778,9	56%	52 620,0	58%
1,2	Jismoniy shaxslardan olinadigan daromad solig'i	15 140,8	33%	18 917,7	32%	24 284,5	38%	29 917,4	41%	35 384,0	39%
1,3	Aylanmadan olinadigan soliq	1 353,9	3%	1 649,4	3%	2 512,7	4%	2 407,3	3%	2 829,0	3%
2.	Bilvosita soliqlar	46 428,4	35%	56 290,4	34%	71 390,2	35%	83 325,8	36%	88 341,0	32%
2,1	Qo'shilgan qiymat solig'i	31 177,4	67%	38 439,0	68%	52 189,4	73%	57 885,3	69%	59 280,0	67%
2,2	Aksiz solig'i	11 697,3	25%	13 086,5	23%	13 455,0	19%	15 834,4	19%	19 060,0	22%
2,3	Bojxona boji	3 553,7	8%	4 764,9	8%	5 745,7	8%	9 606,1	12%	10 001,0	11%
3.	Resurs to'lovlari va mulk solig'i	21 257,0	16%	23 036,4	14%	23 912,8	12%	28 079,5	12%	36 363,0	13%
3,1	Mol-mulk solig'i	1 974,3	9%	2 457,3	11%	4 015,4	17%	5 097,7	18%	6 805,0	19%
3,2	Yer solig'i	2 386,7	11%	4 082,8	18%	5 305,9	22%	6 890,1	25%	8 216,0	23%
3,3	Yer qa'ridan foydalanganlik uchun soliq	16 417,1	77%	15 811,9	69%	13 887,4	58%	15 300,3	54%	20 170,0	55%
3,4	Suv resurslaridan foydalanganlik uchun soliq	478,8	2%	684,4	3%	704,1	3%	791,4	3%	1 173,0	3%
4	Boshqa daromadlar	20 045,8	15%	26 542,2	16%	42 113,7	21%	47 212,5	20%	58 886,0	21%

Jadvaldagi ma'lumotlar, Iqtisodiyot va moliya vazirligining internetdagi rasmiy sahifasidan olingan bo'lib, muallif tomonidan tegishli tartibda tahlil qilingan.

Jadvalda keltirilgan raqamlardan quyidagicha xulosa qiladigan bo'lsak, ushbu jadval asosida shakllantirilgan davlat byudjeti daromadlari ko'rsatkichlari bo'yicha 2020 va 2021 yillarda bevosita soliqlar yoki to'g'ri soliqlardan tushgan mablag'lar jami daromadlarga nisbatan 34-36 foizni tashkil etgan bo'lsa, 2022,

2023 va 2024 yillarda ushbu ko'rsatkichlar 32-33 foizni tashkil etgan. Bunga sabab, respublika hududlarida yangi tashkil etilayotgan ishlab chiqarish korxonalariga davlat tomonidan soliq imtiyozlarini qo'llanilishi va boshqa tartibda davlat ko'maklari berilishi natijasida soliq yuki kamaytirilgan. Huddi shuningdek, resur to'lovlari va mol-mulk solig'i bo'yicha ham 2020-2021 yillarda 16-14 foiz tushum bo'lgan bo'lsa, ushbu ko'rsatkichlardan 2022, 2023 va 2024 yillarda 12-13 foiz tushum bo'lgan. Bu ham mamlakatda ishlab chiqarish korxonalarini yanada rivojlantirish maqsadida va ularning sonini ko'paytirish siyosatini amalga oshirish uchun keyingi yillarda tashkilotlar tomonidan to'lanadigan resurs to'lovlari va mol-mulk solig'i bo'yicha foiz miqdorlari kamaytirilgan. Ushbu soliq va yig'implarning yuklarini jadvalda keltirilgan bilvosita soliqlar va boshqa daromadlar tarkibidagi tushumlarning zimmasiga yuklatilgan. Ushbu ma'lumotlardan kelib chiqib xulosa qiladigan bo'lsak, ishlab chiqaruvchilar tomonidan to'lanadigan davlat soliqlari yuklarini istemol soliqlari va boshqa davlat daromadlari yuklariga qo'shilganligini ko'rishimiz mumkin. Jadvaldan ko'rinib turibdiki, bilvosita soliqlar orqali davlat daromadlarini bajarilishi o'rtacha 35-36 foizni tashkil etmoqda. Mazkur soliqdan tushadigan daromadlarni o'rtacha 70 yoki 80 foizi mahalliy byudjetlar daromadlariga tushushi orqali mahalliy byudjetlarning xarajatlarini bajarilishida yuzaga keladigan taqchilliklarning oldi olinishi maqsadga muvofiq bo'lar edi.

Mahalliy byudjetlarning daromad bazasi hududlarda yaratilayotgan milliy daromad, ya'ni ishlab chiqarishning rivojlanish darajasi, daromadlarning doimiy va bir maromda tushishi bilan bevosita bog'liqdir. Albatta bu jarayonlarni amalga oshirishda hududlardagi mahalliy davlat hokimiyati organlarining xizmatlari juda ham beqiyosdir. Bunda mahalliy byudjetlar daromadlarini oshirishning ichki rezervlarini oshirishda hududlarda ishlab chiqarishning rivojlanishida hamda joylardagi iqtisodiy islohotlarning muvaffaqiyatli amalga oshirilishida mahalliy davlat hokimiyati organlarining ahamiyati kattadir. Chunki, joylardagi mahalliy boshqaruv organlari barcha mahalliy byudjetga tushadigan daromadlar bazasini juda yaxshi bilishlari oqibatida mahalliy byudjet daromadlarini ortishiga katta hissa qo'shishmoqda. Quyida keltirilgan 2-jadvalda hududlardagi mahalliy byudjet daromadlari va xarajatlari to'g'risida ma'lumotlar keltirilgan. Ushbu ma'lumot jadvalidan asosan xarajatlarni daromadlardan ortganligini va mahalliy byudjet taqchilligini Respublika byudjetidan ajratilgan tartibga soluvchi byudjet transfetrlari va o'zaro hisob-kitoblar asosida bartaraf etilganligini ko'rishimiz mumkin.

O'zbekiston Respublikasining mahalliy byudjetlari daromadlari va xarajatlari to'g'risida

MA'LUMOT

(mlrd.so'm)

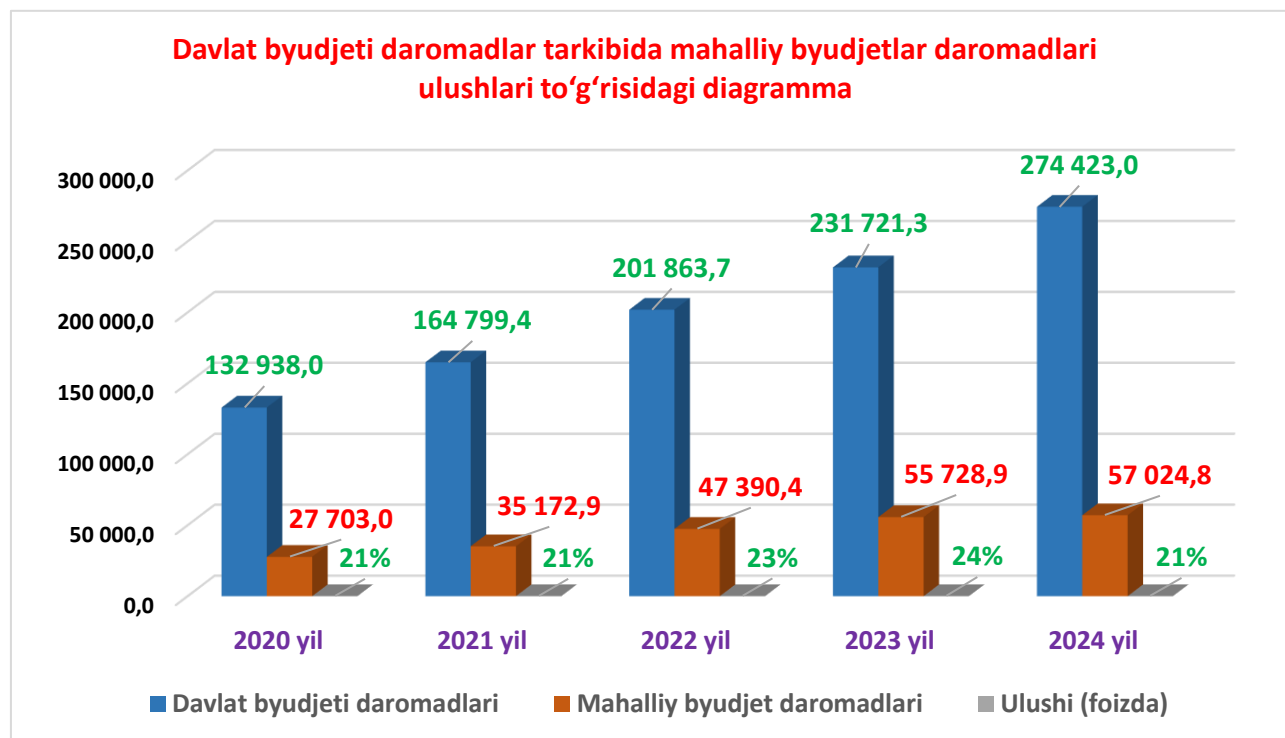
№	Hududlar nomi	2020 yil			2021 yil			2022 yil			2023 yil			2024 yil		
		yillik			yillik			yillik			yillik			yillik		
		Daromad	Xarajat	Transfert	Daromad	Xarajat	Transfert	Daromad	Xarajat	Transfert	Daromad	Xarajat	Transfert	Daromad	Xarajat	Transfert
	Jami	27 703,0	47 190,8	19 487,8	35 172,9	65 534,3	30 361,4	47 390,4	88 787,5	41 397,1	55 728,9	101740,9	46 011,7	57 024,8	86 811,8	16 836,8
1	Qoraqalpog'iston	2 743,9	3 542,0	798,1	1 869,3	4 376,1	2 506,9	2 499,5	5 939,9	3 440,3	2 843,7	6 806,0	3 962,3	2 933,1	5 637,5	2 077,9
2	Andijon	2 105,9	3 708,0	1 602,1	2 418,6	4 911,1	2 492,5	3 246,5	6 869,8	3 623,3	3 931,2	8 137,3	4 206,0	3 782,0	6 757,4	1 913,8
3	Buxoro	1 782,9	3 103,5	1 320,6	2 374,1	4 071,0	1 696,8	3 425,3	5 350,7	1 925,4	3 876,6	5 968,4	2 091,9	3 898,8	5 348,1	361,1
4	Jizzax	1 058,0	2 057,7	999,7	1 460,4	2 927,2	1 466,7	1 822,8	3 928,5	2 105,7	2 227,9	4 645,7	2 417,8	2 151,1	3 847,2	888,6
5	Qashqadaryo	2 468,8	4 603,2	2 134,4	2 722,1	6 095,4	3 373,3	3 920,0	8 812,2	4 892,3	4 607,5	10 519,3	5 911,8	4 572,5	6 585,8	927,0
6	Navoiy	1 540,9	1 818,2	277,3	1 947,8	2 629,4	681,6	2 432,9	3 469,1	1 036,1	3 039,4	4 046,1	1 006,7	2 690,3	3 802,6	182,5
7	Namangan	1 763,0	3 776,9	2 013,9	2 297,1	4 955,0	2 658,0	3 265,4	6 927,5	3 662,2	3 516,8	8 113,6	4 596,7	3 391,4	5 983,4	1 984,0
8	Samarqand	2 385,6	3 811,6	1 426,0	3 154,8	5 681,6	2 526,8	4 197,7	7 889,6	3 691,9	5 100,1	8 778,5	3 678,4	5 312,6	7 678,6	1 588,5
9	Surxondaryo	1 605,7	3 246,6	1 640,8	1 993,3	4 782,1	2 788,8	2 670,6	6 527,9	3 857,3	3 043,0	7 944,0	4 901,0	2 989,1	5 541,5	1 832,8
10	Sirdaryo	716,5	2 375,6	1 659,1	881,7	2 138,9	1 257,2	1 147,8	2 671,1	1 523,3	1 390,3	3 147,7	1 757,3	1 528,1	2 752,1	901,8
11	Toshkent v.	2 395,5	3 386,8	991,3	3 734,1	4 879,3	1 145,2	4 526,0	6 838,2	2 312,2	6 024,1	7 770,3	1 746,1	5 448,4	7 041,6	517,4
12	Farg'ona	2 677,3	4 132,1	1 454,8	3 665,1	5 865,9	2 200,8	4 778,5	8 749,0	3 970,5	5 169,3	9 889,9	4 720,6	5 273,6	8 131,9	1 943,7
13	Xorazm	1 302,7	2 278,9	976,2	1 743,1	3 344,6	1 601,5	2 384,2	4 485,5	2 101,3	2 740,7	5 610,0	2 869,3	2 876,9	4 691,1	1 203,8
14	Toshkent sh.	3 156,3	5 349,7	2 193,5	4 911,4	8 876,7	3 965,3	7 073,2	10 328,5	3 255,3	8 218,3	10 364,1	2 145,8	10 176,9	13 013,0	513,9

Jadvaldagi ma'lumotlar, Iqtisodiyot va moliya vazirligining internetdagi rasmiy sahifasidan olingan bo'lib, muallif tomonidan tegishli tartibda tahlil qilingan.

Ushbu jadvaldan ko'rinib turibdiki, ma'umotlarni 5 yilligini tahlil qilinganda, yildan-yilga xarajatlarni ortishi oqibatida Respublika byudjetidan ajratilgan tartibga soluvchi byudjet transfertlari orqali taqchillikni bartaraf etish ham ortib borgan. Jumladan, 2020 yilda 19487.8 mlrd.so'm byudjet transferti jalb qilingan bo'lsa, 2021 yilda bu ko'rsatkich 30361.4 mlrd.so'mni, 2022 yilda 41397.1 mlrd.so'mni, 2023 yilda 46011.7 mlrd.so'mni tashkil etgan. Ushbu yillarda mahalliy byudjet daromadlarini asosini byudjet transfertlari bilan to'ldirish amalga oshirilgan. Bunga sabab, davlatning ichki iqtisodiy siyosatini isloxotlari tufayli joylarda ishlab chiqarish korxonalarini ko'paytirish maqsadida tadbirkorlarga tegishli soliq imtiyozlari berilishi oqibatida byudjetga soliqlardan tushumlar biroz kamaygan. 2024 yilda esa Respublika byudjetidan ajratilgan tartibga soluvchi byudjet transfertlaridan foydalanish jarayonlari 2020 yilga nisbatan ham ancha kam bo'lgan yoki 2024 yilda byudjet transfertlari hisobidan 16836.8 mlrd.so'm foydalanishga erishilgan. Bu esa mahalliy byudjet daromadlarini oldingi yillarga nisbatan to'g'ridan-to'g'ri ortganligidan dalolat beradi. Buning asosiy sabablaridan bittasi mamlakatning barcha ma'muriy hududlarida kichik biznes va o'rta biznesni ko'paytirish hamda ularga davlat tomonidan tegishli soliq imtiyozlarini qo'llanilishi oqibatida mahalliy byudjetlar daromadlarini oldingi besh yilga nisbatan ortganligini kuzatishimiz mumkin. Jumladan, 2020 yilda mahalliy byudjet daromadlari jami 27703.0 mlrd.so'm bo'lgan bo'lsa, ushbu ko'rsatkich 2024 yilda 57024.8

mlrd.so'mni tashkil etgan yoki 2020 yilga nisbatan mahalliy byudjet daromadlari 206 foizga ortganligini ko'rishimiz mumkin.

Yuqoridagi jadval ma'lumotlardan foydalangan holda O'zbekiston Respublikasining davlat byudjeti daromadlari tarkibida mamlakatning ma'muriy hududlarining mahalliy byudjetlari daromadlari ulushini quyidagi diagrammada ko'rinishimiz mumkin.



1-chizma

Diagrammada keltirilgan raqamli ma'lumotlar muallif tomonidan solishtirma jadvallar asosida tahlil qilinib shakllantirilgan.

Mazkur diagrammadan ko'rinib turibdiki, davlat byudjeti daromadlari tarkibida mahalliy byudjetlarning ulushi anchagina pastligi bu achinarli holatdir. Mahalliy byudjetlarining daromadlari qachon mustaxkam va serdaromad bo'lsagina shunda davlat byudjeti daromadlarini ortishi ham kuzatiladi. 2020 yilda mahalliy byudjet ulushi 21 foizni tashkil etgan bo'lsa, bu ko'rsatkich 2024 yilda ham 21 foizni tashkil etmoqda. Bunday o'zgarishsiz bo'lgan ko'rsatkich byudjet daromadlarining ortishiga salbiy ta'sir ko'rsatadi. Bu esa mahalliy byudjet xarajatlarini ta'minlashda muammo va qiyinchiliklarga sabab bo'lishi mumkin. Diagrammada ko'rinib turganidek 5 yil davomida daromadlarni ortishida tegishli o'zgarishlar bo'lishiga qaramasdan yoki davlat byudjeti daromadlari 2024 yilda 274423.0 mlrd.so'm bo'lgan bo'lsa, shu ko'rsatkichga nisbatan mahalliy byudjetlar daromadi jami 57024.8 mlrd.so'mni tashkil etgan. Ushbu daromadlarni ortishini foiz ko'rsatkichi bilan solishtirilganda mahalliy byudjetlarning tegishli daromadlari davlat byudjeti daromadlari negizda o'zgarishsiz qolmoqda. Bu esa o'z navbatida, mahalliy byudjetlar daromadlarini shakllanishida davlat byudjeti daromadlari oldida boqimanda kayfiyatida bo'lishini taqozo etmoqda.

Xulosa va takliflar.

Bugungi kunda davlat byudjeti ijrosini amalga oshirishda mahalliy byudjetlarni yuqori byudjetga bog'lovchi yoki aksincha yuqori byudjet bilan quyi byudjetlar o'rtasida aloqa vositasini amalga oshiruvchi tizim bu byudjetlararo munosabatlar tizimidir. Ushbu tizimni tartibga solish amaliyotida ayrim mahalliy byudjetlar daromadlarining asosiy qismini shakllanishini ta'minlamoqda. Mahalliy byudjet daromadlarining bunday miqdorda bo'lishi mahalliy hokimiyat organlarining o'z mas'uliyatlarini yuqori darajada his qilmaslikka olib keladi. Bunday holat davlat iqtisodiyotini erkinlashtirish siyosatiga to'g'ri kelyamaydi. Bundan tashqari, mahalliy davlat hokimiyati organlari respublikamizdagi donor mintaqalar va respublika byudjeti orqali qo'llab-quvvatlanishini bilganliklari uchun o'zlarining daromad bazalarini va iqtisodiy imkoniyatlarini oshirishga unchalik harakat qilmaydilar. Ayrim hududlar esa respublika byudjetidan ko'proq mablag' olish maqsadida birinchi darajali to'lovlar, ijtimoiy nafaqalar va turli ijtimoiy to'lovlar hajmini sun'iy ravishda oshirishga harakat qiladilar.

Mahalliy byudjetlarning daromadlar bazasi bo'lgan mahalliy soliqlar va mahalliy yig'imlarni hamda moliyaviy oqimlarni tahlil qilish yoki o'rganish yuzasidan amalga oshirilgan tadqiqotlar asosida quyidagicha xulosa fikrlar bildirish mumkin;

- ryepublikamizda hozirgi kunda shakllangan mahalliy soliqlar mahalliy byudjet daromadlari bazasida mustaxkamlangan bo'lsa, lekin ushbu soliqlarni to'liq mahalliy byudjet daromadlariga tushishni ta'minlash lozim,

- mahalliy soliqlar va yig'imlarning tarkibini ijtimoiy-iqtisodiy shart-sharoitlardan kelib chiqqan holda soliqqa tortish manbasi, soliq to'lovchilar tarkibini tahlil qilgan holda birlashtirish,

- umumdavlat soliqlardan tashqari tartibga solinadigan soliqlarni ajratmalar foizini to'laligicha mahalliy byudjet daromadlari bazasiga o'tkazish kerak, jumladan; alkogol ichimliklarga qo'llaniladigan aksiz solig'i,

Maqolada keltirilgan mavzu esa bugungi kunning dolzarb mavzulardan biri bo'lib, mahalliy byudjetlar xarajatlarini mablag' bilan ta'minlash yuzasidan hududlardagi mahalliy davlat hokimiyati organlarining iqtisodiy munosabatlardagi mustaqilligini yanada oshirishga qaratilgan. Shu bilan birga mahalliy byudjetni shakllantirishda mahalliy hokimiyat organlarining vakolatlarini yanada oshirish va byudjet daromadlarining barqarorligini ta'minlash, mahalliy davlat hokimiyati organlarining tadbirkorlikni rivojlantirishga, kichik va o'rta biznes sohasida manfaatdorligini yanada oshirishdan dalolat beradi. Bundan tashqari, hududlarda investision salohiyatlarni oshirish yuzasidan taraqqiy etgan xorij investorlarini jalb qilish orqali hududlarda investision muhitni shakllantirish va buning natijasida zamonaviy texnologiyalar asosida shakllantirilgan ishlab chiqarish korxonalarini hamda sanoat korxonalarni ko'paytirish maqsadga muvofiq bo'ladi. Bu esa mahalliy byudjet daromadlarini ortishiga katta ta'sir etadi.

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IQTISODIY VA IJTIMOIIY GEOGRAFIYA TA’LIMIDA RAQAMLI TEKNOLOGIYALAR YORDAMIDA TALABALARDA IJODIY FIKRLASH KOMPETENSIYALARINI RIVOJLANTIRISH

***Annotatsiya:** Raqamli texnologiyalarni ta’lim jarayoniga joriy etish talabalarda ijodiy fikrlash, tanqidiy tahlil qilish va mustaqil qaror qabul qilish kompetensiyalarini rivojlantirishda muhim ahamiyatga ega. Iqtisodiy va ijtimoiy geografiya fanida raqamli platformalar va multimedia vositalaridan foydalanish hududiy jarayonlarni tahlil qilish, global axborot manbalaridan samarali foydalanish hamda kreativ yondashuvni shakllantirishga xizmat qiladi. Shu bois, raqamli texnologiyalar asosida ijodiy fikrlash kompetensiyalarini rivojlantirish metodikasini o‘rganish bugungi ta’lim tizimi uchun dolzarb va amaliy ahamiyatga egadir.*

***Kalit so‘zlar:** Raqamli texnologiyalar, ijodiy fikrlash, GIS, raqamli platformalar, kreativ yondashuv, analitik fikrlash, interaktiv ta’lim, multimedia, masofaviy ta’lim, innovatsion metodlar.*

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DEVELOPING STUDENTS' CREATIVE THINKING COMPETENCES WITH THE HELP OF DIGITAL TECHNOLOGIES IN ECONOMIC AND SOCIAL GEOGRAPHY EDUCATION

***Abstract:** The integration of digital technologies into the educational process plays a crucial role in developing students' creative thinking, critical analysis, and independent decision-making skills. The use of digital platforms and multimedia tools in teaching economic and social geography enhances the analysis of spatial processes, promotes effective use of global information resources, and fosters creative approaches. Therefore, studying the methodology for developing creative thinking competencies through digital technologies is a relevant and practically significant task for the modern education system.*

Keywords: *Digital technologies, creative thinking, GIS, digital platforms, creative approach, analytical thinking, interactive learning, multimedia, distance learning, innovative methods.*

Bugungi globallashtirish jarayonida ta'lim tizimida raqamli texnologiyalarni keng joriy etish zamonaviy pedagogikaning asosiy talablaridan biriga aylandi. Raqamli ta'lim resurslari, interaktiv platformalar, multimediyaviy vositalari, virtual mashg'ulotlar va xorijiy ta'lim dasturlari o'quv jarayonining sifatini oshirish, talabalarning fanga bo'lgan qiziqishini kuchaytirish hamda ularni mustaqil izlanishga yo'naltirishda katta imkoniyat yaratmoqda. Ayniqsa, iqtisodiy va ijtimoiy geografiya kabi tahlil va mantiqiy fikrlashga asoslangan fanlarda raqamli texnologiyalardan foydalanish talabalarda ijodiy fikrlash, kompleks yondashuv va analitik kompetensiyalarni shakllantirishda muhim omil bo'lib xizmat qiladi. Iqtisodiy va ijtimoiy geografiya ta'limi hududiy iqtisodiy jarayonlar, migratsiya, urbanizatsiya, demografik jarayonlar va ijtimoiy-iqtisodiy rivojlanish dinamikasini o'rganishni o'z ichiga oladi. Ushbu jarayonlarni chuqur anglash uchun talabalarning faqat nazariy bilimlari emas, balki ularda kreativ fikrlash, vizual tahlil, modellashtirish, muammoli vaziyatlarga yechim topish kabi kompetensiyalar ham rivojlangan bo'lishi zarur. Raqamli texnologiyalar esa ushbu malakalarni rivojlantirishda samarali vosita hisoblanadi. Xususan, geografik axborot tizimlari (GIS), onlayn xaritalar, raqamli statistik bazalar, interaktiv modellar va virtual laboratoriyalar yordamida talabalar murakkab ijtimoiy-iqtisodiy jarayonlarni real vaqt rejimida o'rganish va tahlil qilish imkoniyatiga ega bo'ladi. Iqtisodiy va ijtimoiy geografiya ta'limining mazmuni va kreativ fikrlash talablari. Iqtisodiy va ijtimoiy geografiya fanining asosiy vazifasi — hududiy iqtisodiy jarayonlar, aholi dinamikasi, urbanizatsiya, migratsiya va ijtimoiy rivojlanish tendensiyalarini tahlil qilishdir. Ushbu jarayonlar murakkab bo'lgani sababli, talabalardan nafaqat nazariy bilimlar, balki mustaqil tahlil qilish, kartografik materiallarni solishtirish, statistika bilan ishlash, baholash va xulosa chiqarish, kreativ yondashuv asosida muammoga yechim topish kabi ko'nikmalarni talab qiladi. Bu o'rinda raqamli texnologiyalar talabalarga global iqtisodiy-ijtimoiy jarayonlar haqida real, qiyosiy va aniq tasavvurlar hosil qilish imkonini beradi. Geografik axborot tizimlari (GIS), ArcGIS Online, Google Earth, QGIS, Gapminder, Datawrapper va Statista kabi zamonaviy xorijiy raqamli platformalar geografik jarayonlarni grafik, xarita, diagramma va dinamik animatsiyalar orqali o'rganishga imkon beradi. Bu esa o'quvchilarda nafaqat fazoviy tasavvurni kuchaytiradi, balki hududiy farqlarni solishtirish, statistik ma'lumotlarni sharhlash, hududlarning rivojlanish tendensiyalarini oldindan baholash kabi analitik fikrlash jarayonlarini faollashtiradi. GIS texnologiyalari yordamida talabalar real xaritalar bilan ishlash, boshqa hududlarga oid ma'lumotlarni qatlamlar bo'yicha tahlil qilish, ekologik jarayonlarni modellashtirish va hududiy muammolarni aniqlash imkoniga ega bo'ladi. Shuningdek, 3D kartografiya, virtual sayohatlar, sun'iy yo'ldosh tasvirlari bilan ishlash, onlayn ma'lumotlar bazasini tahlil qilish kabi amaliy mashg'ulotlar talabalarning qiziqishlarini oshirib, o'quv jarayonini yanada

interaktiv va samarali qiladi. Talabalar GIS loyihalari, virtual tadqiqotlar, onlayn xaritalash bo'yicha ijodiy ishlanmalar yaratishi mumkin. Xorijiy

ta'lim dasturlari va raqamli platformalarning o'quv jarayoniga integratsiyasi. Zamonaviy ta'limda xorijiy o'quv resurslari va platformalari keng qo'llanilmoqda. Coursera, EdX, Khan Academy, OpenLearn kabi platformalarda iqtisodiy geografiya bo'yicha darslar mavjud bo'lib, talabalarning global bilim maydoniga integratsiyasini kuchaytiradi. Bundan tashqari, Google Earth Engine yordamida landshaft o'zgarishlarini tahlil qilish, ArcGIS StoryMaps orqali geografik hikoyalar yaratish, UNData, World Bank Data, UNDP Reports orqali iqtisodiy ko'rsatkichlarni solishtirish talabalar uchun ijodiy va tahliliy fikrlash tajribasini kengaytiradi. Raqamli ta'lim asosidagi dars quyidagi metodlar bilan kuchaytiriladi:

- Muammoli o'qitish metodi: talabalarga real iqtisodiy-ijtimoiy hodisalar bo'yicha muammo berilib, raqamli vositalar orqali yechim topish talab qilinadi.

- Interaktiv metodlar: kahoot, quizizz, mentimeter orqali kreativ fikrlash testlari.

- Loyiha asosida o'qitish: talabalar GIS loyihalari, aholi xaritalari, urbanizatsiya dinamikasi bo'yicha loyiha yaratadilar.

- Virtual ekskursiyalar: Google Earth va VR texnologiyalar yordamida shaharlar, landshaftlar va iqtisodiy mintaqalar bo'yicha virtual sayohatlar.

Bu metodlar ijodiy fikrlashni faollashtiradi, talabani faol subyekt sifatida shakllantiradi. Xulosa qilib ayganda, iqtisodiy va ijtimoiy geografiya ta'limida raqamli texnologiyalarni qo'llash talabalarda ijodiy va analitik fikrlash kompetensiyalarini rivojlantirishda muhim omil hisoblanadi. GIS dasturlari, interaktiv xaritalar, virtual darslar va xorijiy ta'lim platformalari o'quv jarayonini yanada samarali va qiziqarli qiladi. Raqamli vositalar orqali talabalar real vaqt ma'lumotlarini tahlil qilishi, muammolarga kreativ yechim topishi va mustaqil fikrlash qobiliyatini rivojlantirishi mumkin. Shu bois, ushbu texnologiyalarni ta'lim jarayoniga keng joriy etish iqtisodiy va ijtimoiy geografiya o'qitish sifatini oshirishning dolzarb yo'nalishidir.

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XORAZM VILOYATINING TURIZMI VA TURISTIK RESURSLARI GEOGRAFIYASI

Annotatsiya: *Ushbu maqolada Xorazm viloyatining turizmi va uning turistik resurslari geografik jihatdan har tomonlama tahlil qilinadi. Tadqiqotda viloyatning tabiiy, tarixiy-madaniy, arxeologik va etnografik resurslari, ularning hududiy joylashuvi hamda turizmni rivojlantirishdagi ahamiyati yoritilgan. Shuningdek, Xorazmda turizm infratuzilmasining bugungi rivojlanish holati, mavjud muammolar va istiqboldagi imkoniyatlar ilmiy asosda ko'rib chiqiladi.*

Kalit so'zlar: *Xorazm viloyati, turistik resurslar, geografik joylashuv, tarixiy meros, arxeologik yodgorliklar, turistik salohiyat.*

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Annotation: *This article provides a comprehensive geographical analysis of tourism in the Khorezm region and its tourist resources. The study examines the region's natural, historical-cultural, archaeological, and ethnographic resources, their spatial distribution, and their significance in the development of tourism. In addition, the article scientifically evaluates the current state of tourism infrastructure in Khorezm, existing challenges, and future development prospects.*

Keywords: *Khorezm region, tourist resources, geographical location, historical heritage, archaeological sites, tourism potential.*

Xorazm viloyati O'zbekistonning eng qadimiy madaniyat o'choqlaridan biri bo'lib, Markaziy Osiyo sivilizatsiyasi shakllanishida beqiyos o'rin tutadi. Qadimiy Xorazm davlati, uning ilm-fan, me'morchilik va hunarmandchilikdagi yutuqlari, shuningdek, o'ziga xos etnografik merosi bugungi kunda jahon ilmiy hamjamiyati tomonidan keng o'rganilmoqda. Aynan shu omillar viloyatni turizm sohasini rivojlantirish uchun juda katta salohiyatga ega hudud sifatida namoyon etadi. Tarixiy manbalar, arxeologik qazilmalar va me'moriy obidalar Xorazmning ko'p asrlik madaniy qatlama ega ekanligini tasdiqlaydi. Xorazmning geografik

joylashuvi ham turizm taraqqiyotida muhim omil hisoblanadi. Xorazm hududi Amudaryoning quyi oqimi, qadimiy voha va cho'l hududlari tutashgan joyda joylashib, o'ziga xos tabiiy landshaftlarga ega. Keskin kontinental iqlimga qaramay, daryo bo'yidagi to'qayzorlar, qadimiy sug'orish tizimlari bilan bog'liq dehqonchilik yerlari va cho'l hududlari eko-turizm, agro-turizm va cho'l safari uchun qulay imkoniyat yaratadi. Hudud ming yillardan beri karvon yo'llari kesishgan bo'lib, Buyuk Ipak yo'lining muhim bo'g'inlaridan biri sifatida tarixiy-madaniy turizm markazi sifatida ahamiyatga ega. Xiva shahri qadimiy shahar tuzilishi va me'moriy obidalari bilan YUNESKO Butunjahon merosi ro'yxatiga kiritilgan bo'lib, xalqaro miqyosda tan olingan turistik markazdir. Ichan-Qal'a, Juma masjidi, Toshhovli saroyi va Pahlavon Mahmud maqbarasi sayyohlar uchun asosiy qiziqish obyektlari hisoblanadi. So'nggi yillarda O'zbekistonda turizm sohasini innovatsion yondashuv asosida rivojlantirishga katta e'tibor qaratilmoqda. Prezidentimiz tashabbusi bilan qabul qilingan davlat dasturlari, vizasiz rejimlarning joriy etilishi, infratuzilmaning modernizatsiya qilinishi Xorazm viloyatiga tashrif buyurayotgan turistlar sonining ortishiga sezilarli ta'sir ko'rsatmoqda. Xorazmda turizm sohasi hali o'z salohiyatidan to'liq foydalanmagan. Hududiy resurslarni tizimli o'rganish, ularni turizm tarmoqlari bo'yicha tasniflash, muammolarni aniqlash va ilmiy takliflar ishlab chiqish viloyat turizmini rivojlantirish uchun zarur. Ellikqal'a majmuasi, qadimiy sug'orish tizimlari, Amudaryo bo'yidagi eko-hududlar, etnografik qishloqlar va qo'riqxonalarni samarali boshqarish Xorazmning turistik brendini kuchaytiradi. Tadqiqot maqsadi — hududning turistik salohiyatini baholash, resurslarning joylashuvini o'rganish, infratuzilma darajasini aniqlash va istiqboldagi imkoniyatlarni yoritish, shuningdek turizm rivojiga to'squinlik qilayotgan omillarni aniqlab, tavsiyalar berishdir. Xorazmning turizm resurslarini o'rganishga bag'ishlangan ilmiy manbalar turli yo'nalishlarda yondashuvlarni o'z ichiga oladi. A. Asqarov, S. Tolstov, Ya. G'ulomov kabi olimlar hududning tarixiy va arxeologik salohiyatini yoritgan. Turizm geografiyasi bo'yicha M. Mirzaev, R. Mullabaev va boshqalar resurslarning tasnifi va hududiy rivojlanishini o'rgangan. Amaliy ma'lumotlar Davlat statistika qo'mitasi, Turizm qo'mitasi, UNWTO va UNESCO ma'lumotlariga asoslangan. Xiva shahri va Ichan-Qal'a majmuasining jahon merosi sifatida o'rganilishi, shuningdek Ellikqal'a ekspeditsion tadqiqotlari hududning tarixiy va arxeologik turizm salohiyatini tasdiqlaydi. Shu bilan birga, Xorazmning turistik resurslari hududiy-geografik tizim sifatida kompleks o'rganilmagan. Tadqiqot metodologiyasi geografik tahlil, tizimli yondashuv, statistik ma'lumotlar, kartografik tahlil va qiyoslash elementlariga asoslanadi. Geografik tahlil turistik resurslarning hududiy xususiyatlarini aniqlashga, voha, daryo bo'yi va cho'l landshaftlarining turizmga ta'sirini baholashga yordam berdi. Tizimli yondashuv esa tabiiy, tarixiy-madaniy va infratuzilmaviy resurslarning o'zaro bog'liqligini aniqlash, ularni yagona turistik tizim sifatida talqin etish imkonini yaratdi. Statistika asosidagi tahlil Xorazmga tashrif buyurayotgan turistlar soni, mehmonxonalar sig'imi, xizmatlar ko'lami va turizm iqtisodiy ko'rsatkichlarining o'zgarish dinamikasini aniqlash uchun qo'llandi. Kartografik materiallardan foydalanish turistik obyektlarning

joylashuvini aniqlashtirish, resurslarning hududiy taqsimotini ko'rish va amaliy xulosalar chiqarish imkonini berdi. Shuningdek, boshqa viloyatlar bilan qiyosiy tahlil qilindi. Tadqiqot jarayonida Xiva, Ellikqal'a, Shovot, Bog'ot va Urganch hududlarida joylashgan turistik obyektlarda ekspeditsion kuzatuvlar ham o'tkazildi. Ushbu amaliy kuzatuvlar yodgorliklarning saqlanish holatini, infratuzilmaning mavjud darajasini hamda turizm rivojiga to'sqinlik qilayotgan omillarni aniqlash imkonini berdi. Yuqoridagi metodologik yondashuvlar asosida Xorazm viloyatining turistik resurslari har tomonlama o'rganildi, ularning geografik tuzilishi, amaliy ahamiyati va rivojlanish istiqbollari tahlil qilindi. Tadqiqot natijalari viloyat turizmining samarali rivoji uchun ilmiy asoslangan takliflar ishlab chiqishga xizmat qiladi. Tadqiqotlar Xorazmning turistik salohiyati keng va ko'p qatlamli ekanini ko'rsatdi. Hududning tarixiy yodgorliklari — Ichan-Qal'a, Xiva shahri, Ellikqal'a, qadimiy qal'alar va me'moriy obidalar, shuningdek, tabiiy landshaftlar — Amudaryo bo'yidagi biologik xilma-xillik, to'qayzorlar, cho'l hududlari va etnografik qishloqlar turizmning asosiy yo'nalishlari uchun imkon yaratadi. Xorazm turizm infratuzilmasi rivojlangan bo'lsa-da, transport, mehmonxona xizmatlari, gidlik, raqamli xizmatlar va ekologik obyektlar hali mukammal emas. Mahalliy aholi madaniy meros va hunarmandchilikda faol, lekin professional ko'nikmalar yetarli emas. Xorazm boy tarixiy-madaniy meros, tabiiy landshaft va noyob geografik joylashuvi bilan ko'p qirrali turizm imkoniyatlariga ega hududdir. Xiva shahri va Ichan-Qal'a YUNESKO ro'yxatiga kiritilgan bo'lib, Ellikqal'a, Amudaryo bo'yidagi tabiiy hududlar va etnografik qishloqlar viloyatni turizm yo'nalishlari bilan boyitadi. Tadqiqotlar shuni ko'rsatdiki, resurslardan samarali foydalanish va boshqaruv to'liq yo'lga qo'yilmagan; transport, raqamli xizmatlar, gidlik va xizmat madaniyati takomillashishni talab qiladi. Ekoturizm va agro-turizm boshlang'ich bosqichda bo'lib, ularni rivojlantirish uchun tizimli yondashuv zarur. Mahalliy aholini turizmga jalb qilish va milliy merosni targ'ib qilish iqtisodiy foyda bilan birga madaniy qadriyatlarni saqlashga xizmat qiladi. Xulosa qilib aytganda, Xorazm turizmini rivojlantirish uchun turistik resurslarni kompleks boshqarish, barqaror va ekologik xavfsiz turizmni joriy etish, zamonaviy marketing va xalqaro hamkorlikni kuchaytirish zarur. Shu yo'l bilan viloyat ilmiy asoslangan boshqaruv va innovatsion xizmatlar orqali mintaqaning yetakchi turizm markaziga aylanishi mumkin.

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KAMOL-QOZI MADRASASI TARIXI VA UNI O'ZIGA XOS JIHATLARI (1910–2000-YILLAR MISOLIDA)

***Annotatsiya:** Ushbu maqola Qo'qon shahridagi Kamol-Qozi madrasasining 1910–2000-yillardagi tarixiy evolyutsiyasi hamda uning o'ziga xos me'moriy, ma'rifiy va ijtimoiy jihatlarini kompleks tahlil qilishga bag'ishlangan. Maqolada madrasaning Rossiya imperiyasi davridagi faoliyatidan boshlab, sovet tuzumi ostidagi transformatsiyasi va mustaqillik davridagi qayta tiklanish jarayonlarigacha bo'lgan yo'li yoritilgan.*

***Kalit so'zlar:** Kamol-Qozi madrasasi, Qo'qon, Rossiya imperiyasi, islom ta'limi, me'moriy meros, sovetlashtirish, madrasa tarixi, madaniy meros*

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HISTORY OF KAMOL-KAZI MADRAS AND ITS CHARACTERISTICS (IN THE EXAMPLE OF 1910–2000)

***Abstract:** This article is devoted to a comprehensive analysis of the historical evolution of the Kamol-Kazi Madrasah in the city of Kokand in the 1910s–2000s and its unique architectural, educational and social aspects. The article covers the path of the madrasah from its activities during the Russian Empire to its transformation under the Soviet regime and the processes of restoration during the period of independence.*

***Keywords:** Kamol-Kazi Madrasah, Kokand, Russian Empire, Islamic education, architectural heritage, Sovietization, history of the madrasah, cultural heritage*

Kirish. XX asr O'rta Osiyo madaniyati va ta'lim tizimi tarixda chuqur iz qoldirgan muhim davr hisoblanadi. Aynan shu asrda an'anaviy islom ta'lim muassasalari bo'lgan madrasalar yangi siyosiy, ijtimoiy va madaniy sharoitga moslashish zarurati bilan yuzlashdi. Ushbu jarayonni tadqiq etish mintaqaning ma'naviy-ma'rifiy merosi evolyutsiyasini tushunishda alohida ahamiyatga ega. Qo'qon shahrida joylashgan Kamol-Qozi madrasasi ana shunday yodgorliklardan biri bo'lib, 1909–1910-yillarda qurilgan. U Farg'ona vodiysi me'morchilik an'analarning so'nggi yirik namunalari qatoriga kiradi. Madrasa o'z nomini mahalliy nufuzli qozi va olim Kamol-Qozidan olgan bo'lib, u nafaqat diniy arbob, balki davrining taniqli ma'rifatparvar shaxslaridan biri edi [1]. Sovet davrida madrasa yopildi va bino turli maqsadlarda ombor, turar joy, ma'muriy binolar sifatida — foydalanildi. Mustaqillik yillarida esa madrasa yangicha ma'noda — madaniy meros obyekti sifatida qayta tiklandi va jonlantirildi.

Adabiyotlar tahlili. Kamol-Qozi madrasasining ma'naviy markaz sifatidagi o'rni, mahalliy kadrlar tayyorlashdagi roli hamda madaniy merosni rivojlantirishdagi hissasi haqida bir qator tarixchi va tadqiqotchilar tomonidan ilmiy izlanishlar amalga oshirilgan. Jumladan, Abdullayevning *“Qo'qon madrasalar tarixi”* nomli kitobining 3-bobi Kamol-Qozi madrasasini har tomonlama — tarixiy, me'moriy va ijtimoiy jihatdan kompleks o'rganishga bag'ishlangan. Ushbu bo'limda Kamol-Qozining tarixiy portreti, uning Qo'qon jamiyatidagi mavqe va nufuzi, madrasa qurilish jarayoniga qo'shgan hissasi hamda ilm-fanni rivojlantirishdagi faoliyati yoritib berilgan [1]. berilgan [1]. Yo'ldashev ham o'z tadqiqotlarida Kamol-Qozi madrasasining Qo'qon xonligi davridagi o'rni va ta'lim tizimidagi ahamiyatiga e'tibor qaratgan [2].

Metodologiya. Mazkur tadqiqot metodologiyasi madrasalarni o'rganishga bag'ishlangan mavjud ilmiy izlanishlarga asoslanadi. Tadqiqot jarayonida tarixiy hodisalar xronologiyasi, tizimli-tahliliy yondashuv, qiyosiy-tarixiy tahlil, tarixiy-tipologik tasniflash usuli, struktural-funksional tahlil kabi ilmiy metodlar qo'llanildi. Qiyosiy tahlil metodlari orqali Kamol-Qozi madrasasi boshqa mintaqaviy madrasalar bilan solishtirib o'rganildi. Tarixiy-tipologik usul madrasaning struktura va funksional xususiyatlarini tasniflashda qo'l kelgan bo'lsa, struktural-funksional yondashuv ta'lim muassasasi sifatida madrasaning tizimiy mohiyatini aniqlashga imkon berdi.

Natijalar. O'tkazilgan tadqiqotlar asosida quyidagi ilmiy xulosalarga kelindi: 1915-yilga kelib Kamol-Qozi madrasasida 68 nafar talaba tahsil olgan bo'lib, ulardan 42 nafari mahalliy aholiga, 26 nafari esa boshqa viloyatlardan kelgan talabalar hisoblangan [5]. Talabalarga dars bergan asosiy o'qituvchilar soni 5 nafar, yordamchi o'qituvchilar 2 nafar, shuningdek 1 nafar kutubxona mutavallisi faoliyat yuritgan [1]. Madrasa tasarrufida 18 gektar yer, 10 ta savdo do'koni va 1 ta karvonsaroy mavjud bo'lgan [5]. 1913-yilda madrasa yillik daromadi 1450 so'mni tashkil etgan bo'lib, uning 520 so'mi talabalar ehtiyoji uchun, 380 so'mi esa o'qituvchilar maoshiga sarflangan. Madrasa mahalliy madaniyat rivojiga sezilarli ta'sir ko'rsatgan, unda adabiy muhit shakllangan,

ilmiy munozaralar o'tkazilgan, xattotlik va amaliy san'at rivojlantirilgan [2]. Madrasaning ta'lim jarayonida an'anaviy va zamonaviy yondashuv uyg'unligi kuzatilgan, kichik hajmdagi, ammo samarali o'quv tizimi shakllangan. Hozirgi kunga kelib madrasaning 75 foizi original holatda saqlanib qolgan bo'lib, 2000-2018-yillar davomida u kapital ta'mirdan o'tkazilgan [2].

Muhokama. Tadqiqot natijalari Kamol-Qozi madrasasining nafaqat mahalliy, balki mintaqaviy darajadagi ahamiyatga ega yodgorlik ekanini ko'rsatadi. Binoning ikki qavatli, 28 hujrali tuzilishi o'rta hajmdagi klassik madrasalarga xos xususiyatdir. Ganchkorlik, yog'och o'ymakorligi va bezak san'ati elementlarining saqlanishi mahalliy me'moriy an'analarning mustahkamligini tasdiqlaydi. Shu bilan birga, binoning faqat 75 foizi original holatda saqlangani keng qamrovli restavratsiya zaruriyatini ko'rsatadi [3]. Madrasaning o'quv dasturida diniy fanlarning 55 foiz, dunyoviy fanlarning 35 foiz va amaliy fanlarning 10 foiz ulushga ega bo'lgani jadidchilik ta'sirini ko'rsatadi. Bu o'sha davr uchun progressiv yondashuv sifatida baholanadi [1]. Biroq hozirgi kunda madrasa bir qator muammolarga duch kelmoqda: binoning qisman yemirilishi, original hujjatlarning yo'qolishi va obyektning zamonaviy talablarga moslashtirishdagi qiyinchiliklar shular jumlasidan. Bu muammolarni bartaraf etish uchun ilmiy asoslangan restavratsiya, raqamli arxiv yaratish, adaptiv foydalanish dasturlarini yo'lga qo'yish zarur. Ushbu choralar madrasaning saqlanishi va barqaror rivojlanishini ta'minlaydi [5].

Xulosa. Kamol-Qozi madrasasining zamonaviy jamiyatdagi o'rni uni nafaqat tarixiy yodgorlik, balki tirik madaniy institut sifatida namoyon etadi. Uning madaniy meros sifatidagi qadriyati faqat o'tmish bilan cheklanib qolmay, hozirgi va kelajak avlodlar uchun ham dolzarb ahamiyat kasb etadi. Madrasa qurish qarorining o'zi ham xayriya emas, balki uzoqni ko'ra bilgan ijtimoiy fikr va ma'naviy mas'uliyat mahsuli bo'lganini ko'rsatadi. Madrasaning ijtimoiy ta'siri keng qamrovli bo'lib, uning faoliyati nafaqat ta'lim sohasi bilan chegaralanmasdan, mahalliy iqtisodiyotga ham sezilarli hissa qo'shgan.

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PECULIARITIES OF USING INFORMATION AND COMMUNICATION TECHNOLOGIES IN MEDICAL EDUCATION

Abstract: *This article analyzes the role and importance of information and communication technologies (ICT) in medical education. In modern education, ICT tools play a significant role in deepening students' theoretical knowledge, developing practical skills, and engaging them in research activities. The article discusses effective methods of using virtual simulators, online platforms, and multimedia resources. In solving medical problems, general informatics serves as a core discipline that establishes data-processing methods. Based on these methods, it supports the management of various objects and relies on information computer systems. As an applied discipline, informatics studies the laws of information processes, the creation of information communication models, as well as information systems and technologies in specific fields. Specialized medical informatics examines the applications of medical information technologies. It considers the use of both standard and universal tools to address medical tasks, special medical information technologies, and systems.*

Keywords: *IT in medicine, ICT in medical education, VR/AR technologies, mothers with young children, communicative competence, medical information technology, registry, admission department.*

Introduction. A simulation-based learning environment is one of the most important characteristics of medical education. It includes simulators, virtual laboratories, and the use of VR/AR technologies, ensuring student safety during training. Interactive tests, virtual laboratory sessions, and access to global medical data are integral components. Students gain experience working with medical databases, electronic medical records, patient charts, laboratory analyses, and radiographic data, along with the use of clinical decision-support systems. Visualization tools in medical education make the learning process active, interactive, and personalized. Online tests and quizzes, clinical case discussions, and group-based online debate platforms improve learning quality. ICT tools also

help familiarize students with medical information systems. In healthcare, information technologies support the following tasks: Maintaining patient records in clinics, remote monitoring of patients' health status, storing and transmitting diagnostic results, monitoring the accuracy of prescribed treatment, conducting remote education, consulting and monitoring inexperienced healthcare personnel. ICT also ensures the security of medical information. Keeping electronic medical documents reduces the time clinical staff spend on preparing paper forms. All patient-related information can be stored within a unified system accessible to medical specialists. With the use of ICT, students also learn to: protect patients' personal data, correctly store and transmit medical information, understand cybersecurity fundamentals. Diagnostic test and procedure results are entered directly into the electronic medical record. This enables other specialists to evaluate the quality of prescribed treatment and detect uncertainties in diagnosis. The use of IT in medicine allows doctors to conduct online consultations and consiliums at any convenient time, significantly increasing the effectiveness of medical services. Patients can receive qualified assistance remotely from experienced doctors—especially beneficial for those living in remote areas, people with disabilities, the elderly, and mothers with young children. Thus, neither patients nor doctors need to travel long distances to receive or provide consultations. By using modern information technologies, a physician can assess the patient's condition, examine them, and review all diagnostic results.

Results and discussion: Modern IT opportunities in healthcare positively impact all aspects of medical care. Using information technologies in medicine enables: conducting remote education, establishing connections for experience exchange between colleagues, obtaining the most recent healthcare-related information. In addition, information technologies improve the management of medical institutions. They enable the automation of healthcare systems, clinical management, planning, HR, finance, pharmacies, and material resources. Managers gain the ability to collaborate more effectively with mandatory medical insurance funds and regional healthcare authorities. IT in medicine also optimizes the work of physicians, registries, admission departments, and other administrative units. Innovative systems simplify the supply of pharmaceuticals. New technologies help: record financial operations (income and expenses), monitor warehouse inventories, create requests for medication delivery, track drug consumption, write off materials and supplies, generate reporting documents and submit them to higher authorities. Scientific research and technological innovations in medicine play a decisive role in improving human health and effectively treating diseases. Together, these two factors drive the development of modern medicine, increase healthcare efficiency, and lead to the creation of new diagnostic and treatment methods. Research helps identify the causes of diseases and their mechanisms in the body, leading to the development of new pharmaceuticals and therapeutic approaches. At the same time, technological innovations enable the practical application of these scientific achievements, such as early disease detection, personalized treatment plans, and improved surgical procedures.

Innovations in modern medicine also enhance medical research, facilitate collaboration between researchers and clinicians, and accelerate the translation of scientific discoveries into clinical practice. Technologies such as telemedicine, wearable medical devices, and remote patient monitoring have expanded access to healthcare, especially in remote or underserved regions, improving health outcomes and increasing patient engagement.

Innovative medical technologies have significantly improved the ability to detect diseases at early stages, tailor treatments to individual patient needs, and enhance overall healthcare quality. For example, the integration of artificial intelligence and machine learning into medical imaging has revolutionized diagnostic interpretation, enabling more accurate and timely diagnoses for conditions such as cancer, cardiovascular diseases, and neurological disorders. Furthermore, the rise of precision medicine, genomics, and personalized therapies has opened new pathways for targeted treatment, improving effectiveness while reducing adverse effects. By analyzing a person's genetic makeup, medical history, and lifestyle factors, healthcare providers can develop individualized treatment plans, ultimately improving clinical outcomes and patient satisfaction.

The purpose of this article is to conduct medical education effectively, conveniently, and using modern methods. The main goal of ICT in medical education is to ensure high-quality teaching, rapid information exchange, and the development of practical skills through interactive and digital methods.

Teachers in educational institutions actively use computer technologies in the learning process. This indicates that computer technologies have become a crucial requirement in organizing modern lessons. ICT enhances teachers' computer literacy and communicative competence. Teachers voluntarily attend training courses, participate in the development of electronic resources, join online courses and webinars, and take part in projects and practical training sessions.

Conclusion. The use of information and communication technologies (ICT) in medical education is an integral part of the modern pedagogical process. ICT helps strengthen students' theoretical knowledge, develop practical skills, and build competencies necessary for making independent decisions in clinical situations. Simulation environments, virtual laboratories, VR/AR technologies, electronic medical records, clinical decision support systems, and online learning platforms significantly increase the effectiveness of medical education. The application of modern ICT automates medical processes, ensures the secure storage and rapid exchange of patient data, and expands opportunities for distance learning and telemedicine for both physicians and students. These advantages are especially important for providing quality healthcare to populations living in remote areas. The introduction of IT solutions in medicine improves diagnostic procedures, enhances the quality of treatment, optimizes the workflow of medical staff, and increases the efficiency of management in healthcare institutions. As a result, the quality of medical services, patient satisfaction, and the overall development of the healthcare system improve. Thus, ICT serves as an essential innovative factor in medical education and clinical practice, providing students with in-depth knowledge,

facilitating the work of educators, improving the management of medical institutions, and contributing to the overall enhancement of healthcare quality.

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DEVELOPMENT OF THE INDUSTRY OF UZBEKISTAN AND ENSURING FOOD SAFETY

Annotation: *It is analyzed questions of development of the food industry to ensure people with food and food security of the country.*

Keywords: *food products, food security, food industry, agricultural processing, investi process projects.*

The food industry in Uzbekistan plays an important role in meeting the population's needs for growing food at the level possible and ensuring its safety. The policy of the state on ensuring food security provides for the development of production and sales of products mainly on the basis of its agriculture and industry, and the rest on the basis of imports from foreign countries. irst President Of The Republic Of Uzbekistan I.A. Karimov, speaking at the opening ceremony of the International Conference on "essential reserves for the implementation of the Food Program in Uzbekistan", held on June 6, 2014, noted that "I do not need to talk too much today about the fact that the gap between the rapid increase in the population of the Earth and the limitation of growth opportunities in the volume of food production. [1].

Situations such as natural disasters caused by climate change on earth, water shortages for irrigation of land, drought make it difficult to grow food products. As a result, prices are rising in the world's food markets. The fact that in 54 countries of the world there is a decrease in the level of material condition of families, the main part of the population of more than 20 countries is struggling with hunger, the average life expectancy of the population in 12 countries is reduced, and in recent years more than 840 million of the world's population suffer from hunger is clear evidence. [3]. That is why a lot of importance is attached to the issues of ensuring food safety all over the world. On the basis of the rapid development of food production in our country during the years of independence, grain independence was achieved, and the production of all the main types of food in the country itself was practically fully ensured. In order to ensure the food security of the country and the sustainable supply of food to the population, the Association of enterprises of the food industry was established in accordance with the decree of the president of the Republic of Uzbekistan dated October 31, 2017 PQ-1633. The association included oil and oil enterprises, meat, dairy enterprises, confectionery, soft drinks and fruit and vegetable processing enterprises. In accordance with this decision, the authorities in the places are tasked with the development of targeted regional

programs for the construction of new enterprises that process meat-milk, fruits and vegetables and grapes together with the enterprises of the association and the modernization and reconstruction of existing ones.

Food security represents the ability of the country's population to support itself, independently, with basic food products. It also means that it has got rid of the extreme dependence on food imports. It is worth noting that food security is not limited to providing only internal self-sufficient food. Food imports are also considered for this. The policy of the state on ensuring food security is mainly aimed at developing its own agricultural production and domestic sales markets, in part, to meet the optimal level of food needs of the population based on the import of food from foreign countries. It is important that the state's food security policy is able to rationally harmonize the level of self-food supply as well as the levels of their importation, create guaranteed opportunities for the supply of food to the population of the country, establish international cooperation in this regard. In addition, this policy will also be aimed at creating food reserves that are periodically updated.[4].

Economic palatability with food represents the cultivation of the population's ability to procure food by growing income, maintaining an acceptable level of inflation. Safe nutrition, on the other hand, represents the components of improving the quality of a healthy diet of the population. In order to ensure the implementation of the decree of the president of the Republic of Uzbekistan dated January 26, 2019 PQ-1047 "on additional measures to expand food production and replenish the domestic market", enterprises carried out investment projects to increase food production, build new enterprises for the processing of milk, meat, fruits and vegetables and grapes, reconstruct and modernize existing ones. The share of food industry products in the total volume of industrial products in Uzbekistan in 2018 was 18.2. 33.4% of the food produced in our country is produced by enterprises of the Food Industry Association, 14.5% by the company "Uzdonmahsulot", 8.9% by the company "Uzvinosanoatholding", 43.2% by private enterprises, etc.

In our republic, in 2017, 1,529 investment projects with a total value of 555 billion 832 million were carried out within the framework of regional programs for the production of food industry products, agricultural processing. This resulted in 17,327 new jobs. Including 156 investiture projects worth 95,055 crore in Tashkent City, 123 projects worth 93,025 crore in Samarkand region and 116 investiture projects worth 74,995 crore in Khorezm Region [5]. In accordance with the target program for the construction of meat, dairy, fruit and vegetable processing enterprises and the modernization and reconstruction of existing ones, investments in the equivalent of US \$ 48.07 million were directed in 2018 and 333 projects were carried out in our country. Of this, new enterprises were created on the basis of 158 investment projects. On the basis of 175 investment projects, existing agricultural products processing enterprises were modernized and reconstructed.[6].

The share of fruit and vegetable processing increased from 13.3% in 2015 to 17.8% in 2017, respectively, the share of meat processing increased from 6.9% to 12.0%, the share of milk processing increased from 9.8% to 14.1% in 2015, as a result of the implementation of the target program for the production of food

industry products in our republic for 2015-2017, and the modernization and reconstruction of existing ones. During the analysis period, the share of fruit and vegetable processing increased from 2.1% in Andijan region to 12.2%, that is, 5.8 times, from 3.0% in Surkhandarya region to 10.4%, that is, 3.4 times, from 4.8% to 13.5%, that is, 2.8 times. The share of meat processing increased from 3.2% to 7.8% in the Khorezm region, 2.4 times, from 4.6% to 10.9% in the Kashkadarya region, and from 3.6% to 8.3% in the Navoi region. The share of milk processing was achieved from 3.7% to 11.2% in Khorezm region and from 6.7% to 10.7% in Surkhandarya region. It should be said that the highest rate for processing fruits and vegetables is 30.2% in Samarkand region, 27.6% in meat Tashkent region and Tashkent City together, and 22.7% in milk Namangan region.[5]. In 2017, 230 enterprises processing agricultural products, 114 new cooling chambers with a capacity of 77,800 tons, were established and modernized.

The total capacity of storing fruits and vegetables in our country was increased to 832 thousand tons. In the food industry, the value in 2017 on the basis of state investment programs was 117.6 million. \$ 136 will be completed, with a projected project capacity of 143,929 tonnes. In accordance with regional destination programs, 1,042 investment projects will be carried out for \$ 154.4 million, with a project capacity of 94,270 tons. As a result, 11,849 new jobs will be created. 150 for milk processing and 10.78 million for meat processing. \$ 97, and \$ 16.17 million in fruit processing. \$ 160, and \$ 110.39 million in other agricultural processing. \$ 635 investment projects are planned to be implemented.

Now to improve the efficiency of the implementation of investment projects for the rapid development of production of food industry products, the construction of processing enterprises, reconstruction and modernization of existing ones:-the organization of food industry enterprises, the modernization of existing ones, the further improvement of financing investment projects aimed at technical and technological re - equipment;-support entrepreneurs by purchasing modern technological equipment; -strengthen the material and technical base of projects and improve the provision of energy resources; - improve the system of training, retraining and professional development of economist-specialist personnel for the design of investments in economic higher educational institutions and improve its quality; - organize the initiators of investment projects to effectively use information communication technologies, organize monitoring of the implementation of projects.

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ECOLOGICAL CONDITION OF THE SHORKOL RESERVOIR AND ITS SURROUNDING LANDSCAPES

Abstract: *the article deals with the information about the Shorkol reservoir, located in the northwestern part of the Bukhara region, on the border of the Gijduvan district and the Konimekh district of the Navai region, as well as its natural geographical features and ecological condition.*

Keywords: *reservoir, rodent, exploitation, river, lake, sea, energy, industry, ecological condition, water resource, ecosystem, landscape.*

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SHO'RKOL SUV OMMONI VA UNING Atrofidagi LAYZATLARNING EKOLOGIK HOZIRI

Annotatsiya: *ushbu maqolada, Buxoro viloyatini shimoliy g'arbiy qismida, G'ijduvon tumani va Navoiy viloyatining Konimex tumani chegarasida joylashgan Sho'rko'l suv ombori va uning tabiiy geografik xususiyatlari va ekologik holati to'g'risida ma'lumot berilgan.*

Kalit so'zlar: *suv ombor, kemiruvchi, ekspluatatsiya, daryo, ko'l, dengiz, energetika, sanoat, ekologik holat, suv resurs, ekotizim, landshaft.*

In world experience, river flow management using reservoirs and large water intake structures is considered as one of the important directions of integrated use of water resources. The study of historical processes shows that water bodies have played an important role in the development of mankind. On the one hand, floods, droughts, changes in the regime of rivers, lakes and seas have caused disasters and great socio-economic damage, on the other hand, water bodies have ensured the development of agriculture, energy, industry and economic sectors. The UN 2030 Agenda for Sustainable Development includes 17 "goals". The tasks set out in Goal 6: "Ensure the rational use of water resources and prevent water pollution". It means the necessity to conduct research on the relationship of reservoirs with irrigation

facilities and landscapes, as well as recreational opportunities and issues of their use, analysis of changes in landscapes adjacent to reservoirs, as well as assessment of their ecological status and monitoring.

Water is of great importance for human health and economic activity. Otherwise, dirty water can lead to various negative consequences. It causes and spreads diseases, negatively affects the technological process in industrial enterprises, reduces the quality of products, disables expensive equipment, corrodes hydraulic, reinforced concrete structures, water pipes, and causes enormous economic and moral damage.

Reservoirs are water bodies created and managed by man, operating under the strong influence of natural phenomena. Therefore, reservoirs occupy a place between natural and artificial objects, that is, they are natural-technical systems.

The Zarafshan River does not reach the western part of the region, and for irrigation water is mostly taken from the Amu Darya. It is for this purpose that the Amu-Karakol, Amu-Bukhara, and Yomanjar canals were built. The canal of the same name begins from the Kuyimozor reservoirs located in the neighboring Navai region and irrigates part of the Bukhara, Kogon, and Jondor districts. In addition, there are canals such as Zarafshan, Khairabad, and Shofirkon, as well as the Shorkol reservoir.

Today, in order to effectively use these lakes, the most important issue is to improve their condition and create a natural nutrient base. Regarding such issues, the "Shurkul Suv" reservoir is located in the northwestern part of the Bukhara region, on the border with the Gijduvan district and the Konimekh district of the Navai region.

The approximate coordinates of the Shorkul reservoir are: 40.33° north latitude, 64.86° east longitude. The Shorkol reservoir was built in 1977–1980. It is operated by the "Toshrabot-Jilvon" irrigation system department under the Amu-Bukhara irrigation systems basin department. The source of water intake for the reservoir is the Zarafshan River. Some sources say that it was founded in 1978.

The Shorkol reservoir is located on the border of the Gijduvan district of the Bukhara region and the Konimeh district of the Navai region. Shorkol was commissioned in 1983. Its area is 4200-5000 ha, and its water capacity is 170-230 million m³. The deepest point is 12-13 m, the average is 8 m. The maximum depth is 20-25 meters. 3 sources of water flow into Shorkol: Konimeh, Zarafshon and the Amu-Bukhara canal. The function of Shorkol is to collect water, that is, to act as a reservoir and provide water to the lands of the Shafirkon district throughout the year. The water cover of the lake with aquatic plants is 10%. Currently, water is stored only in deep places. 5-10 m³ / sec of water is flowing in. Microphytes are found around the water intake channel of the reservoir and in the upper part of the reservoir. Macrophytes are mainly reeds and cattail. The amount is not very large. Phytoplankton is quite diverse, with more than 130 species. There are 9 species of kolovrats, 8 species of cladocera and 5 species of copepods. Zoobenthos mainly includes chironomids, oligochaetes, mollusks, and pelago benthos, including river

shrimp and mysids. The water composition of Shorkul is rich with chlorosulphate and highly mineralized - 12097.3 mg/l.

Shorkol Reservoir is filled with water through the Shorkul water inlet channel. The reservoir's water intake source is the Zarafshon River, which is filled with water through the Shorkol water inlet channel. The area attached to the reservoir is 29.0 thousand hectares, of which 28.3 thousand hectares are the "Jilvan" and "Toldi" massifs of the Shafirkan district and 0.7 thousand hectares are the "Kutchi" massif of the Gijduvan district. The total water volume of the reservoir is 394.0 million m³, the useful volume is 380.0 million m³, the dead volume is 14.0 million m³, the surface area is 30.5 km², the length is 5.5 km, the width is 3.5 km, the depth is 30.0 meters, the average depth is 5.7 meters, the length of the dam is 560 meters. The earthquake resistance of the reservoir is 6 points.

The newly developed lands are located in the Gijduvan and Shafirkan districts of Bukhara region, previously used as pastures, and occupy the area around the Shorkol reservoir. The main conditions of the reservoir and new land development project are as follows:

- Use of the autumn and winter flows of the Zarafshan River (348.8 million m³ per year with a 90% probability) as a reserve water source, including the discharge of the Navai TPP, and later filling the reservoir with water delivered via the Amu-Bukhara Canal;

- Total capacity of the reservoir - 394 million m³, useful capacity - 380 million m³;

- Provision of water to 200 thousand hectares of irrigated land through the use of natural depressions and the gradual commissioning of the reservoir, and subsequent development of 32.3 thousand hectares of new land.

It is planned to use the waters from the Shorkol reservoir for irrigation and development of 32.3 thousand hectares of land adjacent to the reservoir. According to studies, it is planned to gradually provide new lands for irrigation, and by the end of the construction of the reservoir (1982), 3.3 thousand hectares of land were developed. Full development was completed in 7 years. By 1982, the water supply of existing irrigated lands was improved by using 100 million m³ of water annually. The economic efficiency of the reservoir was determined for the following two options:

1. Increasing the water supply of existing irrigated lands subordinate to the Amu-Bukhara Canal.

2. Improving the water supply of existing lands along with the development of new lands.

The Shorkol reservoir is used to irrigate surrounding arable land. Approximately 35 thousand hectares of arable land are irrigated. In addition, it is also used for fishing. There are several species of fish in the reservoir: the slobber and other types of fish. The fauna is inhabited by desert plants, reptiles, and rodents. Over the past half century, the development of new desert areas for agriculture, the continuous expansion of existing arable land, the construction of new reservoirs and

canals, the increasing scarcity of running water, and pollution have caused many serious economic, social, and geoecological problems.

In conclusion, it is worth saying that the Shorkol reservoir has an ecologically important and life-rich landscape. In order to effectively use the landscapes of the reservoir, we have made the following proposals:

- there are risks such as illegal fishing, water pollution, and control and environmental management measures are necessary to reduce them;
- in the educational process, it is necessary to form a positive attitude towards water in students, while closely familiarizing them with the country's water resources and water supply;
- the role and place of future geographers and ecologists is considered extremely important, and through this, it is necessary to instill patriotic qualities in students;
- expanding environmental monitoring, regulating fishing, and preserving surrounding plant ecosystems may be positive in the future.

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O'TKIR KORONAR SINDROM SHIFOXONAGACHA BO'LGAN DAVOLASH BOSQICHIDA FARMAKOTERAPIYASI TAHLILI

***Maqsad.** 2001 va 2006 yillarda o'tkir koronar sindrom (o'tkir miokard infarkti va beqaror stenokardiya) uchun dori retseptlari tuzilishini o'rganish.*

***Materiallar va usullar.** O'tkir koronar sindrom (o'tkir miokard infarkti va beqaror stenokardiya) bilan og'rig'an 1114 nafar bemorni gospi talgacha davolash bosqichini retrospektiv farmakoepidemiologik o'rganish o'tkazildi.*

***Natijalar.** 2001 yilda o'tkir miokard infarktini davolashning gospi talgacha bo'lgan bosqichida atsetilsalitsil kislotasi, b-blokerlar va geparinni qo'llash chastotasi mos ravishda 0%, 0% va 81,5, 2006 yilda esa mos ravishda 23,9%, 8% va 13,4% ni tashkil etdi. 2001 yilda beqaror anginani davolashning gospi talgacha bo'lgan bosqichida asetilsalitsil kislotasi umuman ishlatilmadi, 16,2% hollarda b-blokerlar, 12,3% hollarda geparin buyurildi; 2006 yilda ushbu dorilarni qo'llash chastotasi mos ravishda 3,4%, 1,6% va 0,5% ni tashkil etdi. O'tkir koronar sindromni davolashning gospi talgacha bo'lgan bosqichida polifarmatsiya 2001 yilga nisbatan 2006 yilda sezilarli darajada kamaydi.*

***Xulosa.** O'tkir koronar sindromni davolashning gospi talgacha bo'lgan bosqichida giyohvand moddalarni iste'mol qilish tuzilishi ushbu kasallikni davolash bo'yicha mavjud tavsiyalardan farq qiladi.*

***Kalit so'zlar:** o'tkir koronar sindrom, farmakoepidemiologiya, gospi talgacha davolash*

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ANALYSIS OF PHARMACOTHERAPY IN THE PREHOSPITALIZATION STAGE OF TREATMENT OF CURRENT CORONARY SYNDROME

Aim. *To evaluate the pre-hospital treatment of patients with acute coronary syndromes (acute myocardial infarction and unstable angina) in 2001 and 2006.*

Material and methods. *Retrospective pre-hospital treatment survey was performed in 1114 patients with acute coronary syndrome (acute myocardial infarction (AMI) or unstable angina (UA)) in 2001 and 2006.*

Results. *For acute myocardial infarction use of aspirin, β -blockers, heparin was 0%, 0%, 81,5% in 2001 and 23,9%, 8%, 13,4% in 2006, respectively. Use of aspirin, β -blockers, heparin in unstable angina were 0%, 16,2%, 12,3% in 2001 and 3,4%, 1,6%, 0,5% in 2006, respectively. Fibrinolytic therapy was not provided. Polypragmasia reduced in 2006 in comparison with 2001.*

Conclusions. *This survey demonstrates the discordance between existing current practice and guidelines for acute coronary syndrome.*

Key words: *acute coronary syndrome, pharmacoepidemiology, pre-hospital treatment*

Ko'pgina rivojlangan mamlakatlarda yurak-qon tomir kasalliklari katta iqtisodiy yo'qotishlarga olib keladigan kasallanish va o'limning asosiy sababi bo'lib qolmoqda [1]. O'tkir koronar sindrom (AKS), shu jumladan ST segmenti ko'tarilgan yoki bo'lmagan miokard infarkti (MI) va beqaror angina (UA) shoshilinch kardiologiya guruhlarini chaqirishning eng keng tarqalgan sabablaridan biridir. ACS rivojlanganda bemorga shoshilinch tibbiy yordam kerak: dam olish va jismoniy dam olishdan shoshilinch invaziv aralashuvga (perkutan koronar balon angioplastikasi, stentlash). O'z vaqtida va to'g'ri harakat qilish shoshilinch kasalxonaga yotqizishni, doimiy tibbiy nazoratni va barcha bosqichlarda diagnostika va davolash tadbirlarini amalga oshirishni talab qiladi, bu ACS bemorlarni boshqarish taktikasining zamonaviy kontseptsiyalari bilan iloji boricha chambarchas bog'liq. ACSni davolashda hal qiluvchi omil kasallikning dastlabki soatlarida tibbiy yordamning etariligi hisoblanadi, chunki bu davrda eng yuqori o'lim kuzatiladi [2, 3]. G'arbiy Evropa mamlakatlari tajribasi shuni ko'rsatadiki, turli yurak-qon tomir kasalliklari bilan og'rigan bemorlarga tibbiy yordam ko'rsatishni sezilarli darajada yaxshilashning samarali usuli ekspert guruhlar tomonidan klinik ko'rsatmalar ishlab chiqish bo'lib, ularga kundalik amaliyotda rioya qilish kasallik natijalarini sezilarli darajada yaxshilashga yordam beradi [4, 5]. ACS bilan og'rigan bemorlarni davolashning samarali usullarini kundalik tibbiy amaliyotga joriy etish uchun Butunrossiya kardiologlar ilmiy jamiyati tavsiyalar ishlab chiqdi va nashr etdi [6], Dori vositalaridan foydalanish bo'yicha har yili yangilanadigan Federal qo'llanma (FRLS) nashr etiladi [7] va "Shoshilinch tibbiy yordam bo'yicha qo'llanma" milliy loyihaning bir qismi sifatida nashr etildi [8]. 1998-2002 yillarda Rossiya Federatsiyasida ACSni davolashda vaziyat rivojlangan mamlakatlarga qaraganda yomonroq edi [9-11]. Biroq, klinik ko'rsatmalarning nashr etilishi

kundalik klinik amaliyotga sezilarli ta'sir ko'rsatishi mumkin [12]. Shuning uchun so'nggi yillarda kasalxonadan oldingi bosqichda ACS davolash evolyutsiyasini bilish farmakoterapiyani optimallashtirish va ta'lim va axborot faoliyatini rivojlantirish uchun zarurdir. Ushbu tadqiqotning maqsadi 2001 va 2006 yillarda shifoxonagacha bo'lgan bosqichda ACS uchun dori retseptlari tuzilishini qiyosiy o'rganish va mavjud amaliyotning zamonaviy tavsiyalarga muvofiqligini baholashdir.

Materiallar va usullar Tadqiqot Saratov shahridagi Markaziy podstansiya va uchta tuman EMS podstansiyalarida o'tkazildi. Biz 2001 va 2006 yillarda EMS kardiologiya guruhlaridan foydalangan ACS (o'tkir miokard infarkti va beqaror angina) bilan og'rigan bemorlarning EMS chaqiruv yozuvlarini retrospektiv tarzda baholadik. Yozuvlar tasodifiy tanlangan. EMS chaqiruv yozuvlari yordamida ST segmentidagi o'zgarishlarga asoslangan o'tkir miokard infarkti holatlarini farqlash mumkin emas edi. Faqat ixtisoslashtirilgan EMS kardiologiya guruhlaridan tomonidan boshqariladigan farmakoterapiya tahlil qilindi, chunki ACS uchun chiziqli guruhlariga qo'ng'iroqlar nisbati ahamiyatsiz edi. Maxsus ishlab chiqilgan individual ro'yxatga olish yozuvida bemorning demografik ma'lumotlari, birlamchi tashxis va qo'shma kasalliklar, dori-darmonlarni qabul qilish tartibi (dozasi, chastotasi va yuborish yo'li) ko'rsatilgan holda qayd etilgan. Tahlil yuborilgan dorilar uchun suyuq yozuvchi sifatida ishlatiladigan dorilarni o'z ichiga olmaydi (natriy xloridning izotonik eritmasi va 40% glyukoza eritmasi). Dori vositalari ATC (Anatomik Terapevtik Kimyoviy) tasnifiga muvofiq kodlangan. Barcha bemorlar uchun tavsifiy tahlil o'tkazildi, ayrim ko'rsatkichlar bo'yicha kichik guruhlar tahlili o'tkazildi. Sifatli o'zgaruvchilar mutlaq va nisbiy (%) chastotalar yordamida tasvirlangan; miqdoriy o'zgaruvchilar uchun o'rtacha arifmetik, standart og'ish, minimal va maksimal qiymatlar aniqlandi. Farqlarning ahamiyatini baholash uchun miqdoriy o'zgaruvchilar uchun Student's t-testi va sifatli o'zgaruvchilar uchun z-testidan foydalanilgan. Farqlar $p \leq 0,05$ da muhim deb hisoblangan.

Natijalar 2001 yilda jami 421 ta tez tibbiy yordam chaqiruv kartalari va 2006 yilda 733 ta kartalar tahlil qilindi. 2001 yilda kartalarning 39,9% o'tkir MI bilan og'rigan bemorlarga va 60,1% NS uchun bo'lsa, 2006 yilda ularning ulushi mos ravishda 48% va 52% ni tashkil etdi. Retrospektiv farmakoepidemiologik tadqiqotga kiritilgan ACS bilan og'rigan bemorlarning demografik xususiyatlari 1-jadvalda keltirilgan. 5 yil davomida (2001 yildan 2006 yilgacha) bir bemorga MI va NS uchun buyurilgan dorilarning o'rtacha soni kamaydi. 2001 yilda MI bilan og'rigan 1 bemorga o'rtacha dori vositalari soni $4,14 \pm 0,31$ ni tashkil etgan bo'lsa, 2006 yilda bu ko'rsatkich $1,5 \pm 0,5$ ni tashkil etdi.

2001 yilda NSni davolashda 16 ta farmakoterapevtik guruhdan, 2006 yilda esa 14 tadan dori vositalari qo'llanilgan. Bundan tashqari, 2001 yilda bitta bemorga o'rtacha $3,22 \pm 0,40$, 2006 yilda esa $3,22 \pm 0,40$ dori ishlatilgan.

2001 yilda bemorlarning 93,9 foizida MI bilan og'rigan bemorlarni davolashda giyohvand analjeziklari ishlatilgan; 2006 yilda ulardan foydalanish chastotasi deyarli 35% ga kamaydi. Bundan tashqari, 2001 yilda giyohvandlik analjeziklari retseptlarining 2/3 qismi trimeperidinga tegishli bo'lib, bu analjezik

ta'sirida morfindan 2-4 baravar past. 2006 yilda morfin 57% hollarda, omnopon - 28%, trimeperidin - 12,6%, tramadol - 2,4% da buyurilgan. NSda 2006 yilda giyohvand analjeziklar retseptlarining chastotasi ham sezilarli darajada kamaydi: ular amalda qo'llanilmaydi (2-jadvalga qarang). 2001 va 2006 yillarda MI bilan kasallangan har uchinchi bemorga giyohvand bo'lmagan analjeziklar buyurilgan. 2001 yilda faqat metamizol natriy ishlatilgan bo'lsa, 2006 yilda bu preparat 87,6% hollarda, ketorolak esa 12,4% hollarda buyurilgan. 2006 yilda o'tkir koronar sindromlar uchun giyohvand bo'lmagan analjeziklardan foydalanish 80% ga oshdi. 2001 yilda ushbu dorilar guruhidan faqat metamizol natriy buyurilgan bo'lsa, 2006 yilda u 77,1% hollarda, ketorolak esa 22,9% ishlatilgan. Ushbu dorilar guruhi ACS uchun standart davolashga kiritilmagan, shuning uchun ushbu dorilarni giyohvandlik analjeziklariga nisbatan imtiyozli qo'llash tibbiy sabablar bilan emas, balki tashkiliy sabablar bilan, masalan, giyohvandlik analjeziklarini qo'llash bo'yicha murakkab hisobot bilan izohlanishi mumkin. 2006 yilda MI uchun trankvilizatorlarni buyurish chastotasining oshishi shoshilinch tibbiy yordam shifokorlarining giyohvand bo'lmagan analjeziklarning ta'sirini kuchaytirish zarurati to'g'risidagi o'rnatilgan fikri bilan bog'liq bo'lishi mumkin. 2001 yilda o'tkir MI va NS davolash uchun birinchi avlod antigistamin difengidraminni buyurishning yuqori chastotasi qayd etilgan. 2006 yilda bunday retseptlarning chastotasi sezilarli darajada kamaydi. Ilgari, ushbu preparat morfin bilan birga shunga o'xshash sharoitlarda, ikkinchisining kiruvchi ta'sirini bartaraf etish uchun tavsiya etilgan. Hozirgi vaqtda bu maqsadda metoklopramid tavsiya etiladi [7], u 2006 yilda retseptlarda paydo bo'lgan. ACS uchun antispazmodiklarni (magniy sulfat, papaverin, drotaverin, bendazol) buyurish chastotasi sezilarli darajada kamaydi (2-jadvalga qarang). Ma'lumki, antispazmodiklar yurak ishemik kasalligini davolashda past samaradorlikka ega va bundan tashqari, ularning ba'zilari miokard "o'g'irlash" [13] fenomenini keltirib chiqarishi mumkin, ammo shoshilinch tibbiy yordam shifokorlari ushbu dorilarni qo'llashdan butunlay voz kechmaganlar. Bundan tashqari, 2006 yilda 2001 yilga nisbatan glikozid bo'lmagan kardiotoniklar va antiaritmik vositalardan foydalanish o'tkir MI da, NSda esa - yurak glikozidlari va antiaritmik preparatlardan foydalanish kamaydi (2-jadvalga qarang). Bu, ehtimol, ushbu dorilarni tayinlash uchun ko'rsatmalarga qat'iy rioya qilish bilan bog'liq. 2001 yilda kardiologiya guruhlari ko'pincha MI da glyukokortikoidlarni (prednizolon) buyurdilar. 2006 yilda ushbu guruhda giyohvand moddalarni iste'mol qilish chastotasi sezilarli darajada kamaydi.

Munozara Butun Rossiya Kardiologlar Jamiyati va Rossiya Federatsiyasining yurak etishmovchiligining oldini olish bo'yicha (VNOK) va Rossiya Federatsiyasining chap qo'l kardiologiyasi (FRLS) tavsiyalariga ko'ra, NS va MI bilan og'rikan barcha bemorlarga, agar kontrendikatsiyalar bo'lmasa, kislotali kislotani buyurish kerak. og'riqni yo'qotish uchun kasalxonadan oldingi bosqichda geparin va morfin va asoratlari mavjud bo'lganda antiaritmik dorilar, diuretiklar va kardiotoniklar [6-8]. Bu xalqaro tavsiyalarining asosiy qoidalariga ham mos keladi [14-17]. Bundan tashqari, nitratlar og'riqni, miokard ishemiyasini va chap qorincha etishmovchiligini yo'qotish uchun talab qilinishi mumkin, nitrogliserin spreyi tomir

ichiga infuziyaga maqbul alternativ hisoblanadi [18]. 2006 yilda qayd etilgan ACSni hospitalgacha davolashda bir nechta ijobiy tendentsiyalarga qaramay (atsetilsalitsil kislotasi retsept bo'yicha paydo bo'ldi, polifarmatsiya kamaydi), shoshilinch shifokorlar tomonidan MI va NS uchun farmakoterapiyaning hozirgi amaliyoti maqbul darajada bo'lib qolmoqda. Noto'g'ri ko'p miqdorda dori-darmonlarni buyurish muhim muammo bo'lib qolmoqda. Ushbu holat uchun ko'rsatilmagan dorilar (spazmolitiklar, H1-gistamin retseptorlari antagonistlari) tez-tez buyuriladi, aniq ko'rsatilgan dorilar (atsetilsalitsil kislotasi, b-blokerlar) kamdan-kam hollarda qo'llaniladi, garchi tez-tez foydalanish tendentsiyasi mavjud. Shunisi e'tiborga loyiqki, trombolitik terapiya MI bilan kasallangan bemorlarga tibbiy yordam ko'rsatishning hospitalgacha bo'lgan bosqichida mutlaqo yo'q, ammo uni imkon qadar erta amalga oshirish nafaqat yaqin kelajakda, balki keyingi yil davomida bemorlarda o'limni kamaytirishga yordam beradi, bu Rossiya Federatsiyasida ko'pincha tashkilot va iqtisodiy sabablarga ko'ra amalga oshirib bo'lmaydigan perkutan koronar angioplastikaga haqiqiy muqobildir. Bu, shubhasiz, dorilarning yuqori narxiga bog'liq. ACSni davolashda shoshilinch shifokorlar tomonidan qo'llaniladigan og'riqni yo'qotish tamoyillari etarli deb hisoblanishi mumkin emas. Zamonaviy tavsiyalarda (masalan, ACC/ANA 2004 va boshqalar) morfin asosiy agent sifatida nomlanadi; uni qisman, kichik dozalarda, qat'iy ravishda tomir ichiga yuborish kerak. Narkotik analjezidlarni teri ostiga yoki mushak ichiga yuborish morfinning nojo'ya ta'sirlari ehtimolini kamaytirishga yordam beradi degan fikr asossizdir [21]. Ma'lumki, "bosqichma-bosqich" og'riqni yo'qotish sxemalari, masalan, ketorolak (steroid bo'lmagan yallig'lanishga qarshi dori) birinchi bosqichda qo'llanilganda, keyin benzodiazepin trankvilizatori "qo'shiladi" va shundan keyingina giyohvand analjezidlari etarli darajada og'riqni engillashtirmaydi, og'riqni kamaytirishga yordam beradi va og'riqni kamaytirishga yordam beradi. qon aylanish tizimi, nafas olish va ong haqida [21].

Xulosa Shoshilinch kardiojarrohlik guruhlarini tomonidan ACS bilan og'rigan bemorlarga shoshilinch tibbiy yordam ko'rsatishda giyohvand moddalarni iste'mol qilish strukturasi optimaldan uzoqdir. Kasalxonagacha bo'lgan bosqichda ACS bilan og'rigan bemorlarga yordam ko'rsatish sifatini yaxshilash uchun ixtisoslashtirilgan shoshilinch tibbiy yordam guruhlarini jihozlashni yaxshilash (birinchi navbatda trombolitik vositalar bilan), tegishli ilmiy jamiyatlar tomonidan o'quv dasturlarini ishlab chiqish va amalga oshirish, shoshilinch tibbiy yordam shifokorlari uchun ACSni davolashni zamonaviy nuqtai nazardan yorituvchi adabiyotlardan foydalanishni yaxshilash, federal standartlarni ishlab chiqish va tibbiy yordam sifatini nazorat qilish tizimini ishlab chiqish.

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GEOGRAFIYA DARSLARIDA AXBOROT KOMMUNIKATSION TEKNOLOGIYALARIDAN FOYDALANISH

Annotatsiya: Ushbu maqolada geografiya darslarida axborot-kommunikatsion texnologiyalaridan (AKT) samarali foydalanishning nazariy va amaliy jihatlari yoritiladi. Zamonaviy raqamli vositalar — multimedia taqdimotlari, interaktiv xaritalar, elektron darsliklar, onlayn platformalar va geoinformatsion texnologiyalar — o'quvchilarning fan bo'yicha bilimlarini chuqurlashtirish, mantiqiy fikrlashini rivojlantirish hamda dars jarayonining samaradorligini oshirishdagi o'rni ko'rsatib beriladi. Shuningdek, AKTni qo'llash orqali ta'lim jarayonini individuallashtirish, o'quvchilarning fanga bo'lgan qiziqishini kuchaytirish, geografik ma'lumotlarni vizual va interaktiv tarzda o'zlashtirish imkoniyatlari tahlil qilinadi. Maqolada o'qituvchilar uchun amaliy tavsiyalar, AKTdan foydalanishning afzalliklari va duch kelinadigan muammolarni bartaraf etish yo'llari yoritilgan.

Kalit so'zlar: Geografiya, axborot-kommunikatsion texnologiyalar, AKT, interaktiv xarita, multimedia, GIS, elektron darslik, raqamli ta'lim, innovatsion pedagogika, ta'lim texnologiyalari, onlayn platformalar.

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USE OF INFORMATION COMMUNICATION TECHNOLOGIES IN GEOGRAPHY LESSONS

Abstract: This article discusses the theoretical and practical aspects of the effective use of information and communication technologies (ICT) in geography lessons. The role of modern digital tools - multimedia presentations, interactive maps, electronic textbooks, online platforms and geoinformation technologies - in deepening students' knowledge of the subject, developing logical thinking and increasing the efficiency of the lesson process is shown. It also analyzes the possibilities of individualizing the educational process, increasing students' interest in science, and mastering geographic information visually and interactively through the use of ICT. The article provides practical recommendations for teachers, the advantages of using ICT, and ways to overcome the problems encountered.

Keywords: *Geography, information and communication technologies, ICT, interactive map, multimedia, GIS, electronic textbook, digital education, innovative pedagogy, educational technologies, online platforms.*

Maktab o'sib kelayotgan yosh avlodni ta'lim va tarbiyaga chorlovchi maskan hisoblanadi. Ta'lim va tarbiya maktabda birgalikda, uzviy aloqada olib boriladi. Dastlab tarbiya, keyin ta'lim. Tarbiya ta'lim olishga yo'l boshlovchi vosita bo'lib xizmat qiladi. Umumiy o'rta ta'limda ta'lim tarbiyaviy vazifalarni hal qilishda barcha o'quv fanlari singari geografiya o'quv Bitiruv malakaviy ishningining ham ahamiyati katta bo'lib, bunday ma'suliyatli vazifani amalga oshirishda geografiya o'qituvchisidan mahorat talab qiladi. Mamlakatning ertangi kuni, dunyoqarashi o'zgargan, zamonaviycha fikrlaydigan, muvaffaqiyatli ish yuritadigan, yuksak malakali, chuqur bilimli yoshlarni tarbiyalash-geografiya o'qituvchilariga ham ko'p jihatdan bog'liqdir.

Internet xizmatining tobora yuksalib borayotgani, o'qitish jarayonida undan to'g'ri va unumli foydalanishga bo'lgan ehtiyoj yurtimiz ta'lim tizimida axborot-kommunikatsiya texnologiyasining milliy strategiyasini izchil joriy etishni taqozo etmoqda. Ushbu strategiya ta'lim maskanlarini axborot-kommunikatsiya texnologiyalari bilan ta'minlash orqali ta'lim sifatini oshirish, elektron o'quv darsliklarini yaratish, o'qituvchi va o'quvchilarning axborot-kommunikatsiya texnologiyalaridan foydalanish bilim va ko'nikmalarini oshirish kabi jarayonlarni o'z ichiga oladi.

Keyingi yillarda maktab ta'lim-tarbiya tizimida zamonaviy ta'lim turlaridan axborot kommunikatsiya texnologiyalaridan keng foydalanilmoqda. AKTdan foydalanishning amaliy ahamiyati shunda-ki, u o'qituvchining mehnat unumdorligini va o'quv jarayonining samaradorligini oshiradi. Texnika vositalari qo'llanilgan darslarda bilimlarni o'zlashtirish jarayoni maqsadga muvofiq xolda amalga oshiriladi, o'quv axboroti esa o'quvchilarga qulay ko'rgazmali shaklda yetkaziladi.

Shuningdek texnik vositalari yordamida o'tilgan har bir dars mavzuni bayon qilish sur'atini oshiradi, vaqtni tejashga imkon beradi. Bunday darslar o'quvchilarni mustaqil fikrlashga undaydi hamda voqea va hodisalarni bir-biri bilan taqqoslash, ular orasidagi o'xshashlik va tafovutlarni aniqlashga yordam beradi. Ishlab chiqarish va kishilik jamiyatning turli jabhalariga zamonaviy axborot kommunikatsiya vositalari kirib kelganidek, ta'limda ham internet global kompyuter tarmog'ining rivojlanishi butun dunyo ta'lim tizimini takomillashtirish zamonaviy yo'nalishlarini ochilishiga sabab bo'ldi. Bu o'quv muassasalarining texnik ta'minotini keskin o'zgarishi, dunyoviy axborot resurslariga keng yo'l ochilishi o'qitishning zamonaviy shakl va usullaridan foydalanish zaruriyatini keltirib chiqardi. O'rta maktabda geografiya o'qitish jarayonida kompyuter texnologiyalarini qo'llash masalasi nihoyatda ko'p qirralidir. Maktabda geografiya o'qitishning 3 asosiy yo'nalishi ajratib ko'rsatiladi:

- geografiya darslarida informatsion texnologiyalarni qo'llash;

- o'quvchilarning darsdan tashqari mashg'ulotlarini tashkillashtirish uchun informatsion texnologiyalarni qo'llash;

- axborot texnologiyalaridan o'quvchilarning bo'sh vaqtlarini to'g'ri tashkillashtirish uchun foydalanish.

Kompyuter texnologiyalari dasturiy ta'lim g'oyalarini taraqqiy ettiradi, o'qitishning eng zamonaviy texnologik variantlarini kashf etadi, ular esa zamonaviy kompyuter va telekommunikatsiyalarning ulkan imkoniyatlarini ro'yobga chiqaradi. Kompyuter texnologiyalarini qo'llash hozirgi zamon geografiyasini fan va o'quv predmeti sifatidagi rivojining eng muhim komponentlaridan biridir.

Kompyuterli darslar - o'quv jarayonida zamonaviy zamonaviy yutuqlarga tayangan xolda didaktikaning so'nggi texnologiyalari asosida tashkil etiladigan darsdir. Bunday darslar o'quv materiallarini tez va oson o'zlashtirish imkonini beradi. Darslarni sifatli qilib yaratish murakkab jarayon, ammo istiqbolidir.

Ta'lim jarayonida multimediya texnologiyalaridan foydalanish deyilganda esa kompyuterga matn, tovush, videotasvir, grafik tasvirlarni va turli (multiplikatsiya) animatsiyalarni kiritish, chiqarish, qayta ishlash, saqlash, texnologiyalari tushuniladi. Multimedia texnologiyalaridan foydalangan xolda ularni namoyish etish yoki eshitish orqali olinadigan bilim ta'lim jarayoni deb tushuniladi.

Geografiya fani qadimiy yer to'g'risidagi fan bo'lganligi sababli tabiat, jamiyat, tabiiy jarayon va hodisalarni o'qitish jarayonida internet tizimidan samarali foydalanmog'imiz kerak. Internet tarmog'ida turli geografiya mavzulariga oid veb-saytlar mavjud bo'lib, ulardan aniq maqsadlarda foydalanish, zamonaviy saytlar ochish va ularning sonini ko'paytirish, shuningdek internetdagi bor mavzularni aynan ko'chirib olinishiga yo'l qo'ymaslik kerak.

Respublikamizda amalga oshirilayotgan islohatlar tufayli O'zbekiston jamiyatning barcha sohalarini, shu jumladan ilm-fan va ta'lim sohalarini zamonaviylashtirish imkoniyatiga ega bo'lmoqda. Shu jihatdan jahon tajribasiga tayangan xolda geografiya fanini o'qitishda ta'limning ilg'or usullari, zamonaviy axborot texnologiyalari va internetdan foydalanish ta'lim jarayoni samaradorligi va sifatini oshirishi bilan bir qatorda respublikaning jahon informatsion hamjamiyatiga muvaffaqiyatli integratsiyalashuviga ham keng imkoniyatlar yaratib beradi. O'quvchilarning kompyuter savodxonligini oshirish, maktabda zamonaviy kompyuter texnologiyalarini qo'llash pedagogik jarayonni mukammallashtirishning imkonlarini beradi. Jumladan O'zbekiston tabiiy geografiyasini o'qitishda texnika vositalaridan foydalanish o'quvchilarning shu darsga bo'lgan qiziqishini kuchaytiribgina qolmay, ma'naviy-siyosiy jihatdan rivojlanishiga katta ta'sir ko'rsatadi. Masalan, O'zbekistonning asosiy foydali qazimalari mavzusini o'qitishda kompyuter texnologiyalaridan foydalanilgan darsda o'quv axboroti o'quvchilarga qulay ko'rgazmali shaklda yetkazilish bilan birga o'quvchilarni mustaqil fikrlashga undaydi. Bunda displayda "O'zbekiston hududidagi foydali qazilmalari" navbati bilan ketma-ket joy ola boshlaydi. ko'mir, neft, gaz, oltingugurt, fosfor, mis rudasi, alyuminiy, oltin, temir, grafit, osh tuzi, kaolin, o'tga chidamli gil, oxaktosh, granit, marmar, gips, mineral suvlar zaxiralari

va boshqalar. O'quvchi bu ma'lumotlarga ega bo'lgandan so'ng, navbatdagi tugmachani bosadi. "O'zbekistonning yoqilg'i foydali qazilmalari" degan yozuv paydo bo'ladi va unga ko'mir, neft, gaz o'z ifodasini topadi.

O'quvchi navbatdagi tugmachani bosgandan so'ng, displey ekranida "O'zbekistonning yozuvsiz xaritasi" namoyon bo'ladi va unda kartaning yuqorisiga ko'mir qazilma boyligi nomi pastiga esa qayerdan qazib olinishini, masalan toshko'mir Sharg'un va Boysundan, qo'ng'ir ko'mir Angrendan qazib olinadi. Yozuvsiz kartada esa ularning joylashish o'rnida shartli belgisi paydo bo'ladi. Bu jarayon shu tariqa davom eta boshlaydi. Neft: Farg'ona vodiysining Andijon, Polvontosh, Janubiy Olamushuk, Xo'jaobod, So'x Mingbuloqda, Surxondaryoda, Ko'kayti, Lalmikor, Xovdog', Qashqadaryoda, Ko'kdumaloq tabiiy gaz, Gazli, Jarqoq, Muborak, Sho'rta va xokozo. Ekranida mavzu yuzasidan ko'rsatish tartib bilan davom ettiriladi. O'quvchilar "rangli va nodir" metallar bilan tanishtiriladi. So'ngra displey ekranida "O'zbekiston foydali qazilmalari" mavzusi bo'yicha savollar va test savollari hamda javoblari ketma ket tartib bilan ko'rinadi. Bunday darslarda o'qitishning kompyuter texnologiyasi yordamida axborotni tayyorlash hamda uning vositasida o'quvchiga yetkazishda. o'qituvchidan va o'quvchilardan bir xil kompyuter savodxonligini talab etiladi.

Insoniyat XX asr nihoyasida bir turkum muammolarga duch keldikim, ular bevosita axborot texnologiyalarining jadal sur'atlar bilan rivojlanishiga bog'liq. Internet tarmog'idan noto'g'ri foydalanish salbiy oqibatlarni keltirib chiqardi. Bunday noxushliklarning oldini olishda umumiy o'rta ta'lim maktablarining ta'lim tarbiya jarayonlarida AKTdan keng va unumli foydalanish lozim.

Xulosa qilib shuni aytish mumkinki, har bir darsni AKTdan foydalanib tashkil qilinishiga erishish lozim, bu davr talabi, shundagina o'quvchilar yanada chuqur va puxta bilim egallay oladilar.

Respublikamizda amalga oshirilayotgan islohatlar tufayli O'zbekiston jamiyatining barcha sohaları, shu jumladan ilm-fan va ta'lim sohalarini zamonaviylashtirish imkoniyatiga ega bo'lmoqda. Shu jihatdan jahon tajribasiga tayangan holda Geografiya fanini o'qitishda ta'limning ilg'or usullari, zamonaviy axborot texnologiyalari va Internetdan foydalanish ta'lim jarayoni samaradorligi va sifatini oshirishga ham keng imkoniyatlar yaratib beradi.

O'rta maktabda geografiya o'qitish jarayonida kompyuter texnologiyalarini qo'llash masalasi nihoyatda ko'p qirralidir. Maktabda geografiya o'qitishning uchta asosiy yo'nalishi ajratib ko'rsatiladi: birinchidan, bu geografiya darslarida informatsion texnologiyalarni to'g'ridan-to'g'ri qo'llash, bunda eng ko'p amaliy mashg'ulotlarda qo'llanadi; ikkinchidan, o'quvchilarning darsdan tashqari mashg'ulotlarini tashkillashtirish uchun informatsion texnologiyalarni qo'llash;

uchinchidan, axborot texnologiyalari bilimga yo'naltirilgan bo'sh vaqtni ta'minlashga (bolaning aqliy rivojiga ko'maklashuvchi o'yinlar, elektron qomuslar kabi) qaratilgan.

Kompyuter texnologiyalarini qo'llash hozirgi zamon geografiyasini fan va o'quv predmeti sifatidagi rivojining eng muhim komponentlaridan biridir.

Kompyuter texnologiyalari dasturiy ta'lim g'oyalarini taraqqiy ettiradi, o'qitishning eng yangi sinab ko'rilmagan texnologik variantlarini kashf etadi.

O'qitishning kompyuter texnologiyasi kompyuter yordamida axborotni tayyorlash hamda uning vositasida o'quvchiga yetkazishdir. Ammo ushbu jarayon yetarlicha murakkabdir, u o'qituvchidan va o'quvchilardan birday kompyuter savodxonligini talab etadi ya'ni, kerakli axborot ko'lamini olish, unga ishlov berish yoki yaratishning texnik va dasturiy vositalarini qo'llashni bilish. O'quvchilarning kompyuter savodxonligini oshirishning yangi imkonlarini beradi.

Geografiya – informatsion fan. Boshqacha qilib aytganda, geografiyaning o'ziga xosligi shundan iboratki, geografik ta'limot o'zida ikki asosni jamlaydi: tabiiy va antropologik asos. Geografiya fani qadimdan yer to'g'risidagi fan bo'lib, tabiat, tabiiy jarayon va hodisalarni o'rganib kelgan. Geografiyani zamonaviy axborot texnologiyalari yordamida o'qitish orqali avvalambor o'quvchilarda fanga bo'lgan qiziqishni orttirish, ularning mustaqil ishlash va ijod qilishlari uchun imkoniyat yaratib, o'quv jarayonini takomillashtiriladi

Maktab geografiya kursi shunday tuzilganki, u o'quvchiga atrof muhit va uning tuzilishi haqida kengroq tasavvur berishi kerak, xuddi shunday vazifa boshqa tabiiy fanlar oldida ham turibdi. Umumta'lim davlat standartlari qanchalik jiddiy bo'lmasin, o'rtacha saviyali o'quvchi materiallarning barchasini «yodlab» ololmaydi. O'rta maktab hajmida o'rgatiladigan ma'lumotlar o'quvchilar uchun juda zarur, O'quvchi bu ma'lumotlar orasidagi o'zaro aloqalarni, o'xshashlik va farqlarini topib sababini tushuntirishi kerak.

Maktab geografiya kursi alohida ma'lumotlarni o'rganishdan iborat bo'lib qolmasligi uchun bu ma'lumotlarni o'quvchilar ongida hamisha to'liq anglangan, mantiqiy geoaxborot tizimlarini shakllantirish uchun kompyutorlardan keng foydalanish lozim. Komp'yuterlar imkoniyati juda katta, o'lkan miqdordagi xilma-xil va murakkab axborotlarni «xotira»sida saqlash qobiliyatiga ega. Bu ko'p geografik atama va nomlarni o'ziga qamragan tabiiy geografiya kurslarida, axborot ma'lumot tizimini yaratish va uni kompyuter xotirasiga yozishda qo'l keladi.

O'quv kompyuterida ma'lumotlar tayyorlash, dars mashg'uloti o'tish ayniqsa, amaliy va mustaqil ish, grafik topshiriqlarini tayyorlash imkoniyatini beradi. Kompyuterlardan foydalanishda avvalo, dastur tuzish, uni tizimlash geografiya ta'limida uch bosqichda olib boriladi.

Birinchi bosqich: Kompyuter texnikasi uchun axborot- ma'lumot tizimi (bazasi) tayyorlash.

Ikkinchi bosqich: Axborot - ma'lumot tizimini tegishli kadrlar vositasida kompyuter vositasiga yozish.

Uchinchi bosqich: Kompyuterda yozilgan ma'lumotlardan ta'lim jarayonida foydalanish.

Xulosa: Geografiya darslarida axborot-kommunikatsion texnologiyalaridan foydalanish ta'lim jarayonining sifatini oshirishda muhim omil hisoblanadi. AKT vositalari — interaktiv xaritalar, multimedia resurslari, elektron darsliklar va geoinformatsion tizimlar — o'quvchilarda geografik tafakkurni rivojlantirish, murakkab jarayon va hodisalarni ko'rgazmali tarzda tushuntirish hamda o'qitish

samaradorligini oshirish imkonini beradi. Ushbu texnologiyalar yordamida o'quvchilar dars jarayonida faol ishtirokchi bo'lib, mustaqil izlanish va tahlil qilish ko'nikmalarini shakllantiradi. Natijada geografiya faniga bo'lgan qiziqish ortadi, o'quvchilar o'zlashtirish darajasi yuqorilaydi va zamonaviy raqamli ko'nikmalarga ega bo'ladi. Shuningdek, o'qituvchi darsni innovatsion yondashuv asosida tashkil etish imkoniyatiga ega bo'lib, ta'lim jarayoni yanada interaktiv va samarali tus oladi. Demak, geografiyada AKTdan oqilona foydalanish kelajakda raqobatbardosh, bilimli va zamonaviy fikrlovchi yoshlarni tarbiyalashda muhim ahamiyat kasb etadi.

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O'QUVCHILARNING KASBIY MA'NAVIYAT HAQIDAGI BILIM VA TASAVVURLARINI KENGAYTIRISHDA ZAMONAVIY INNOVATSION YONDASHUVLARNING ROLI

***Annotatsiya.** Maqolada o'quvchilarning kasbiy ma'naviyat haqidagi bilim va tasavvurlarini kengaytirishda zamonaviy innovatsion yondashuvlarning roli tahlil qilinadi. Kasbiy ma'naviyatning mohiyati, o'quvchilarda axloqiy va professional qadriyatlarni shakllantirish usullari, shuningdek, interfaol va innovatsion pedagogik texnologiyalarni qo'llash samaradorligi yoritiladi.*

***Tayanch so'z va tushunchalar:** kasbiy ma'naviyat, innovatsion yondashuvlar, pedagogik texnologiyalar, o'quvchi kompetentligi, ta'lim jarayoni.*

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THE ROLE OF MODERN INNOVATIVE APPROACHES IN ENHANCING STUDENTS' KNOWLEDGE AND PERCEPTIONS OF PROFESSIONAL MORALITY

***Abstract.** The article analyzes the role of modern innovative approaches in enhancing students' knowledge and perceptions of professional morality. It examines the essence of professional morality, methods for developing students' ethical and professional values, and the effectiveness of using interactive and innovative pedagogical technologies.*

***Key words and concepts:** professional morality, innovative approaches, pedagogical technologies, student competence, educational process.*

Kirish. Bugungi globallashuv sharoitida ta'lim tizimining asosiy vazifalaridan biri — yosh avlodda kasbiy ma'naviyatni shakllantirish, ularning axloqiy, ijtimoiy va kasbiy qadriyatlar tizimini boyitishdan iborat. Shu nuqtai nazardan, o'quvchilarning kasbiy ma'naviyat haqidagi bilim va tasavvurlarini kengaytirishda innovatsion yondashuvlar muhim ahamiyat kasb etadi. Kasbiy ma'naviyat - bu shaxsning o'z kasbiga, mehnat jarayoniga, hamkasblariga va jamiyatga nisbatan mas'uliyatli, vijdonli, halol va fidokorona munosabatini ifodalovchi ichki ma'naviy-axloqiy qadriyatlar majmuidir. U o'qituvchi, shifokor, muhandis, huquqshunos yoki boshqa har qanday kasb egasining professional

yetukligi bilan chambarchas bog‘liq bo‘lib, insonning kasbiy faoliyatidagi axloqiy me‘yorlarni belgilaydi.

Zamonaviy ta‘lim jarayonida o‘quvchilarni faqat nazariy bilim bilan cheklab bo‘lmaydi. Kasbiy ma‘naviyatni shakllantirishda innovatsion pedagogik texnologiyalar, interfaol usullar, axborot-kommunikatsiya vositalari va loyihaviy ta‘lim metodlari keng qo‘llanilishi lozim. Chunki bu yondashuvlar o‘quvchilarning o‘z fikrini mustaqil ifoda etish, muammoni tahlil qilish, jamoada ishlash va ijtimoiy mas‘uliyatni his etish ko‘nikmalarini rivojlantiradi.

Amaliy innovatsion shakllar.

1. Interfaol o‘yinlar va treninglar – o‘quvchilarda kasbiy muhitda axloqiy qaror qabul qilish, muammoli vaziyatlarda to‘g‘ri yo‘l tanlash malakasini shakllantiradi.

2. Keys-stadi (muammoli vaziyatlar tahlili) – kasbiy axloq me‘yorlarini amaliy misollar orqali o‘rganishga imkon beradi.

3. Raqamli platformalar va onlayn muhitlar – kasbiy qadriyatlarni targ‘ib etuvchi virtual treninglar va simulatsiyalar orqali o‘quvchilarning motivatsiyasini oshiradi.

4. Loyihaviy o‘qitish – o‘quvchilarni kasbiy sohada dolzarb ijtimoiy muammolarni hal etishga yo‘naltirib, ularni mas‘uliyatli fuqarolik pozitsiyasiga tayyorlaydi.

O‘qituvchi bu jarayonda asosiy boshqaruvchi va yo‘naltiruvchi shaxsdir. Uning kasbiy ma‘naviy namunasidan o‘quvchilar ilhom oladi. Shuning uchun o‘qituvchi nafaqat bilim manbai, balki axloqiy-ruhiy yetakchi sifatida o‘z ustida doimiy ishlashi, innovatsion yondashuvlarni amaliyotga tatbiq eta olishi lozim.

Pedagogik faoliyat jarayonida kasbiy ma‘naviyatga ega bo‘lishda o‘z ustida ishlash va o‘z-o‘zini rivojlantirish muhim ahamiyatga egadir. Bunda kasbiy faoliyatni rivojlantirish mutaxassis o‘zini tahlil qilish va baholash jarayonida aniqlanadi.

Hazrat Navoiyning “Nasoyim-ul-muhabbat” asarida komil insonga xos xususiyatlar, uning kasbiy faoliyatida sharqona xislat va fazilatlari batafsil sanab o‘tilgan. Bu xususiyatlar - halol luqma bilan qanoatlanish, shariat qoidalariga rioya etish, muloyim tilli, saxiy, sadoqatli, vafoli bo‘lishdan iborat, deb xisoblagan²⁷. Har bir kasbning o‘ziga xos tomonlari, insonlarni o‘ziga jalb qila qladigan qirralari mavjud bo‘lib, inson bu jarayonlarni kuzatib borib, shu kasbni egallashga intiladi. Kasbga xos bo‘lgan jarayonlar, ularni egallash, tanlash inson ma‘naviyati bilan ham bog‘liq ijtimoiy voqelikdir. Insoniyat hayot faoliyati uchun zarur bo‘lgan ehtiyojlarni qondirish davomida yangi kasblar ham paydo bo‘lib boradi. Masalan, Olimlarning ta‘kidlashicha bugun dunyoda 40 mingdan ziyod kasblar mavjud²⁸.

Pedagogik tadqiqotlar olimlarning asarlari shuni ko‘rsatadiki, ta‘lim jarayoniga innovatsion texnologiyalarni joriy etish o‘quvchilarda ijobiy psixologik muhit yaratadi, ularning ma‘naviy qadriyatlar tizimini mustahkamlaydi.

²⁷ Alisher Navoiy. Asarlar. 1-15-jildlar. – Toshkent, 1987-1990.

²⁸ M. Quronov va b. Tarbiya, 6-sinf. Umumiy o‘rta ta‘lim maktablarining 6-sinf o‘quvchilari uchun darslik. – T.: G‘afur G‘ulom nomidagi nashriyot-matbaa ijodiy uyi, 2020 yil 57-bet.

Shuningdek, UNESCOning “Education for Sustainable Development” konsepsiyasi ham ma’naviy va kasbiy tarbiyani integratsiyalashgan yondashuv asosida olib borishni tavsiya etadi.

So‘rovga asoslangan ta’lim (IBL). IBL metodlari o‘quvchilarni ilmiy tadqiqotchi sifatida mustaqil izlanish, kuzatish va tahlil qilishga rag‘batlantiradi. Bu metod nafaqat kasbiy bilimlarni oshiradi, balki o‘quvchilarning mas’uliyat hissi, analitik tafakkuri va kasbiy qaror qabul qilish qobiliyatini mustahkamlaydi (UNESCO, 2021).

Axborot-kommunikatsiya texnologiyalari (ICT). Virtual laboratoriyalar, interaktiv platformalar va onlayn simulatsiyalar o‘quvchilarga kasbiy vaziyatlarni amaliyotda sinab ko‘rish imkonini beradi. Bu esa zamonaviy texnologiyalar bilan ishlash ko‘nikmasini oshirib, kasbiy kompetentsiyani rivojlantiradi (Sharipov, 2020).

Kasbiy ma’naviyat fanidan dars berish jarayonida o‘qituvchi lokal darajadagi pedagogik texnologiyalardan “Keys-stadi”, “Tushunchalar tahlili”, “Loyiha”, “Venn diagrammasi”, “Aqliy hujum”, “Kichik guruhlarda ishlash”, “Atamalar zanjiri”, “Atamalar varag‘i”, tezkor o‘yinlar va o‘yin mashqlarning turli shakllaridan foydalanish tavsiya etiladi²⁹. Kasbiy ma’naviyat darslarida mavzu mazmunidagi muammoli masalalarni o‘qitishda “Keys-stadi” hamda “Muammoli izlanish” metodidan foydalanish tavsiya etiladi.

Xulosa. Xulosa qilib aytganda, o‘quvchilarda kasbiy ma’naviyatga oid tasavvurlarni boyitishda innovatsion yondashuvlar o‘quv jarayonining ajralmas qismiga aylanishi zarur. Bu orqali nafaqat kasbiy malakali, balki ma’naviy barkamol, ijtimoiy mas’uliyatli shaxslar shakllanadi. Ta’lim jarayoniga zamonaviy texnologiyalarni tatbiq etish esa o‘quvchilarning shaxsiy rivojlanishi, professional o‘sishi va milliy qadriyatlar asosida kamol topishiga xizmat qiladi. O‘quvchilarning kasbiy ma’naviyatini shakllantirish jarayoni zamonaviy pedagogik yondashuvlar va innovatsion metodlar bilan bevosita bog‘liq. Tadqiqotlar va olimlarning ilmiy asarlari shuni ko‘rsatadiki, kasbiy ma’naviyat shaxsning o‘z kasbiga, jamiyatga va mehnat jarayoniga nisbatan axloqiy va mas’uliyatli munosabatini shakllantiruvchi muhim omil hisoblanadi.

Zamonaviy pedagogik yondashuvlar, xususan interfaol metodlar, loyihaviy o‘qitish, so‘rovga asoslangan ta’lim (IBL) va axborot-kommunikatsiya texnologiyalari (ICT) o‘quvchilarda kasbiy ma’naviyatni shakllantirishning samarali vositalari sifatida ilmiy asos bilan tasdiqlangan. Interfaol metodlar o‘quvchilarga murakkab kasbiy vaziyatlarni xavfsiz muhitda sinash imkonini beradi, loyihaviy o‘qitish esa ularni real hayotiy muammolarni hal qilishga jalb qiladi. Shu bilan birga, IBL metodlari o‘quvchilarning mustaqil izlanish, kuzatish va tahlil qilish ko‘nikmalarini rivojlantiradi, bu esa ularning analitik tafakkurini va axloqiy qaror qabul qilish qobiliyatini oshiradi. ICT vositalari esa o‘quvchilarning zamonaviy texnologiyalar bilan ishlash malakasini oshirish orqali kasbiy kompetentsiyasini mustahkamlaydi.

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INTEGRATIVE ANALYSIS OF NYSTAGMUS IN MIDDLE EAR AND VESTIBULAR SYSTEM DISORDERS: PATHOGENESIS, CLINICAL PHENOTYPES, DIAGNOSTIC ALGORITHMS, AND MODERN TREATMENT STRATEGIES

Abstract. *Nystagmus is a rhythmic, repetitive, uncontrolled movement of the eyes, a common sign in pathologies of the middle ear and vestibular systems. This article provides an integrative analysis of the pathogenesis of nystagmus, its main clinical phenotypes (peripheral and central), diagnostic algorithms, and modern treatment strategies. Detection of nystagmus and establishing the correct etiology are important for the patient's rehabilitation and prognosis. The diagnostic process is carried out by anamnesis, examination by assignment, Fresnel or videonystagmography, VHIT, VEMP, audiology and, if necessary, MRI/CT. Treatment is etiological: in vestibular peripheral diseases, pharmacotherapy (vestibular suppressors, antiemetics), vestibular rehabilitation and, if indicated, surgery; in central diseases, it is important to identify and treat the underlying disease, symptomatic therapy and rehabilitation. The article presents a clinical-unified algorithm and practical recommendations.*

Keywords: *Nystagm; vestibular system; middle ear; peripheral vestibulopathy; central disorders; diagnostics; videonystagmography; vestibular therapy.*

Introduction. Pathologies of the middle ear and diseases of the vestibular system are among the most common otoneurological problems in clinical practice, which directly affect a person's balance, spatial orientation, and movement coordination. Functional disorders of these systems are often manifested by nystagmus - a rhythmic, involuntary oscillation of the eyeball. Nystagmus is not only a symptom, but also an important biomarker for assessing the physiological and pathological state of the vestibular system. The mechanisms of its occurrence are closely related to changes in the central and peripheral vestibular structures, inflammatory processes of the middle ear, impaired endolymphatic dynamics, or dysfunction of neurosensory integration.

The imbalance of the vestibulo-ocular reflex (VOR) is the main axis of nystagmus pathogenesis, and the asymmetry of afferent vestibular impulses leads to compensatory activation of the oculomotor centers. Inflammation of the middle ear (otitis media), endolymphatic hydrops, perilymphatic fistulas, labyrinthitis, as

well as diseases of the central nervous system (focal lesions of the cerebellum, demyelination of the brainstem, cerebrovascular pathologies) are manifested by various types of nystagmus. Therefore, the correct interpretation of clinical phenotypes of nystagmus is an important diagnostic step in the differential identification of peripheral and central genetic mechanisms.

In modern otoneurology, instrumental analyses for the study of nystagmus, such as videonystagmography (VNG), video head impulse test (VHIT), caloric test, vestibular evoked myogenesis responses (VEMP), audiometry, and high-resolution computed tomography (CT), are combined into an integrative diagnostic algorithm. This approach allows for a comprehensive assessment of vestibular function, determining the relationship between structural and functional changes.

Treatment strategies are selected individually based on the etiology of the pathology, central or peripheral origin, and the clinical type of nystagmus. Vestibular rehabilitation, pharmacotherapy (betagistin, vestibular suppressors), etiological treatment of middle ear infections, surgical procedures (endolymphatic decompression, closure of perilymph fistulas), and therapeutic programs based on neuroplasticity are used in a complex manner. All this contributes to symptomatic relief of patients, restoration of balance function, and improvement of quality of life.

This article analyzes the pathogenesis, clinical phenotypes, modern diagnostic algorithms, and multidisciplinary treatment strategies of nystagmus in diseases of the middle ear and vestibular system based on an integrative approach. Also, the significance of the latest scientific research and innovative technologies in clinical practice in the detection and management of nystagmus is widely covered.

Modern interpretation of pathogenesis. The vestibulo-ocular reflex (VOR) is the main mechanism of nystagmus pathogenesis, and when its peripheral links - semicircular canals, otolith receptors, and vestibular nerve - undergo functional asymmetry, rhythmic eye movements are formed. Inflammation, pressure changes, or increased endolymph in the middle ear cause uneven afferent impulses to the vestibular nuclei, leading to classic peripheral "jerk" type nystagmus. Among the central mechanisms, the integrated role of the cerebral cortex, brainstem, cerebellar flocculo-nodular complex, and vestibular nuclei is emphasized. Their dysfunction causes forms of vertical, torsion, or dissociated nystagmus. Metabolic stress, toxic agents, medications (especially aminoglycosides), hypoxic states, and intratympanic chemical effects can alter the excitability of vestibular receptors, causing variable and sometimes transient nystagmus phenotypes.

Variety of clinical phenotypes. Although the clinical division of nystagmus into peripheral and central types is well known, modern literature interprets its phenotypic spectrum much more broadly. Peripheral vestibular nystagmus is usually unidirectional, often subsiding with fixation and intensifying with head movements. This type may be associated with Meniere's disease, vestibular neuritis, acute labyrinthitis, barotrauma, perilymphatic fistula, or BPPV. Central nystagmus is vertical, torsional, or multi-component and does not disappear with fixation, but in some cases intensifies. Its occurrence is associated with such pathologies as

cerebellar degeneration, stroke of the brainstem, MS, Arnold-Chiari malformation. Episodic, provocative forms in the clinic - nystagmus arising from shaking the head, nystagmus induced by hyperventilation, Valsalva-provocative nystagmus - have diagnostic significance and often manifest as latent vestibular dysfunction.

Diagnostic algorithms. In current scientific sources, the International Classification of Vestibular Diseases (ICVD) is considered the main criterion of the diagnostic process. According to it, clinical examination, head position-driven tests, fixation-suppression reaction, temporary provocative tests (head-shaking, hyperventilation, Valsalva) and instrumental diagnostics are used in combination to assess nystagmus. Modern studies, such as videonystagmography, video head impulse test, caloric stimulation, VEMP (oVEMP, cVEMP), help to more accurately determine the degree of vestibular asymmetry, the functional state of otolith organs, and central-peripheral analysis. Imaging methods - especially high-resolution MRI - play a key role in the rejection of central etiology. The integrative diagnostic approach is based on the interpretation of nystagmus morphology, duration, direction, and reaction to visual fixation as a whole.

Modern treatment strategies. In the treatment of nystagmus, an integrative strategy based on etiology prevails over a one-sided symptomatic approach. In acute vestibular syndromes, vestibular suppressants and antiemetics are used for short-term symptom relief, but it is noted that their prolonged use can slow down vestibular compensation. In Meniere's disease, intratympanic gentamicin may improve vertigo control, but selective, controlled administration is required due to the risk of hearing loss. Betahistine and some neuromodulators (gabapentin, baclofen) have been observed to reduce symptoms in some forms of central nystagmus.

Vestibular rehabilitation therapy (VRT) has been shown in many studies as the most effective method for accelerating post-peripheral vestibular pathology compensation, contributing to the reduction of nystagmus intensity through targeted exercises aimed at re-learning head-movement coordination, postural stability, and VOR. In central nystagmus, the main treatment is aimed at the etiological factor - for example, reperfusion protocols in stroke or immunomodulation measures in demyelination. Among future approaches, AI-based videonystagm analysis, individualized vestibular rehabilitation protocols, and non-invasive neuromodulation technologies that enhance oculomotor neuroplasticity are recognized as particularly promising areas.

Conclusion. Nystagmus, observed in diseases of the middle ear and vestibular system, is a clinical manifestation of the interaction of complex neuro-otological mechanisms, the pathogenesis of which is determined by the combination of peripheral sensory dysfunction, central compensatory responses, and neuroplastic changes. The diversity of clinical phenotypes - spontaneous, positional, induced, and visual - contributes to the emergence of forms of nystagmus, which are directly related to the degree of damage to the vestibular apparatus, inflammatory processes, pressure dynamics, and disruptions in neural pathways.

The modern approach to diagnostic algorithms is multi-stage, allowing for precise determination of etiology by integrating such instrumental studies as audiometry, vestibulometry, VNG/VHIT, pulse tests, positional tests, CT/MRI of the temporal bone. In this case, the differentiation of peripheral and central nystagmus, assessment of the effect of visual fixation, dynamic monitoring, and analysis of the process of functional compensation play an important role in making a clinical decision.

Modern treatment strategies require a comprehensive approach to the pathogenesis of the disease, including anti-inflammatory therapy, blood pressure normalization procedures, labyrinth stabilizing drugs, vestibular rehabilitation, exercises to restore visual-proprioceptive integration, and in some cases, surgical interventions. The integrative treatment model increases the rate of functional recovery of patients, reduces symptoms, and accelerates central compensation.

Thus, the systematic study of nystagmus and the individualization of diagnostic and therapeutic measures in associated diseases, the application of a multidisciplinary approach and the introduction of digital vestibular monitoring technologies into clinical practice will significantly increase effectiveness and improve the quality of life of patients.

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DEKSMEDETOMIDIN: ANESTEZIOLOGIYADA YANGI IMKONIYATLAR

Annotasiya: Deksmedetomidin o'ziga xos xususiyatlarga ega mutlaqo yangi α_2 -agonist preparatdir. Ushbu maqolada preparatning bemorga ta'sirining asosiy farmakologik va fiziologik jihatlariga yo'naltirilgan adabiyotlar sharhi keltirilgan. Deksmedetomidinni anesteziologiyada qo'llash bo'yicha to'plangan tajriba batafsil ko'rib chiqiladi. Mualliflarning ta'kidlashicha, tabiiy uyquga o'xshash tinchlantiruvchi ta'sir ko'rsatadigan va nafas olishni susaytirmaydigan deksmedetomidin turli xil klinik vaziyatlarda, jumladan, neyroxirurgiya, ortiqcha vaznli bemorlar, yurak kasalligi xavfi yuqori bo'lgan bemorlar va pediatriyada behushlikni yaxshilashi mumkin.

Kalit so'zlar: deksmedetomidin, α_2 -agonistlar, neyroxirurgiya, sedasyon

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DEXMEDETOMIDINE: NEW OPPORTUNITIES IN ANESTHESIOLOGY

Abstract: Dexmedetomidine is a novel α_2 -agonist with unique characteristics. The review contains description of main pharmacological and physiological features of this drug. The experience of off-label using of dexmedetomidine in anesthesia is discussed in details. Authors consider that dexmedetomidine can improve anesthesia management in various clinical

situations due to specific sedation profile similar to natural human sleep pattern. It can be helpful in neurosurgery, in overweight patients or in patients with high cardiac risk as well as in pediatric practice.

Key words: dexmedetomidine, α_2 -agonists, neurosurgery, sedation

Kirish. Deksmedetomidinni behushlik bilan anesteziologiya va reanimatsiyada sedasyon uchun ishlatiladigan eng yangi dori deb atash mumkin. Garchi u 1999 yilda Precedex® (Hospira Inc, AQSh) brendi ostida AQShda birinchi marta ro'yxatga olingan bo'lsa-da, Evropa va Rossiyada klinik foydalanish uchun tasdiqlash jarayoni mos ravishda 2011 va 2012 yilgacha davom etdi. Shu sababli, yaqin vaqtgacha mahalliy mutaxassislar ushbu preparatning imkoniyatlarini baholay olmadilar va uning afzalliklaridan haqiqiy klinik amaliyotda foydalana olmadilar. Ushbu qisqacha sharhda biz deksmedetomidinning asosiy farmakologik xususiyatlarini ta'kidlashga harakat qildik va shu xususiyatlardan kelib chiqib, Dexdor® (Orion Pharma, Finlyandiya) savdo belgisi ostida ichki bozorda paydo bo'lgan ushbu preparatning potentsial qo'llanilishini belgilab oldik [1]. Bizga ko'proq tanish bo'lgan anesteziologiya sohasiga alohida e'tibor qaratdik.

Deksmedetomidinning farmakologik xususiyatlari Deksmedetomidinni o'z ichiga olgan α_2 -adrenergik agonistlar guruhidagi dorilar uzoq vaqtdan beri anesteziologlar va reanimatologlar arsenalida alohida o'rin egallagan [47]. Ushbu guruhdagi dorilar tomonidan ishlab chiqarilgan ta'sir murakkab bo'lib, ko'plab organlar va tizimlarning ishlash parametrlarini o'zgartiradi (1-rasm). Ushbu turdagi ta'sir, farmakologik guruh nomidan aniq bo'lganidek, α_2 -adrenergik retseptorlarni stimulyatsiya qilish bilan bog'liq. Bu retseptorlar bir vaqtning o'zida bir nechta kichik tiplarni o'z ichiga oladi, ular orasida asosiylari α_2A -, α_2B - va α_2C -retseptorlaridir. α_2A -adrenergik retseptorlari asosan miyada, birinchi navbatda presinaptik tarzda nerv uchlarida joylashgan. Ushbu retseptorlar qo'zg'atilganda, hujayralardagi adenilatsiklazaning faolligi inhibe qilinadi, bu esa kaltsiy ionlarining nerv uchlariga oqishini pasayishiga olib keladi. Bu, o'z navbatida, norepinefrinning sinaptik yoriqqa chiqarilishini bostiradi. α_2 -adrenergik agonistlarning ko'p ta'siri, xususan, antinosiseptiv, anksiyolitik, sedativ, simpatolitik (ayniqsa, gipotenziv) va gipotermik, miya sopi lokus koeruleusida joylashgan ushbu retseptorlarga ta'siri bilan bog'liq. α_2B -adrenergik retseptorlari, α_1 -adrenergik retseptorlari kabi, asosan silliq mushaklarda (xususan, qon tomirlarida) joylashgan. Ularga ta'siri α_2 -adrenergik agonistlarni qabul qilish va markaziy α_2A -adrenergik retseptorlari orqali gipotenziv ta'sirni yumshatishga javoban qon bosimining dastlabki oshishini tushuntiradi. α_2C -adrenergik retseptorlari dopaminerjik neyrotransmissiya modulyatsiyasida, shuningdek xatti-harakatlarning o'zgarishida ishtirok etadi [2, 50]. 1960-yillarda klinik amaliyotga kiritilgan α_2 -adrenergik agonistlar guruhidan birinchi dori klonidin edi [50]. Dastlab, u faqat antihipertenziv vosita sifatida ko'rib chiqildi, ammo nisbatan tez ko'rsatkichlar anesteziologlar amaliyotida foydali bo'lgan klonidinning bir qator birga keladigan xususiyatlariga ko'ra paydo bo'la boshladi. Ma'lum bo'lishicha, bugungi kunda ham foydalanish uchun ko'rsatmalarni aniqlaydigan bemorga gemodinamik ta'sir ko'rsatishdan tashqari, klonidin

anestezikaga bo'lgan ehtiyojni kamaytiradi, tinchlantiruvchi ta'sirga ega, bezovtalikni yo'q qiladi va operatsiyadan keyingi davrda titroqni kamaytiradi [2, 13, 45]. Ushbu ijobiy ta'sirlar, ammo klonidin ta'sirining past nazorat va prognozlanilishi tadqiqotchilarning ushbu guruhdagi a2-adrenergik agonistlarning ijobiy ta'sirini ko'rsatishga qodir bo'lgan va ularning salbiy xususiyatlariga ega bo'lmagan yangi dori vositalarini izlashga qiziqishini uyg'otdi. Ushbu qidiruv natijasi veterinariya amaliyotida sedativ va og'riq qoldiruvchi vosita bo'lgan medetomidin kimyoviy D-enantiomeri bo'lgan deksmedetomidin edi [50]. Klonidindan farqli o'laroq, u a2-adrenergik retseptorlari uchun sezilarli darajada yuqori selektivlikka ega, a2: a1 yaqinlik nisbati 1600: 1 ga teng (klonidin uchun 200: 1). Uning farmakokinetikasi nisbatan tez tarqalishi ($t_{1/2a} = 6$ min) va yarim yemirilish davri ($t_{1/2}$ taxminan 2 soat, klonidin uchun 9-12 soat) bilan tavsiflanadi [57].

Markaziy asab tizimiga ta'siri Yuqorida ta'kidlab o'tilganidek, deksmedetomidin ta'siri, birinchi navbatda, miya sopi lokus koeruleusida joylashgan a2A-adrenergik retseptorlarning stimulyatsiyasi bilan bog'liq (2-rasm). Bu ta'sir talamusning ventrolateral preoptik yadrosida (VLPO) ko'tarilgan nerv tolalari bo'ylab adrenergik uzatishni buzadi, bu esa o'z navbatida ushbu yadrodan chiqadigan tuberomammillar yadrosining (TMN) GABAergik inhibitsiyonining faollashishiga olib keladi. Natijada, ikkinchisi bilan bog'liq bo'lgan korteksning gistamin vositachiligida faollashuvining zo'ravonligi pasayadi [22]. Tadqiqotchilarning ta'kidlashicha, aynan shu tizim orqali tabiiy sekin to'lqinli uyqu mexanizmi amalga oshiriladi [44, 48]. Shunday qilib, deksmedetomidin ta'siri inson uyqusining tabiiy mexanizmiga chambarchas mos keladi, bu boshqa anestezikalardan farq qiladigan ushbu preparat tomonidan qo'zg'atilgan sedasyonning noyob naqshini belgilaydi. Venn va boshqalarning dastlabki tadqiqotida ta'kidlanganidek, deksmedetomidin terapevtik konsentratsiyalarda qo'llanilganda, "bemorlar xotirjam, uyqudan osongina uyg'onadilar va hatto endotraxeal trubka orqali sun'iy ventilyatsiya qilinganida ham xodimlar bilan muloqot qilishlari mumkin va aloqa to'xtatilganda tezda uyquga qaytadi" [62]. Deksmetomidin keltirib chiqaradigan amneziya darajasi noaniqligicha qolmoqda. Ba'zi adabiyot ma'lumotlariga ko'ra, u bu jihatdan midazolamdan pastroqdir [18], ammo shunga o'xshash sedasyon darajasiga erishish uchun opioidlardan [20] va hatto maqsadli konsentratsiyada qo'llaniladigan propofoldan ham ustundir [38]. Boshqa tomondan, ko'ngillilar bo'yicha olingan eksperimental ma'lumotlar shuni ko'rsatadiki, amneziya faqat og'ir sedasyon bilan, aslida deksmedetomidin tomonidan qo'zg'atilgan dori-darmonlarni qabul qilgan uyqu sharoitida sodir bo'ladi [23]. Deksmetomidin analjezik ta'sirining klinik ahamiyati ham keyingi o'rganish mavzusidir. Ko'ngillilarga deksmedetomidinni tizimli qo'llash bilan o'tkazilgan bir qator tadqiqotlarda qarama-qarshi natijalar olingan [4, 21, 23]. Xususan, Ebert va boshqalarning tadqiqotida. [23], bu erda VAS yordamida og'riqni baholash natijalari tahlil qilinganda, preparatning dozasini oshirish va sedasyon chuqurligining oshishiga muvofiq og'riq hissi kamayishi qayd etilgan. Aksincha, Angst va boshqalarning ishida. [4], deksmedetomidinni tizimli qo'llash fonida og'riq chegarasida hech qanday o'zgarish kuzatilmaganligi ta'kidlangan. Ushbu mualliflar

ko'ngillining qo'lidagi issiqlik va elektr ta'sirlari modelini qo'llashdi. Ushbu ikkita sinchkovlik bilan o'tkazilgan tadqiqotning xulosalaridagi tashqi kelishmovchiliklar noto'g'ri bo'lmasligi kerak: deksmedetomidin infuzioni og'riq sezuvchanligini bostirishga olib kelmaydi, balki anksiyoliz tufayli bemorning og'riqqa munosabatini o'zgartiradi, deb aytish mumkin. Bunday ta'sir, ya'ni tolerantlikni oshiradi, lekin og'riq chegarasi emas, operatsiyadan keyingi davrda va/yoki reanimatsiya bo'limidagi bemorlarda opioidlarga bo'lgan ehtiyojning tavsiflangan qisqarishini tushuntirish ham bo'lishi mumkin [5, 63]. Deksmetomidinning analjezik xususiyatlariga kelsak, shuni ta'kidlash kerakki, α_2 -adrenergik agonistlarning nevraksiyal (epidural va intratekal) ta'sirida samaradorligi to'g'risida ko'plab dalillar to'plangan [24, 25]. Deksmetomidinning miya gemodinamik ko'rsatkichlariga ta'siri bu qadar batafsil o'rganilmagan. Biroq, uning tizimli qo'llanilishi ICPning pasayishiga va CPP ning oshishiga olib keladigan dalillar mavjud [7, 67]. Shuningdek, deksmedetomidinni qo'llash bilan miya qon oqimining pasayishi va ba'zilar qon oqimining pasayishiga nisbatan kamroq, miya tomonidan kislorod iste'molining pasayishi kuzatiladi [27]. Tadqiqotchilarning ta'kidlashicha, deksmedetomidinning EEGga ta'siri tabiiy uyqu rasmiga juda o'xshaydi: sekin to'lqinlarning ma'lum bir nisbati bilan EEG faolligi [32]. Deksmetomidin xuddi shunday BIS darajasiga engil ta'sir ko'rsatadi. Bundan tashqari, epilepsiya bilan og'riqan bemorlarda deksmedetomidin fondagi keskin faollikni bostirolmazligi qayd etilgan [61]. Hayvonlar ustida olib borilgan eksperimental tadqiqotlar shuni ko'rsatdiki, deksmedetomidin tizimli ravishda qo'llanilganda miya yarim ishemiyasining oqibatlarini kamaytirishga qodir [50]. Preparatning bu ta'siri α_2 -adrenergik retseptorlari [42] ta'siri va tegishli simpatolitik ta'sir bilan bog'liq. Qon va miyada katexolaminlar miqdorining pasayishi neyronlarning glutamatga sezuvchanligining pasayishiga, kaltsiy ajralishining pasayishiga, lipid peroksidatsiyasining blokadasiga va penumbra zonasiga ishemik shikastlanish ehtimolining pasayishiga olib keladi, ya'ni miya to'qimalarining ikkilamchi shikastlanishi paytida [7]. Bundan tashqari, deksmedetomidin miyadagi glutamin darajasini pasaytirish, shu bilan glutamatning eksitotoksitesini rivojlanishining oldini olish, shuningdek, neyronlarda antiapoptotik omillar sintezini rag'batlantirish qobiliyatiga ega [26]. Tadqiqotchilar rivojlanayotgan miyaga ishemik va toksik (xususan, izofluran) ta'siri modelida deksmedetomidinning neyroprotektiv xususiyatlarini qayd etdilar [56]. Shuni ta'kidlash kerakki, bu ta'sirlar hayvonlarda yaxshi o'rganilgan; ammo bemorlarda real hayot amaliyotida deksmedetomidin bilan neyroproteksiyaning ahamiyati o'rganilmagan [50]. Tadqiqotchilarning ta'kidlashicha, deksmedetomidinning EEGga ta'siri tabiiy uyqu rasmiga juda o'xshaydi: sekin to'lqinlarning ma'lum bir nisbati bilan EEG faolligi [32]. Xuddi shunday, deksmedetomidin BIS darajasiga engil ta'sir ko'rsatadi. Bundan tashqari, epilepsiya bilan og'riqan bemorlarda deksmedetomidin fondagi keskin faollikni bostirolmazligi qayd etilgan [61]. Hayvonlar ustida olib borilgan eksperimental tadqiqotlar shuni ko'rsatdiki, deksmedetomidin tizimli ravishda qo'llanilganda miya yarim ishemiyasining oqibatlarini kamaytirishga qodir [50]. Preparatning bu ta'siri α_2 -adrenergik retseptorlari [42] ta'siri va tegishli simpatolitik ta'sir bilan bog'liq.

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Gemodinamik ta'sir Barcha a2-adrenergik agonistlar singari, deksmedetomidinning gemodinamik ta'siri ikki fazali. Deksmetomidinni terapevtik dozalarda (infuziya shaklida) qo'llash sistolik va diastolik qon bosimining pasayishiga olib keladi [28], markaziy venoz bosim, o'rtacha arterial bosim, periferik arterial bosim va qon tomirlarining taxminiy qarshiligi parametrlari o'zgarmaydi [23]. Ammo qonda deksmedetomidin kontsentratsiyasining keskin oshishi (masalan, bolus yuborish natijasida) yoki yuqori tezlikda infuziya bilan qon bosimining oshishi kuzatiladi, aksincha [14], bu preparatning tomirlardagi markaziy emas, balki periferik adrenergik retseptorlarga ustun ta'siri bilan izohlanadi. Bunday

holda, deksmedetomidin dozaga bog'liq bradikardiya rivojlanishiga sabab bo'ladi. Ushbu preparatning infuzioni fonida rivojlanayotgan asistoliyaning alohida kuzatuvlari ham mavjud [33]. Shuni ta'kidlash kerakki, terapevtik dozalarda yurak-qon tomir tizimining jiddiy patologiyasi bo'lmasa, qon bosimining pasayishi 10-15% dan oshmaydi va bradikardiya 1 daqiqada 50 zarbadan past bo'lgan klinik ahamiyatga ega emas. Shu munosabat bilan ko'pchilik mutaxassislar deksmedetomidinning gemodinamik ta'sirini simpatik tizim faoliyatini bostirish bilan bog'liq bo'lgan gemodinamikani barqarorlashtirish sifatida tavsiflaydi. Deksmetomidinning yurak-qon tomir patologiyasi bo'lgan bemorlar uchun potentsial kardioprotektiv ta'siri haqida gapirish mumkin, chunki operatsiyadan keyingi stress va ular bilan bog'liq taxikardiya va gipertenziya ushbu toifadagi bemorlar uchun yuqori xavf tug'diradi [57]. Shuni ta'kidlash kerakki, bu turdagi kardioprotektiv ta'sirning mavjudligi klonidin uchun uzoq vaqtdan beri isbotlangan [64].

Nafas olishga ta'siri Ko'pgina zamonaviy anesteziya dorilar, ularning ta'siri miyada GABAergik uzatish vositasida, xususan propofol, benzodiazepinlar, barbituratlar dozaga bog'liq bo'lgan nafas olish depressiyasiga olib keladi. Deksmetomidinning sedativ ta'sirining tubdan boshqacha mexanizmi korteks faollashuvining adrenergik yo'li bilan bog'liq bo'lib, uni qo'llashda bunday ta'sirning yo'qligini tushuntiradi [22]. Ko'ngillilar ishtirokida o'tkazilgan tadqiqotda, hatto silliq infuziya bilan ishlatilgan terapevtik dozalarining 10 baravar ko'pligi ham chuqur uxlayotgan bemorlarda to'yinganlikning pasayishiga olib kelmadi [23]. Bundan tashqari, Xsu va boshqalarning ishlarida. Nafas olishning daqiqali hajmini saqlab qolish va nafas olishning giperkapniyaga reaksiyasi bo'yicha ma'lumotlarni taqdim etdi, shu bilan birga deksmedetomidin infuzioni paytida nafas olish tezligi indikator o'sish tendentsiyasiga ega.

Deksmetomidinni klinik amaliyotda qo'llash Deksmetomidinning sanab o'tilgan xususiyatlari intensiv terapiya bo'limlarida, birinchi navbatda, neyroxirurgiya sharoitida sedasyon uchun dori sifatida unga katta qiziqish uyg'otdi. U 1999 yilda Amerika Qo'shma Shtatlarida foydalanish uchun tasdiqlangan "reanimatsiya bo'limlarida uzoq (24 soatgacha) sedasyon/analjeziya" uchun dori sifatida maxsus edi. Darhaqiqat, uning noyob anksiyolitik va sedativ ta'siri, hatto mexanik shamollatish sharoitida ham bemor bilan nevrologik holatni baholash uchun samarali aloqa qilish imkonini beradi, og'riq qo'zg'atuvchilariga tolerantlikni oshiradi, simpatik faollikni bostiradi va, albatta, nafas olish depressiyasining yo'qligi, deksmedetomidinni reanimatsiya bo'limining ideal bo'limiga eng yaqin qiladi. Bugungi kunga kelib, uzoq muddatli mexanik ventilyatsiyani talab qiladigan bemorlarda sedasyon uchun ushbu preparatning samaradorligini baholash bo'yicha bir qator tadqiqotlar o'tkazildi. Xususan, Riker va boshqalar guruhi. [53] deksmedetomidin yoki midazolam qabul qilgan 375 bemorning klinik ma'lumotlarini tahlil qilish asosida, deksmedetomidin guruhida respiratordan sutdan ajratish vaqti qisqaroq, delirium sezilarli darajada kam rivojlangan, taxikardiya va gipertenziya kamroq kuzatilgan. Kattaroq MIDEX tadqiqoti (500 bemor) deksmedetomidinning midazolamga nisbatan asosiy afzalliklarini tasdiqladi

[35]. Propofol bilan solishtirganda, xuddi shunday sonli bemorlarni o'z ichiga olgan PRODEX tadqiqotida deksmedetomidin ham ekstubatsiya vaqti va bemor bilan o'z vaqtida aloqa qilish bo'yicha ba'zi afzalliklarni ko'rsatdi, shu bilan birga u yon ta'sirlar (bradikardiya va gipotenziya) tez-tezligi bo'yicha propofoldan oshib ketmadi [35]. Deksmetomidinning neyro- va kardioproteksiya, miya qon oqimi va ICPni kamaytirish, miya kislorod iste'moliga ta'siri va boshqalar kabi xususiyatlarining klinik ahamiyati va reanimatsiya bo'limidagi bemorlarning natijalariga ta'siri keyingi tadqiqotlarni talab qiladi. Ushbu masala bo'yicha ko'p sonli va ba'zan qarama-qarshi ma'lumotlarni to'liq tekshirish ushbu ko'rib chiqish doirasidan tashqarida. Biz birinchi navbatda anesteziologiya amaliyotida deksmedetomidinni qo'llashning hozirgi ko'rsatkichlari va istiqbollarni ko'rib chiqmoqchimiz. Deksmetomidining reanimatologlarning e'tiborini tortadigan bir xil xususiyatlar uning anesteziologiyada perioperativ foydalanishga bo'lgan qiziqishini aniqlaydi. Hatto ushbu preparatni behushlik paytida qo'shimcha vosita sifatida qo'llash bemorlarning ayrim toifalarida ma'lum afzalliklarga erishishga imkon beradi [15]. Xususan, yurak-qon tomir jarrohligi amaliyotida deksmedetomidinni kichik dozalarda quyish umumiy behushlik paytida va operatsiyadan keyingi davrda, ayniqsa, bolalarda gemodinamik ko'rsatkichlarning barqarorligini oshirish imkonini beradi [37]. Pediatriya amaliyotida deksmedetomidinning intraoperativ ektopik taxiaritmiyalarni sinus ritmiga aylantirish qobiliyati ko'rsatilgan [19, 41]. Bundan tashqari, jami 3000 dan ortiq bemorni o'z ichiga olgan 23 ta tadqiqotga asoslangan katta meta-tahlil, a2-adrenergik agonistlar qon tomir jarrohlikdan so'ng va yurak jarrohligi paytida bemorlarda o'lim va miyokard infarkti chastotasini kamaytirishini ko'rsatdi [65]. Tadqiqotchilar bu ta'sirni birinchi navbatda simpatik tizim faoliyatini bostirish bilan bog'lashadi. Shuni esdan chiqarmaslik kerakki, deksmedetomidinning yon ta'siri, birinchi navbatda, gipotenziya, aksincha, ishemiya xavfini oshirishi mumkin [36]. Deksmetomidinning to'g'ridan-to'g'ri vazokonstriksiyaga olib kelishi mumkin bo'lgan potentsial qobiliyatining klinik ahamiyati ham shubhali bo'lib qolmoqda. Shuni hisobga olgan holda, preparatning dozasiga diqqat bilan e'tibor berish kerak va deksmedetomidinning kardioprotektiv va pro-ishemik xususiyatlari o'rtasidagi bog'liqlikni aniqlash uchun keyingi tadqiqotlar, shubhasiz, talab qilinadi. Deksmetomidinda analjezik xususiyatlarning bir vaqtning o'zida mavjudligi, ayniqsa opioidlarning ta'sirini kuchaytirish nuqtai nazaridan va nafas olish depressiyasining yo'qligi foydali ko'rinadi. Amalda, morbid semizlik bilan og'rigan bemorlar bilan ishlash, bu dori shunchaki ajralmas bo'lishi mumkin. Obstruktiv apnea va o'pka gipertenzijasidan aziyat chekkan 433 kg bemorni parvarish qilishning yorqin klinik misoli Hofer va boshqalarning ishlarida keltirilgan. [29]. Bunday holda, operatsiyadan keyingi va operatsiyadan keyingi deksmedetomidin infuzionidan foydalanish og'riqni yo'qotish uchun opioidlarni qo'llash chastotasini sezilarli darajada kamaytirishga imkon berdi va shu bilan nafas olish asoratlari xavfi juda yuqori bo'lgan bemorda o'ziga xos nafas olish depressiyasining oldini oldi. Deksmetomidin bemorni parvarish qilishning eng yaxshi variantlaridan biri bo'lishi mumkin bo'lgan anesteziologiyaning alohida sohasi - bu standart orotraxeal

intubatsiya imkonsiz bo'lganda amalga oshiriladigan uyg'oq tolali optik intubatsiya. Ma'lumki, bu muolajani tez va xavfsiz bajarish uchun bemor tinch va harakatsiz bo'lishi kerak, faringeal reflekslar esa bemorni aspiratsiya va asfiksiyadan himoya qilishi kerak. Deksmidetomidin nafas olish funksiyasini saqlab turganda aniq anksiyolizga erishishga imkon beradi. Bundan tashqari, ushbu preparat tuprik bezlarining sekretsiasini bostirish xususiyatiga ega va shuning uchun manipulyatsiyani yuqori sifatli vizual nazorat qilishni ta'minlashga yordam beradi. Ushbu nazariy hisob-kitoblar klinik tadqiqotlarda tasdiqlangan [3, 12]. Biroq, bu klinik vaziyatda deksmedetomidinning remifentanilga nisbatan afzalliklarining klinik ahamiyati munozarali bo'lib qolmoqda [16]. Deksmidetomidinning xususiyatlari, ayniqsa, pediatrik amaliyotda, minimal invaziv yoki noinvaziv muolajalar paytida sedasyon zarur bo'lganda juda qulaydir. Bunday hollarda an'anaviy ravishda qo'llaniladigan propofol va benzodiazepinlar sezilarli nafas olish depressiyasiga olib kelishi ma'lum bo'lib, bemor uchun KT yoki MRI kabi xavfsiz protseduralar xavfini oshiradi. Ushbu dorilarni deksmedetomidin bilan almashtirish orqali ulardan foydalanishdan qochishga urinishlar bir qator tadqiqotlarda tasvirlangan. Shunday qilib, Ko'ro'g'li va boshqalarning tadqiqotlarida. [39, 40], 1 yoshdan 7 yoshgacha bo'lgan 140 nafar bolani o'rganishda deksmedetomidin MRI paytida midazolam va propofoldan sedativlik sifatidan kam emas edi. Shuningdek, 30 kun ketma-ket radiatsiya terapiyasi paytida bolalarda bir necha marta takroriy sedasyonlarda deksmedetomidinni qo'llash bo'yicha alohida kuzatuvlar mavjud [58]. Shuni ta'kidlash kerakki, deksmedetomidin hozirda na AQShda [51], na bizning mamlakatimizda [1] bolalarda klinik foydalanish uchun tasdiqlangan dori emas, lekin ko'plab klinik tadqiqotlar uning bir qator klinik vaziyatlarda xavfsizligi va yuqori samaradorligini tasdiqlaydi. Xususan, adabiyotda deksmedetomidinning bolalar amaliyotida sevofluran anesteziasidan so'ng uyg'onish paytida qo'zg'alishning oldini olish qobiliyatiga oid ko'rsatkichlarni topish mumkin [34, 46]. Ko'pgina tadqiqotlar, shuningdek, bolalar anestezioologlari - bukkal va intranazal - dori vositalarini qo'llashning muqobil usullarida deksmedetomidinni qo'llash samaradorligi bilan bog'liq. Ushbu tadqiqotlar mualliflari bolalarda premedikatsiya va qisqa muddatli sedasyon uchun deksmedetomidinni qo'llash mantiqiyligini ta'kidlaydilar [17, 55, 66]. Deksmidetomidinning yuqorida tavsiflangan barcha qo'llanilishiga qaramay, neyroanestezioologiya uning anestetik preparat sifatidagi potentsialini to'liq amalga oshirish mumkin bo'lgan soha ekanligiga shubha yo'q. Aynan shu erda jarrohlik aralashuvlarni xavfsiz va samarali bajarish uchun bemorning nevrologik holatini davriy intraoperativ monitoring ko'pincha zarur bo'ladi va deksmedetomidin buning uchun noyob imkoniyatlarni taqdim etadi. Bunday aralashuvlar miyaning chuqur hududlarida ogohlantiruvchi elektrodni joylashtirish, karotid endarterektomiya va uyg'oq kraniotomiyadan iborat. Shuni ta'kidlash kerakki, umumiy behushlik ostida an'anaviy kraniotomiya amalga oshirilganda ham, deksmedetomidinni qo'llash yuqori gemodinamik barqarorlikka va nafas olishni susaytiradigan opioidlar va anesteziklarning dozalarini kamaytirishga imkon beradi [27]. Shuning uchun bu yondashuv erta uyg'onish va ekstubatsiyaga olib kelishi mumkin, shuning uchun operatsiyadan keyingi

nevrologik holatning erta monitoringi yaqinda operatsiyadan keyingi asoratlar tufayli bemorning ahvolini yomonlashishiga yo'l qo'ymaslik uchun ko'proq e'tibor qaratmoqda. Elektrodlarni miyaning chuqur hududlariga joylashtirish - bu Parkinson kasalligining dori-darmonlarga chidamli shakllarini yoki boshqa turdagi harakat yoki ohang buzilishlarini va yaqinda depressiya va surunkali og'riqni davolash uchun ishlatiladigan minimal invaziv protsedura. Ushbu protsedura bemorning operatsiya xonasida uzoq vaqt qolishini, protseduralarni takroriy neyroimaging monitoringini va nisbatan engil jarrohlik aralashuvni talab qiladi. Deksmetomidin miyaning subkortikal tuzilmalarining elektr faolligini o'zgartirmasdan anksiyolizning zarur barqaror darajasiga erishishga imkon beradi. elektrodlarni joylashtirishda ba'zan nazorat qilish kerak bo'ladi [54]. Deksmetomidinning asab to'qimalarining elektrofiziologiyasiga sezilarli supressiv ta'sirining yo'qligi qo'zg'atilgan potentsiallarni intraoperativ monitoringini talab qiluvchi orqa miya patologiyasini davolash bilan shug'ullanadigan mutaxassislarning e'tiborini tortadi [8], shuningdek, intraoperativ elektrokortikografiya sharoitida dori-darmonlarga chidamli epilepsiyani jarrohlik davolash amaliyotida [49,59]. Karotid endarterektomiya ichki uyqu arteriyasining bo'shlig'idan aterosklerotik blyashka olib tashlashni o'z ichiga oladi va asosan qon tomir operatsiya hisoblanadi. Biroq, operatsiya qilingan tomirni siqish paytida miya shikastlanishining yuqori xavfi bu aralashuvga neyroxirurgik o'ziga xoslikni beradi. Xususan, yuqori xavfli bemorlarning ma'lum bir toifasida operatsiyani hushyor holatda bajarish ushbu muhim profilaktik protsedura xavfsizligini sezilarli darajada oshiradi. Bunday hollarda deksmedetomidinning anksiyolitik ta'siri bachadon bo'yni nervlarining adekvat mintaqaviy behushligini to'ldiradi, bemor va jarroh uchun maksimal qulaylikni ta'minlab, protsedura davomida nevrologik holatni doimiy ravishda kuzatib borish imkonini beradi. Bundan tashqari, deksmedetomidinni qo'llash nafas olish funktsiyasini saqlab, protsedura davomida barqaror gemodinamikaga erishishga yordam beradi. Bu xususiyat ko'pincha juda foydali, chunki karotid endarterektomiyaga nomzod bo'lgan bemorlar ko'pincha gipertoniya, yurak tomirlari kasalligi va ko'pincha surunkali o'pka kasalliklari bilan og'rigan keksa odamlardir. Bekker va boshqalarning ishlarida deksmedetomidin asosidagi behushlik ostida uyg'oq karotid endarterektomiyaning yaxshi bardoshliligi haqidagi klinik ma'lumotlar etarli darajada batafsil keltirilgan. guruh [9, 10]. Mualliflarning ta'kidlashicha, bu yondashuv va midazolam, fentanil yoki propofoldan foydalangan holda standart behushlik o'rtasida nevrologik holatni tekshirishning etarliligi, operatsiyadan keyingi bo'limda va umumiy kasalxonada qolish muddati yoki jarroh va bemorning qoniqish darajasi nuqtai nazaridan farqlar kuzatilmagan. Bundan tashqari, tuzatishni talab qiluvchi gipertenziya epizodlari deksmedetomidin guruhida nazorat guruhiga qaraganda ancha kam uchraydi. Ammo shuni ta'kidlash kerakki, fenilefrin va efedrin ham ushbu guruhdagi anesteziologlar tomonidan biroz tez-tez ishlatilgan. Bundan tashqari, ilgari o'tkazilgan tadqiqotda, deksmedetomidin guruhida vaqtincha intraluminal shuntini joylashtirish tezligi taqqoslash guruhiga qaraganda yuqori bo'lgan (2 ta holatga nisbatan 6 ta holat, har bir guruhda jami 31 bemor) [10]. Mualliflarning

ta'kidlashicha, bu haqiqatni, bir tomondan, bemorlarning guruhlar o'rtasida oddiy notekis taqsimlanishi bilan izohlash mumkin, boshqa tomondan, qon tomir adrenergik retseptorlari va / yoki tizimli qon bosimining past darajasiga bevosita ta'sir qilish orqali miya qon oqimining mumkin bo'lgan qisqarishi. Keyinchalik ish, 123 karotid endarterektomiya tahlilini o'z ichiga olgan tadqiqot deksmedetomidinni qo'llash bilan intraluminal shuntni joylashtirishning yuqori tezligini tasdiqlamadi (tarixiy nazorat guruhida 4,3% ga nisbatan 10%) [9]. Olingan klinik ma'lumotlarga asoslanib, mualliflar, shuningdek, deksmedetomidinni qo'llash bilan intraoperativ yurak asoratlari xavfining kamayishi tendentsiyasini qayd etadilar: ushbu preparatni qabul qilgan bemorlarda EKG o'zgarishlari kamroq bo'lgan. O'z natijalarini tahlil qilib, mualliflar deksmedetomidinni uyg'oq karotid endarterektomiyada muvaffaqiyatli qo'llash mumkin degan xulosaga kelishadi; ammo uning miya qon oqimiga ta'sirining ba'zi jihatlari qo'shimcha klinik tadqiqotlarni talab qiladi. Uyg'ongan kraniotomiya anestezikani boshqarishning etariligi nuqtai nazaridan neyroxirurgik aralashuvlarning eng qiyin turlaridan biridir. Ushbu protsedura, bir tomondan, operatsiya davomida miya yarim korteksini xaritalash paytida bemor bilan og'zaki aloqani saqlab turishni, ikkinchi tomondan, jarroh uchun qulay ish sharoitlarini va bemorning operatsiya xonasida bo'lishini ta'minlashni talab qiladi. An'anaviy ravishda ishlatiladigan anestetiklar bilan bunday muvozanatga erishish ko'pincha juda qiyin. Bu, ayniqsa, ulardan foydalanish bilan bog'liq nafas olish depressiyasi, giperkapniya va miya shishishi xavfini hisobga olgan holda to'g'ri keladi. Shu sababli, deksmedetomidin bozorga kiritilgandan so'ng, uyg'oq kraniotomiya paytida sedativ dori sifatida e'tiborni tortdi. Uyg'ongan kraniotomiya paytida deksmedetomidinni qo'llash bo'yicha birinchi tajriba Bekker va boshqalar tomonidan tasvirlangan. 2001 yilda [11]. Dastlab, bemorning nafas olishini susaytiradigan va kortikal xaritalash paytida bevosita anksiyolizni ta'minlaydigan boshqa dorilarning (sevofluran yoki propofol) dozasini kamaytirish uchun anesteziyaga qo'shimcha sifatida ishlatilgan. Bu yondashuv kattalarda ham, eng muhimi, bolalarda ham tasvirlangan. Xususan, Ard va boshqalar. [6] 12 yoshli bolalarda deksmedetomidinni qo'llash jarrohlik paytida samarali va xavfsiz kortikal xaritalash imkonini beradigan ikkita holatning tavsifini taqdim etadi. 10 ta katta yoshli bemorlarda xuddi shunday muvaffaqiyat Mack va boshqalarning ishida tasvirlangan. [43]. Keyingi tadqiqotlarda, xususan Souter va boshqalarning tavsiflarida. [59], operatsiyaning eng shikastli daqiqalarida remifentanil infuzioni va qo'shimcha gipnozlarini (kerak bo'lsa) bolus yuborish bilan birgalikda asosiy anestezik sifatida deksmedetomidindan foydalangan holda uyg'oq kraniotomiya qilish samaradorligi haqida ko'rsatmalar mavjud edi. Uyg'oq kraniotomiya uchun ishlatiladigan dori sifatida deksmedetomidinning qo'shimcha afzalligi uning miya tomirlarining giperkapnik vazodilatatsiyasini bostirish qobiliyatidir va shuning uchun o'z-o'zidan nafas olish sharoitida operatsiya qilingan bemorlarda miya shishishi ehtimolini kamaytiradi [60]. Tarixiy nazorat guruhidagi 10% ga nisbatan 3% [9]. Olingan klinik ma'lumotlarga asoslanib, mualliflar, shuningdek, deksmedetomidinni qo'llash bilan intraoperativ yurak asoratlari xavfining kamayishi tendentsiyasini qayd etadilar: ushbu preparatni qabul qilgan

bemorlarda EKG o'zgarishlari kamroq bo'lgan. O'z natijalarini tahlil qilib, mualliflar deksmedetomidinni uyg'oq karotid endarterektomiyada muvaffaqiyatli qo'llash mumkin degan xulosaga kelishadi; ammo uning miya qon oqimiga ta'sirining ba'zi jihatlarini qo'shimcha klinik tadqiqotlarni talab qiladi. Uyg'ongan kraniotomiya anestezikani boshqarishning etariligi nuqtai nazaridan neyroxirurgik aralashuvlarning eng qiyin turlaridan biridir. Ushbu protsedura, bir tomondan, operatsiya davomida miya yarim korteksini xaritalash paytida bemor bilan og'zaki aloqani saqlashni, ikkinchi tomondan, jarroh uchun qulay ish sharoitlarini va bemorning operatsiya xonasida qulay bo'lishini ta'minlashni talab qiladi. An'anaviy ravishda ishlatiladigan anestetiklar bilan bunday muvozanatga erishish, ayniqsa ularni qo'llash paytida nafas olish depressiyasi, giperkapniya va miya shishishi xavfini hisobga olgan holda juda qiyin. Shuning uchun deksmedetomidin bozorda paydo bo'lganidan so'ng, hushyor kraniotomiya paytida sedativ dori sifatida e'tiborni tortdi. Uyg'ongan kraniotomiya paytida deksmedetomidinni qo'llashning birinchi tajribasi Bekker va boshqalar tomonidan tasvirlangan. 2001 yilda [11]. Dastlab, u behushlikning qo'shimcha komponenti sifatida, bemorda nafas olishni bostirishi mumkin bo'lgan boshqa dorilarning (sevofluran yoki propofol) dozasi kamaytirish va kortikal xaritalash paytida bevosita anksiyolizni ta'minlash uchun ishlatilgan. Ushbu yondashuv kattalarda ham, ayniqsa qimmatli bo'lgan bolalarda ham tasvirlangan. Xususan, Ard va boshqalarning ishlari. [6] 12 yoshli bolalarda deksmedetomidinni qo'llash operatsiya vaqtida samarali va xotirjam kortikal xaritalash imkonini beradigan 2 holatning tavsifini taqdim etadi. 10 ta katta yoshli bemorlarda xuddi shunday muvaffaqiyat Mack va boshqalarning ishida tasvirlangan. [43]. Keyingi ishlarda, xususan Souter va boshqalarning tavsiflarida. [59], operatsiyaning eng shikastli daqiqalarida remifentanil infuzioni va qo'shimcha gipnozlarini (kerak bo'lsa) bolus yuborish bilan birgalikda asosiy anestetik sifatida deksmedetomidindan foydalangan holda uyg'oq kraniotomiya qilish samaradorligi haqida ko'rsatmalar paydo bo'ldi. Uyg'ongan kraniotomiya uchun ishlatiladigan dori sifatida deksmedetomidinning qo'shimcha afzalligi uning miya tomirlarining giperkapnik vazodilatatsiyasini bostirish qobiliyatidir va shu bilan o'z-o'zidan nafas olish sharoitida operatsiya qilingan bemorlarda miya shishishi ehtimolini kamaytiradi [60]. Tarixiy nazorat guruhidagi 10% ga nisbatan 3% [9]. Olingan klinik ma'lumotlarga asoslanib, mualliflar, shuningdek, deksmedetomidinni qo'llash bilan intraoperativ yurak asoratlari xavfining kamayishi tendentsiyasini qayd etadilar: ushbu preparatni qabul qilgan bemorlarda EKG o'zgarishlari kamroq bo'lgan. O'z natijalarini tahlil qilib, mualliflar deksmedetomidinni uyg'oq karotid endarterektomiyada muvaffaqiyatli qo'llash mumkin degan xulosaga kelishadi; ammo uning miya qon oqimiga ta'sirining ba'zi jihatlarini qo'shimcha klinik tadqiqotlarni talab qiladi. Uyg'ongan kraniotomiya anestezikani boshqarishning etariligi nuqtai nazaridan neyroxirurgik aralashuvlarning eng qiyin turlaridan biridir. Ushbu protsedura, bir tomondan, operatsiya davomida miya yarim korteksini xaritalash paytida bemor bilan og'zaki aloqani saqlashni, ikkinchi tomondan, jarroh uchun qulay ish sharoitlarini va bemorning operatsiya xonasida qulay bo'lishini ta'minlashni talab qiladi. An'anaviy ravishda ishlatiladigan

anestetiklar bilan bunday muvozanatga erishish, ayniqsa ularni qo'llash paytida nafas olish depressiyasi, giperkapniya va miya shishishi xavfini hisobga olgan holda juda qiyin. Shuning uchun deksmedetomidin bozorda paydo bo'lganidan so'ng, hushyor kraniotomiya paytida sedativ dori sifatida e'tiborni tortdi. Uyg'ongan kraniotomiya paytida deksmedetomidinni qo'llashning birinchi tajribasi Bekker va boshqalar tomonidan tasvirlangan. 2001 yilda [11]. Dastlab, u behushlikning qo'shimcha komponenti sifatida, bemorda nafas olishni bostirishi mumkin bo'lgan boshqa dorilarning (sevofluran yoki propofol) dozasini kamaytirish va kortikal xaritalash paytida bevosita anksiyolizni ta'minlash uchun ishlatilgan. Ushbu yondashuv kattalarda ham, ayniqsa qimmatli bo'lgan bolalarda ham tasvirlangan. Xususan, Ard va boshqalarning ishlari. [6] 12 yoshli bolalarda deksmedetomidinni qo'llash operatsiya vaqtida samarali va xotirjam kortikal xaritalash imkonini beradigan 2 holatning tavsifini taqdim etadi. 10 ta katta yoshli bemorlarda xuddi shunday muvaffaqiyat Mack va boshqalarning ishida tasvirlangan. [43]. Keyingi ishlarda, xususan Souter va boshqalarning tavsiflarida. [59], operatsiyaning eng shikastli daqiqalarida remifentanil infuzioni va qo'shimcha gipnozlarini (kerak bo'lsa) bolus yuborish bilan birgalikda asosiy anestetik sifatida deksmedetomidindan foydalangan holda uyg'oq kraniotomiya qilish samaradorligi haqida ko'rsatmalar paydo bo'ldi. Uyg'ongan kraniotomiya uchun ishlatiladigan dori sifatida deksmedetomidinning qo'shimcha afzalligi uning miya tomirlarining giperkapnik vazodilatatsiyasini bostirish qobiliyatidir va shu bilan o'z-o'zidan nafas olish sharoitida operatsiya qilingan bemorlarda miya shishishi ehtimolini kamaytiradi [60]. Mualliflar deksmedetomidinni uyg'oq karotid endarterektomiyada muvaffaqiyatli qo'llash mumkin degan xulosaga kelishadi; ammo uning miya qon oqimiga ta'sirining ba'zi jihatlari qo'shimcha klinik tadqiqotlarni talab qiladi. Uyg'ongan kraniotomiya anestezikani boshqarishning etarliligi nuqtai nazaridan neyroxirurgik aralashuvlarning eng qiyin turlaridan biridir. Ushbu protsedura, bir tomondan, operatsiya davomida korteks xaritalash paytida bemor bilan og'zaki aloqani saqlab turishni, ikkinchi tomondan, jarroh uchun qulay ish sharoitlarini va operatsiya xonasida bemor uchun qulay sharoitlarni ta'minlashni talab qiladi. An'anaviy ravishda ishlatiladigan anestetiklar bilan bunday muvozanatga erishish ko'pincha juda qiyin. Bu, ayniqsa, ulardan foydalanish bilan bog'liq nafas olish depressiyasi, giperkapniya va miya shishishi xavfini hisobga olgan holda to'g'ri keladi. Shu sababli, deksmedetomidin bozorda paydo bo'lganidan so'ng, uyg'oq kraniotomiya uchun sedativ sifatida e'tiborni tortdi. Uyg'ongan kraniotomiya paytida deksmedetomidinni qo'llash bo'yicha birinchi tajriba Bekker va boshqalar tomonidan tasvirlangan. 2001 yilda [11]. Dastlab, u bemorda nafas olishni bostirishga qodir bo'lgan boshqa dorilarning (sevofluran yoki propofol) dozasini kamaytirish va kortikal xaritalash davrida bevosita anksiyolizni ta'minlash uchun anestetik parvarishning qo'shimcha komponenti sifatida ishlatilgan. Ushbu yondashuv kattalarda ham, ayniqsa qimmatli bo'lgan bolalarda ham tasvirlangan. Xususan, Ard va boshqalarning ishlari. [6] 12 yoshli bolalarda deksmedetomidinni qo'llash operatsiya vaqtida samarali va xotirjam kortikal xaritalash imkonini beradigan 2 holatning tavsifini taqdim etadi. 10 ta katta yoshli bemorlarda xuddi

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Xulosa: Xulosa qilib shuni yana bir bor ta'kidlash kerakki, deksmedetomidin uchun mavjud ko'rsatmalarga qaramay, uning noyob xususiyatlari bemorlarning keng doirasi uchun anesteziik yordam sifatini yaxshilash imkoniyatiga ega. Juda samarali anksiyolitik ta'sirning kombinatsiyasi, og'riqlarga chidamliligini oshirish va buzilmagan nafas olish funksiyasini saqlash ushbu preparatni anesteziologning arsenalida noyob vositaga aylantiradi. Albatta, to'plangan klinik ma'lumotlar har bir o'ziga xos klinik vaziyatda deksmedetomidinning boshqa anesteziiklarga nisbatan aniq ustunligi to'g'risida aniq xulosa chiqarishga imkon bermaydi. Biroq, ushbu ma'lumotlarga asoslanib, biz ishonch bilan aytishimiz mumkinki, deksmedetomidin kelajakda amaliy anesteziologiya amaliyotida o'z o'rnini topadi.

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KARDIOGEN SHOK RIVOJLANGAN O'TKIR KORONAR SINDROMLI BEMORLARDA GOSPITAL O'LIM KO'RSATKICHINI KAMAYTIRISH YO'LLARI

Tadqiqot maqsadi

Kardiogen shokdan (KSh) kasalxonada o'lim xavfini boshqarish nuqtai nazaridan katta shaharda o'tkir koronar sindrom (O'KS) uchun tibbiy yordam ko'rsatish tizimini tahlil qilish.

Materiallar va usullar. *Tadqiqot sog'liqni saqlash tashkilotining KSh va uning salbiy oqibatlari (o'lim) uchun xavflarni boshqarish tizimiga asoslangan. 2018 yildan 2024 yilgacha Andijon kardiologiya dispanseriga (Andijon, O'zbekiston) ketma-ket yotqizilgan O'KS bilan og'rigan bemorlarning tibbiy ma'lumotlaridan foydalangan holda elektron ma'lumotlar bazasi yaratildi. Namuna olish usuli uzluksiz edi (19 281 O'KS bilan kasallangan, 6 537 miyokard infarkti (MI) va 49 kardiogen tizimli tibbiy yordam ko'rsatish natijalari). O'KS bilan og'rigan bemorlarga shoshilinch tibbiy yordam (shifoxonagacha bo'lgan daraja) va bemorning ahvolining og'irligiga asoslangan ko'p bosqichli davolash va diagnostika jarayoniga ega ixtisoslashgan kardiologiya kasalxonasini o'z ichiga oladi. Menejment yordamning uzluksizligi printsiptiga muvofiq, ishonchli ma'lumot almashinuviga asoslangan faoliyatning aniq algoritmlarini qo'llaydi Kasalxonaga yotqizish bo'limi bosqichidan boshlab ishlaydigan shokga qarshi guruh yaratildi, tizimli yondashuv MI ST elevatsiyasi bilan kasallangan bemorlarda reperfuzion terapiya usuli sifatida birlamchi perkutan koronar aralashuvlar (PKA) uchun birinchi navbatda ixtisoslashtirilgan tibbiy yordam ko'rsatish strategiyasini ishlab chiqishga imkon berdi. KSh guruhida kasalxonada o'lim darajasi 88,0% ni tashkil etdi, bu esa asosiy PKA uchun 62,2% ni tashkil etdi O'KS bilan og'rigan bemorlarda natijalar xavflarni boshqarish metodologiyasiga asoslangan barcha darajadagi tibbiy yordam ko'rsatishning yagona tamoyillari bilan belgilanadi.*

Kalit so'zlar: *o'tkir koronar sindrom, kardiogen shok, xavfni boshqarish.*

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WAYS TO REDUCE INHOSPITAL MORTALITY IN PATIENTS WITH CARDIOGENIC SHOCK IN ACUTE CORONARY SYNDROME

Objective: to analyze a medical care system for acute coronary syndrome (O'KS) in a large city in terms of inhospital cardiogenic shock mortality risk management. **Materials and methods.** The health care facility management system for a risk for cardiogenic shock (KSH) and its poor outcome (death) was a methodological basis of this study. The information from case histories of O'KS patients consecutively admitted to the Andijan Cardiology Dispensary (Andijan, Uzbekistan) in the period 2018 to 2024 was used to develop an electronic database. Sampling included 19281 patients with O'KS, 6537 with myocardial infarction (MI), 493 with KSH. **Results and discussion.** The medical care system for patients with O'KS encompasses an emergency team (a prehospital level), a specialized cardiac hospital (an inhospital level) with a multistage therapeutic and diagnostic process in relation the severity of a patient's status. The management is based on the principle of continuity of care, by applying the welldefined activity algorithms through valid information exchange and risk stratification for poor outcomes of O'KS. An antishock team working just in the admission unit of a hospital was set up to treat high KSH risk patients. A systems approach allowed the strategy of early specialized medical care to be developed with a priority of primary percutaneous coronary interventions (PCI) as reperfusion therapy in patients with STElevation MI. In 2018-2024, every three patients with suspected O'KS had verified MI that was complicated by KSH in 7.5%. In the KSH group, the inhospital mortality rates totaled 88.0% of cases; that after primary PCI was 62.2%. In the examined period, the introduction of innovation clinical and organizational approaches provided a reduction in this indicator by 17.6 and 37.5%, respectively. **Conclusion.** The efficiency of risk management for KSH and its poor outcomes in patients with O'KS is determined by the unique principles of medical care rendering at all levels on the basis of risk management methodology.

Key words: acute coronary syndrome, cardiogenic shock, risk management.

Sog'liqni saqlashda strategik menejment sog'liqni saqlash muassasasini bir qator xususiyatlarga ega bo'lgan ijtimoiy-iqtisodiy tizim sifatida ko'rib chiqadi, shu

jumladan tizim parametrlarining o'zgaruvchanligi, uning yakuniy imkoniyatlarining mavjudligi, tuzilishini o'zgartirish va o'zgaruvchan sharoitlarga moslashish qobiliyati. Sog'liqni saqlash sohasidagi maqsadlar hayotni saqlash, uning sifatini yaxshilash va inson mehnat faoliyatini uzaytirishga qaratilgan. Maqsadlar turli darajalarda qo'llanilishi mumkin: strategik, tashkiliy, loyiha, mahsulot yoki jarayon [3]. Sog'liqni saqlash menejerlarining vazifasi xavflarni, ularning hajmini (ahamiyati, tanqidiyligi), chastotasini va oldini olish imkoniyatlarini aniqlashdir [1-2]. Boshqaruv tizimlariga qo'yiladigan xalqaro talablar nuqtai nazaridan, "xavf" - bu noaniqlikning maqsadlarga ta'siri, noaniqlik esa hodisani tushunish yoki uning yuzaga kelish ehtimoli bilan bog'liq bo'lgan ma'lumotlarning etarli emasligi (hatto qisman) tufayli yuzaga keladi. Rus amaliyotida "xavf" atamasi bir xil semantik yukni o'z ichiga oladi - bu hodisa ehtimoli va uning oqibatlarining kombinatsiyasi [4]. Shu munosabat bilan qon aylanish tizimi kasalliklari katta tibbiy va ijtimoiy ahamiyatga ega. Aynan shu kasalliklar klassi aholida yuqori o'lim va nogironlikni belgilaydi va yurak ishemik kasalligi bu hodisalarning eng keng tarqalgan sababidir. Ko'pgina tadqiqotlar shuni ko'rsatdiki, yurak ishemik kasalligining klinik ko'rinishining eng xavfli varianti o'tkir koronar sindromdir [5-7]. O'tkir koronar sindrom patologik jarayonning jadal rivojlanishi va hayot uchun xavfli asoratlarning, birinchi navbatda, miyokard infarkti (MI) va kardiogen shok (KSh) yuqori ehtimoli bilan tavsiflanadi. KSh MI ST segmenti elevatsiyasini asorati va o'lim darajasi $> 50\%$ [8-9] bilan birga keladi. Tadqiqotlar shuni ko'rsatdiki, KSh kasalxonada bemorlarning atigi 10 foizida rivojlanadi. Aholini o'rganish shuni ko'rsatadiki, barcha bemorlarning 26-56 foizida KSh kasalxonaga yotqizish paytida rivojlanadi va qabul paytida KSh belgilari yo'q edi [10]. Bemorlarning yarmida shokning klinik belgilari kasalxonaga yotqizilganning birinchi kunida rivojlanadi. Shu sababli, O'KS dagi KSh xavfi bu asosiy sabablarning ma'lum bir kombinatsiyasi deb taxmin qilish mumkin, bu tibbiy yordamni adekvat baholanmasdan kechiktirilishi va o'lim xavfi ortishi mumkin.

Tadqiqot maqsadi- katta shaharda kardiogen shokdan kasalxonada o'lim xavfini boshqarish nuqtai nazaridan O'KS bilan kasallangan bemorlarga tibbiy yordam ko'rsatish tizimini tahlil qilish.

Materiallar va usullar

O'rganilayotgan hodisa O'KSda kardiogen shokdir. Tadqiqot ob'ekti - yirik shaharda O'KS uchun tibbiy yordam ko'rsatish tizimi. Kuzatuv birligi - bu O'KSda KSh rivojlanish xavfidan shubhalanishga imkon beradigan klinik belgilar yoki alomatlarga ega bo'lgan bemor. O'quv bazasi ixtisoslashtirilgan kardiologiya markazi (Andijon). O'rganish davri 2018 yildan 2024 yilgacha bo'lgan. Ma'lumotlarni yig'ish usuli uzluksiz edi. Kuzatuv hajmi O'KS bilan 19281 bemorni, MI bilan 6537 bemorni, KSh bilan 493 bemorni tashkil etdi. Tadqiqot O'KS bilan og'rigan bemorlarga tibbiy yordam ko'rsatishning klinik va tashkiliy jihatlarini o'rganishga tizimli yondashuvga, ixtisoslashtirilgan shahar markazida KSh uchun xavf omillarini va uning salbiy oqibatlarini vaziyatli tahlil qilishga asoslangan. Tadqiqotda birinchi navbatda xavf omillarini aniqlash, tibbiy-ijtimoiy tahlil qilish va yuqori sifatli va ishonchli ma'lumotlarga asoslangan KSH xavfini

baholash, shuningdek, manfaatdor tomonlar o'rtasida ma'lumot almashish mexanizmlarini va KSHni rivojlantirish uchun xavflarni boshqarish tizimini yaratishga asosiy e'tibor berildi (rasm). Ushbu yondashuv xavflarni tegishli ravishda baholashni, tegishli boshqaruv qarorlarini qabul qilishni, muayyan sharoitlarda amalga oshirilishini va ishtirokchi tashkilotlarning maqsadlariga mos kelishini ta'minlaydi. Statistik ma'lumotlarni qayta ishlash standart litsenziyalangan "Statistica 6.0" dasturiy majmuasi yordamida amalga oshirildi. Miqdoriy ma'lumotlarni tahlil qilishda o'rtacha qiymat va standart og'ish ($M \pm SD$) hisoblab chiqilgan; sifat ma'lumotlarini solishtirish uchun chastota ($P, \%$) hisoblab chiqilgan va Pearson ch kvadrat mezonidan foydalanilgan. Muhimlik darajasining kritik qiymati (p) 0,05 ga teng qabul qilindi. Kasalxonadagi o'limni tahlil qilish butun o'rganish davri uchun va 2015-2021 yillar bilan 2018-2024 yillar bilan taqqoslaganda amalga oshirildi.



Цикл управления риском развития КШ у пациентов с ОКС.

**Natijalar va
muhokama**

Andijonda taxminan 4 mln ga yaqin aholi istiqomat qiladi. 2015 yilgacha Andijondada O'KS bilan og'rigan bemorlarga yordam ko'rsatishning tashkiliy asoslari farqlanmagan va Sog'liqni saqlash vazirligining buyruqlari va tavsiyalari talablariga muvofiq qurilgan. O'KSga shubha qilingan bemorlar to'g'ridan-to'g'ri shoshilinch kasalxonalarining intensiv terapiya bo'limiga (IT) yotqizilgan. Trombolitik terapiya MI ST elevatsiyasi bilan og'rigan bemorlar uchun asosiy reperfuzya usuli edi. Endovaskulyar aralashuvlar kamdan-kam hollarda va kechiktirilgan holda amalga oshirildi. Magistral yo'llarning yaxshi tarmog'i va Andijon viloyatining ma'muriy tumanlarining ixcham joylashuvi tez yordam

brigadasini kutish vaqtini va bemorni tibbiy muassasaga olib borish vaqtini qisqartirish uchun qulay shart-sharoitlarni yaratdi. Bu MI ST elevatsiyasi bilan og'rikan bemorlarda reperfuzion terapiya usuli sifatida birlamchi perkutan koronar aralashuvlarga (PKA) ustuvor bo'lgan ixtisoslashtirilgan tibbiy yordamni erta ko'rsatish strategiyasini ishlab chiqish imkonini berdi. Faqat 2015 va 2021 yillar oralig'ida MI uchun asosiy PKA soni olti baravar ko'paydi (mos ravishda 75 dan 446 gacha). O'KS diagnostikasi va davolashning klinik yondashuvlarini takomillashtirish shahar sog'liqni saqlash darajasida, shuningdek, tibbiyot muassasalari darajasida ixtisoslashtirilgan yordam tuzilmasini optimallashtirishni talab qildi. Andijon kardiologiya xizmati yopiq tsikl texnologiyasi printsipi asosida ishlaydi va O'KS uchun ko'p bosqichli va ko'p bosqichli tibbiy yordam tizimiga ega, bu uni O'zbekistondagi an'anaviy tizimdan hozirgi kungacha ajratib turadi. 2015 yilgacha tuzilma shahar kardiologiya xizmati darajasida takomillashtirildi; keyingi yillarda ixtisoslashtirilgan tibbiy yordam tizimidagi asosiy markaz sifatida kardiologiya markazi darajasida takomillashtirildi. 2015–2021 yillar davri kardiologiya markazi va shahar tibbiy xizmatlari (ko'p bosqichli o'zaro hamkorlik), shuningdek, kardiologiya markazi doirasida (ko'p bosqichli o'zaro ta'sir) faoliyatini integratsiyalash bo'yicha boshqaruv tizimini shakllantirish bilan tavsiflandi. 2018–2024-yillarda O'KS asoratlari va KSh tufayli kasalxonada o'lim xavfini kamaytirishga qaratilgan tibbiy yordam tizimi ishlab chiqildi. Andijonda kardiologiya yotoqlarining 82% kardiologiya markazida to'plangan bo'lib, u ambulatoriya muassasalari (kasalxonagacha bo'lgan daraja) bilan yaxshi o'zaro ta'sir qiladi. Kardiologiya markazi zamonaviy moddiy-texnika bazasiga va yuqori malakali kadrlarga ega bo'lib, bu OKS bilan kasallangan bemorlarga yuqori texnologiyali tibbiy aralashuvlarni amalga oshirishni ta'minlaydi.

Kardiologiya markazining tuzilishi, standartdan farqli o'laroq, mustaqil qabul bo'limi va intensiv terapiya bo'limi (IT) ni o'z ichiga oladi. Kardiologiya markazining qabul bo'limi, IT, rentgen endovaskulyar laboratoriyasi umumiy fazoviy-hududiy tuzilishga ega bo'lib, laboratoriya va diagnostika blokiga piyoda masofada joylashgani bemorni yotqizishdan to'xtatishga ixtisoslashtirilgan tibbiy yordam ko'rsatishgacha bo'lgan vaqtni qisqartirish nuqtai nazaridan muhim hisoblanadi. Qabul qilish bo'limining asosiy vazifalari OKS bilan kasallangan bemorga tibbiy yordam ko'rsatish jarayonining barcha tashqi ishtirokchilari bilan o'zaro munosabatlarni muvofiqlashtirish va kardiologiya markazida bemorning yo'nalishini aniqlashdan iborat. Tez tibbiy yordam brigadasi va kardiologiya markazining muvaffaqiyatli o'zaro hamkorligini ta'minlash uchun "Kasalxonagacha bo'lgan bosqichda ST segmenti ko'tarilgan O'KS bilan og'rikan bemorlarga tibbiy yordam ko'rsatishni tashkil etish algoritmi" ishlab chiqilgan. Axborot almashinuvi tez tibbiy yordam stantsiyasining dispetcherlik bo'limlari va qabul bo'limi o'rtasida alohida telefon liniyasi orqali ta'minlanadi. O'KS tashxisini tekshirish uchun bemorni tekshirish Andijon shahar sog'liqni saqlash organi tomonidan tasdiqlangan standartga muvofiq amalga oshiriladi. Bo'lim zarur ekspress diagnostika uskunalari bilan ta'minlangan bo'lib, tegishli kasalxona o'rinlari bilan ta'minlangan. O'KS bilan og'rikan bemorda yurak-qon tomir tizimining noxush hodisalari xavfi

shoshilinch tibbiy yordam darajasida aniqlanadi, so'ngra qabul bo'limida bemorlar shoshilinch tibbiy yordam turiga va ko'lamiga qarab triajlanadi. Agar bu xavf shoshilinch tibbiy yordam darajasida aniqlansa, bemor shoshilinch yordam bo'limini chetlab o'tib, to'g'ridan-to'g'ri reanimatsiya bo'limiga (IT) yotqiziladi. Quyidagilar IT qabul qilish huquqiga ega:

- simptomlar boshlanganidan keyin 24 soat ichida elektrokardiogrammada ST segmenti ko'tarilgan bemorlar, shu jumladan, kasalxonaga yotqizish bosqichida trombolitik terapiya bilan og'rigan bemorlar;

- yurak yetishmovchiligi bilan asoratlangan kasallikning kechishi bilan simptomlar rivojlanishidan 24 soatdan ortiq vaqt o'tgan elektrokardiogrammada ST segmenti ko'tarilgan barcha bemorlar; hayot uchun xavfli aritmiyalar, vaqtinchalik yurak stimulyatori implantatsiyasi zarurati bilan yurak o'tkazuvchanligining buzilishi.

- Killip II va undan yuqori bo'yicha qon aylanish etishmovchiligi bo'lgan barcha bemorlar.

Reanimatsiya bo'limining (IT) asosiy maqsadi bemorni dastlabki barqarorlashtirishdir. Nasos funksiyasi keskin kamaygan bemorni barqarorlashtirish uchun zarur bo'lgan vaqtni qisqartirish va jarrohlik revaskulyarizatsiya uchun maqbul sharoitlarni yaratish uchun shokga qarshi guruhlar tashkil etilgan va shoshilinch tibbiy yordam guruhidan bemor haqida xabar olgandan so'ng ogohlantirish holatiga keltiriladi. Shunga o'xshash tajriba xorijiy klinikalarda faol rivojlanmoqda, lekin O'zbekistonkardiologiya amaliyotida kam qo'llaniladi.

Andijon kardiologiya markazining shokga qarshi guruhiga rentgenolog, radiologiya bo'limining anesteziologi, intensiv terapiya bo'limi (IT) reanimatologi va qabul qiluvchi kardiolog kiradi. Aniq algoritm mutaxassislarning harakatlarini belgilaydi. IT reanimatologi "shokga qarshi guruh" harakatlarini muvofiqlashtiradi. Agar kerak bo'lsa, sun'iy ventilyatsiya o'tkaziladi, aorta ichidagi balon pompasi va SwanGanz kateteri kiritiladi, invaziv gemodinamik monitoring boshlanadi va inotrop terapiya sozlanadi. Bemorning ahvolining og'irligiga qarab, miyokard infarktining rivojlanishini va uning asoratlari xavfini majburiy monitoring qilish algoritmlari qo'llaniladi. ITda qolish muddati tananing hayotiy funksiyalarini barqarorlashtirish uchun zarur bo'lgan davrning davomiyligiga bog'liq.

Ilgari o'tkazilgan tadqiqotlar shuni ko'rsatdiki, nafaqat o'z vaqtida va etarli revaskulyarizatsiya, balki tizimli yallig'lanish reaksiyasi belgilari doimiy past yurak chiqishi ko'rsatkichlari bilan birgalikda paydo bo'lganda, ekstrakorporeal gomeostazni tuzatish usullarini erta qo'llash KSHrivojlanishi va asoratlanishi xavfiga sezilarli ta'sir ko'rsatadi. Agar intensiv terapiya bo'limiga yotqizilganidan keyin dastlabki 12 soat ichida yurak indeksining $2,5 \text{ l} / \text{m}^2$ dan oshishiga erishilmasa, bu bemorlar uchun prognoz murakkablashadi. Bemorlarning ushbu guruhida ko'p a'zolar disfunktsiyasi sindromining (PYe) rivojlanishi muqarrar, bu uzoq muddatli davolanish va o'lim xavfi yuqori bo'lgan sababdir. Klinik o'lim bilan asoratlangan KSh yoki reperfuziya davrida davom etadigan past yurak chiqishi sindromi bilan og'rigan bemorlarda buyrakdan tashqari ko'rsatmalar uchun erta,

preemptiv buyrakni almashtirish terapiyasi (PBAT) taktikasini qo'llash maqsadga muvofiqligi isbotlangan. KSH va yuqumli bo'lmagan tizimli yallig'lanishli javob sindromi bo'lgan bemorlarda PBAT protsedurasi PKA dan keyin 12 soat ichida boshlanadi. Shu sababli, PYe ning oldini olish va davolash maqsadida revaskulyarizatsiyadan o'tgan bemorlar ham kardiologiya markazining ITga yotqiziladi. 2015 va 2021 yillar oralig'ida 30 ta PBAT protsedurasi amalga oshirildi. Bemorning ahvolining dastlabki og'irligi APACHE II shkalasi yordamida baholanadi, asoratlarning ehtimoli aniqlanadi. Kasallik kursining dinamikasi SOFA organ etishmovchiligi shkalasi yordamida baholanadi, chunki u eng yuqori sezuvchanlik va o'ziga xoslikka ega. Barqaror gemodinamik ko'rsatkichlar, og'riq sindromining yo'qligi va jarrohlik aralashuvining gemorragik asoratlari bemorni keyingi bosqichga - o'tkir koronar patologiya bo'limiga o'tkazish to'g'risida qaror qabul qilish imkonini beradi. Retrospektiv tarzda, Andijon Kardiologiya markazining elektron ma'lumotlar bazasidan foydalanib, biz quyidagilarni o'rnatdik. 2015 yildan 2021 yilgacha MI bilan og'rigan bemorlarning ulushi kardiologiya markazida kasalxonaga yotqizilgan O'KS bilan og'rigan bemorlarning 33,9% ni tashkil etdi, ular orasida KSh bilan og'rigan bemorlarning ulushi 7,5% (minimum 4,4%, maksimal 10,4%).

KSh bilan og'rigan bemorlar guruhida erkaklar ulushi (51,5%) ayollarga nisbatan (48,5%) ustunlik qiladi. KSh bilan og'rigan bemorlarning o'rtacha yoshi $70,4 \pm 11,2$ yil (minimum 39 yosh, maksimal 94 yosh). Ijtimoiy mavqeiga ko'ra, bemorlarning 82,3 foizi pensionerlar; 33,2 foizi nogironlar. Ushbu guruhdagi bemorlar orasida komorbidlikning yuqori tarqalishi qayd etilgan. Shunday qilib, nafas etishmovchiligi bilan surunkali obstruktiv o'pka kasalligi 10,1% hollarda, surunkali buyrak etishmovchiligi - 6,5% hollarda, onkopatologiya - bemorlarning 5,5% da aniqlangan. Bemorlarning deyarli yarmi (48,5%) ilgari miyokard infarkti bilan kasallangan. Bemorlarning 87,2 foizida gipertenziya, Vasilenko Strazhesko tasnifiga ko'ra surunkali yurak etishmovchiligi II bosqich - bemorlarning 54 foizida tashxis qo'yilgan. Bemorlarning 17,0 foizida o'tkir serebrovaskulyar avariylar tarixi qayd etilgan. KSh bilan og'rigan bemorlarning 33,2 foizida multifokal tomirlar shikastlanishi aniqlandi, xususan, ekstrakranial arteriyalarning aterosklerozi (49,4%) va pastki ekstremal arteriyalarning aterosklerozi (50,2%). Ilgari koronar angiografik tadqiqotlar tadqiqot guruhidagi bemorlarning atigi 10,3 foizida (51 bemor) amalga oshirilgan. 17 nafar bemorda (33%) yurak tomirlarini angioplastika va stentlash, 6 nafar bemorda (11%) koronar arteriyalarni aylanib o'tish o'tkazildi. 6 nafar bemorga koronar arteriya bypass transplantatsiyasiga ko'rsatmalar berildi, 5 nafar bemorga PKA tavsiya etildi. Jarrohlik revaskulyarizatsiyasining texnik jihatdan mumkin emasligi sababli 17 nafar bemorda koronar arteriya kasalliklarini konservativ davolash taktikasi belgilandi. Og'riq boshlanganidan kasalxonaga yotqizilishgacha bo'lgan o'rtacha vaqt $11,1 \pm 9,9$ soat, tez yordam mashinasida yurak markaziga o'rtacha etkazib berish vaqti $13,1 \pm 10,6$ minut. Kasallikning davomiyligi 30,3% bemorlarda 24 soatdan ortiq, 6 soat yoki undan kam - 50,7% va 6 dan 24 soatgacha - bemorlarning 19%. Kardiya markazga yotqizilgan vaqtda Killip tasnifi bo'yicha o'tkir yurak etishmovchiligining

tuzilishi quyidagicha edi: Killip I - bemorlarning 13,8%, Killip II - bemorlarning 35,9%, Killip III - 12,8% va Killip IV - bemorlarning 37,5%. Ushbu tuzilma shuni ko'rsatadiki, barcha bemorlar qabul qilinganida KSH bo'lmagan. Umuman olganda, tadqiqot davrida o'rganilayotgan bemorlar guruhida KSH terapiyasi 11,1% hollarda tromboliz va 17,0% hollarda birlamchi PKA yordamida amalga oshirildi. Birlamchi PKA ulushining 2006-2008 yillarda 11,5% dan 2009-2011 yillarda 21,0% gacha o'sishi va tromboliz ulushining mos ravishda 14,4 dan 8,7% gacha pasayishi tendentsiyasi mavjud. 2008-2011-yillarda jami 174 ta intraaorta ballon nasosi muolajalari amalga oshirildi. 2006-2011 yillarda KSh bilan kasallangan bemorlarning shifoxonadagi o'limi o'rtacha 88,0% ni tashkil etdi. Shunisi e'tiborga loyiqki, 2006-2008 yillarda KSh dan o'lim 98,0% ni tashkil etgan bo'lsa, 2018-2024 yillarda bu ko'rsatkich 80,7% ni tashkil etdi ($p=0,0001$). Birlamchi PKA dan o'tgan KSh bilan og'rigan bemorlar orasida 2015-2021 yillarda o'lim darajasi 62,2% ni tashkil etgan bo'lsa, 2015-2021 yillarda 88,9%, 2018-2024 yillarda - 55,5% ($p=0,0014$). 2015-2021 yillarda trombolizda o'lim darajasi 91,6% ni tashkil etdi. 2015-2021 yillarda - 100% hollarda, 2017-2024 yillarda - 83,3% hollarda ($p=0,019$). 2015-2024 yillarda reperfuziyasiz KSh bilan og'rigan bemorlarning o'limi 99,0%, 2015-2021 yillarda - 99,3%, 2015-2024 yillarda - 98,6% ($p=0,55$).

Xulosa

1. Shu jumladan KSHdan kasalxonada o'limni kamaytirishga qaratilgan O'KS uchun tibbiy yordamni boshqarish tizimi kasalxonadan oldingi bosqichda (shoshilinch tibbiy yordam) xavfni baholashni o'z ichiga oladi.
2. Shoshilinch tibbiy yordam xizmati va kardiologiya markazi va aloqa almashinuvi (shifokor, dispetcher) amaliyotida xavfni aniqlash algoritmidan foydalanish intensiv terapiyaning adekvat prognozi va uni o'z vaqtida amalga oshirish uchun sharoit yaratadi.
3. Kardiologiya markazining ko'p bosqichli va ko'p bosqichli integratsiyaga asoslangan innovatsion tuzilmasi O'KS da salbiy oqibatlarni rivojlanish xavfi yuqori bo'lgan bemorlarga yordam ko'rsatishda fanlararo yondashuvni ta'minlaydi (qabul qilish bo'limi, intensiv terapiya bo'limi, shokga qarshi guruhlar).
4. Ixtisoslashtirilgan tibbiy yordam ko'rsatish tizimiga xavflarni boshqarish metodologiyasini joriy etish O'KS bilan KSh da kasalxonada o'lim darajasining pasayishiga olib keladi.

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IMPROVING METHODS FOR DEVELOPING FIRST-GRADE STUDENTS' IMAGINATION THROUGH THE VISUALIZATION OF LETTERS IN THE SCRATCH PROGRAMMING ENVIRONMENT

Annotation (Abstract). *This article analyzes the potential of using the Scratch programming environment to create an effective model for enhancing imagination and visual thinking among first-grade students during the process of learning letters. The psychological, pedagogical, and technological aspects of digital visualization are examined, and the educational effectiveness of interactive letter animations developed in Scratch is evaluated based on the results of experimental trials conducted with first-grade learners. The study demonstrates that a multimedia (audio–visual–kinesthetic) approach increases students' speed of letter perception, strengthens their imaginative activity, and significantly facilitates the early literacy learning process. Regular use of the letter visualization module in Scratch reinforces phoneme–grapheme connections, improves students' ability to distinguish differences between letters, and increases their interest in the lesson.*

Keywords: *Scratch, imagination, visualization, letter animation, digital education, primary education, interactive technologies.*

Introduction. In contemporary educational practice, the use of interactive technologies to activate learners and strengthen connections between letters, symbols, shapes, and sounds in their cognition is becoming increasingly essential. The integration of digital tools—particularly the Scratch programming environment, which enables the creation of multimodal learning settings—into primary education has gained growing attention in both scientific research and classroom practice [1]. The capabilities of Scratch play a significant role in enhancing young learners' imagination, helping them associate symbols with visual images, and facilitating the process of mastering new concepts.

First-grade students typically exhibit highly active imaginative processes. However, because graphic symbols—letters—are abstract in nature, their accurate perception depends largely on the presence of visual, motor, and auditory stimuli [3]. Therefore, demonstrating letters through animation, presenting the step-by-step drawing process of their shapes, creating object-based animations corresponding to each letter, and producing the relevant phonetic sound when a letter is clicked serve as highly effective instructional techniques for young learners [9].

International research highlights that Scratch significantly contributes to the development of creative thinking, visual perception, compositional understanding,

and algorithmic reasoning in young children [2]. However, within Uzbekistan, scientific studies dedicated to the use of Scratch in early literacy instruction remain limited. The relevance of this topic stems from the fact that the current literacy-teaching process makes insufficient use of digital visualization tools, while many students struggle to perceive abstract letter forms effectively [6].

The main goal of this research is to develop and experimentally validate an effective model for enhancing first-grade students' imagination through the visualization of letters using the Scratch programming environment.

2. Methodology. The study was conducted with first-grade students from general education schools located in the Kashkadarya and Bukhara regions, as well as the city of Tashkent. The participants were divided into experimental and control groups across several schools, as shown in Table 1.

№	Educational Institution	Experimental Group	Control Group
1.	School No. 2, Shahrisabz city	31	33
2.	School No. 4, Shahrisabz city	30	29
3.	School No. 3, Shahrisabz district	31	32
4.	School No. 6, Shahrisabz district	35	35
5.	School No. 8, Bukhara city	33	34
6.	School No. 34, Bukhara city	34	31
7.	School No. 242, Olmazor district	30	30
8.	School No. 152, Yashnabod district	39	39
Jami		263	263

Table 1. Distribution of Participants Across Schools

Total: 263 (experimental group) + 263 (control group) = **526 students**

A total of **526 first-grade students** participated in the study:

- **Experimental group:** 263 students
- **Control group:** 263 students

All participants were selected from classes with homogeneous characteristics in terms of age (7 years old) and similar levels of academic readiness [7].

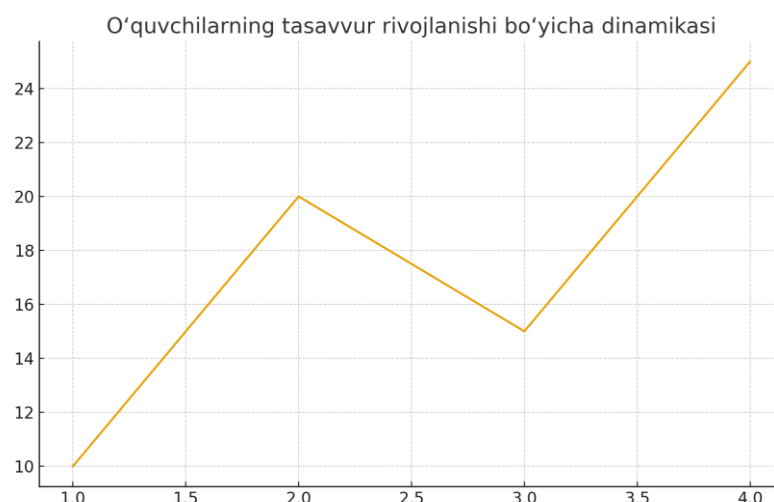


Figure 1. Dynamics of Imagination Development

Development of Instructional Modules. Several pedagogical–informational modules were developed in the Scratch environment as part of the study:

1) Letter Animation Module. The animation of letter shapes—including their movement, coloring, and transformation—enhances learners’ imagination and strengthens their ability to form mental images of abstract symbols [4].



Figure 2. Scene for Teaching Letter Shapes and Writing

2) Phoneme–Grapheme Connection Module. When the learner clicks on a letter, its corresponding sound is played. For example, clicking on the uppercase letter “B” produces the audio “capital b—b—b...”, while clicking on the lowercase “b” plays “small b—b—b” [11]. This feature reinforces the auditory–visual linkage essential for early literacy development.

3) Letter–Object Association Module. Animated objects corresponding to each letter are integrated to strengthen associative learning. Examples include: “T — Camel (Tuya),” “Y — Tiger (Yo‘lbars),” and “K — Deer (Kiyik).” This approach facilitates learning through concrete, recognizable images, making abstract symbols more accessible and meaningful for young learners [8].



Figure 3. Learning Letters Through Animated Objects

4) Letter-Placement Game. In Scratch, students assemble letter combinations to form simple names and place letters into their corresponding cells. This game-based activity develops skills of selection, differentiation, and logical reasoning, thereby strengthening foundational literacy competencies [5].



Figure 4. Scene for Constructing Words Correctly

Stages of the Study

Diagnosis. Students' initial literacy indicators were assessed according to the following criteria:

- speed of letter recognition,
- ability to remember letter shapes,
- level of imagination (capacity to form mental images).

Experimental Intervention. The experimental group participated in classes conducted over a period of four months (September–December) using a Scratch-based electronic learning module specifically developed for this study. In the control group, traditional teaching methods were applied without digital visualization tools.

Stage 3: Final Assessment. The outcomes of both groups were compared using verification tests, mean-value calculations, and variational analysis techniques [2].

3. Results. The findings of the study demonstrated that visualisation through the Scratch programming environment has a high level of educational effectiveness.

Letter Recognition Speed. The letter recognition speed in the experimental group increased by an average of **40%**, whereas the control group showed an improvement of only **12%**. This significant difference confirms the strong impact of multimedia-based visualisation on early literacy development [1].

Development of Imagination. To assess imagination, the diagnostic test included tasks such as “Creating an image corresponding to a letter,” “Reconstructing a letter in graphic form,” and “Associating an object with a letter.” The results revealed that the imagination development index increased by **32%** in the experimental group and by **11%** in the control group, proving an overall effectiveness rate of **21%** in favour of the Scratch-based intervention [10].

Phoneme–Grapheme Association. Sound-enhanced animations in Scratch were found to significantly strengthen the phoneme–grapheme connection. The experimental group outperformed the control group by a factor of **2.1** in correctly linking phonemes to their corresponding graphemes [4].

Letter Differentiation Skills. The letters most frequently confused by students included:

- **b–d, p–q, g–q, o–u.**
- With the help of Scratch animations, the ability to distinguish between these letters increased from **27% to 71%** in the experimental group [6].

Motivation and Engagement. During Scratch-based lessons:

- the frequency of raising hands increased **twofold**;
- the rate of completing tasks independently rose by **1.8 times**;
- both individual and group work skills showed notable improvement.

These outcomes confirm the motivational significance of interactive digital instruction for young learners [9].

Discussion. The results of this study align with both Uzbek and international scholars’ theories on digital education, visualization, and multimedia learning environments.

Mayer’s Multimedia Theory. The integration of audio, visual, and motion elements facilitates perception, and Scratch is built precisely on this model [2].

Vygotsky’s Zone of Proximal Development (ZPD). Scratch allows learners to acquire skills that they cannot perform independently by providing interactive support, thereby promoting scaffolded learning [4].

Constructivist Approach. When students create letters themselves and control the drawing process, knowledge is actively constructed, deepening the learning experience [3].

National Research. Uzbek scholars have also emphasized the importance of visualization, ICT, and interactive methods in primary education [7], [8], [10]. This study demonstrates the practical potential of reinforcing these approaches through Scratch.

Overall, the study confirms that Scratch is not only a coding environment but also a rich didactic platform for teaching, explanation, and animation-based modeling, effectively enhancing early literacy and imaginative skills.

Conclusion. The study confirmed that using the Scratch programming environment for letter visualization significantly enhances first-grade students' imagination, figurative thinking skills, and abilities to recognize and differentiate letters. A multimedia interactive learning environment facilitates the literacy-teaching process, increases students' interest in lessons, and encourages active learning.

Recommendations:

1. Expand the implementation of the "Electronic Alphabet" created in Scratch.
2. Develop methodological guidelines for primary education teachers.
3. Systematically integrate digital tools into literacy teaching programs.

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STYLISTICALLY COLORED VOCABULARY AND VOCABULARY OF RESTRICTED USAGE: A LINGUISTIC ANALYSIS

***Abstract.** This article examines the phenomena of stylistically colored vocabulary and vocabulary of restricted usage within the framework of modern linguistic theory. Stylistically colored vocabulary is understood as lexicon marked by expressive, emotional, or stylistic connotations, whereas vocabulary of restricted usage is delimited by specific professional, regional, or social domains. The study outlines the key types, functions, and characteristics of each lexical category and analyses the interplay between stylistic and social constraints in language use. Attention is also paid to the relevance of these phenomena for lexicology, sociolinguistics, translation studies, and applied linguistics. The article concludes that both categories are essential for the investigation of language variation, functional stylistics, and communicative competence.*

***Key Words:** stylistically colored vocabulary, restricted vocabulary, connotation, functional stylistics, sociolinguistic variation, expressive meaning, emotive vocabulary, colloquial lexicon, literary vocabulary, slang, jargon.*

Introduction. Language is not only a means of communication but also a tool for expressing social identity, emotional attitudes, cultural norms, and stylistic preferences. Within any language system, lexical units differ not only in their denotational meaning but also in their stylistic value and sphere of use. Two important categories that illustrate this variation are stylistically colored vocabulary and vocabulary of restricted usage. Understanding these categories is essential for linguistic analysis, language teaching, translation, and effective communication across diverse contexts.

Lexical units in natural language differ not only by their denotational value but also by stylistic, expressive, and sociolinguistic properties. The distinction between stylistically colored vocabulary and vocabulary of restricted usage is central to the study of functional stylistics and sociolinguistic variation. These two categories highlight how linguistic choices are influenced by communicative intention, social identity, and the situational context of speech (Galperin, 1981; Crystal, 2008). Understanding such differentiation is crucial for analyzing discourse, teaching language effectively, and ensuring accurate translation and intercultural communication.

Stylistically colored vocabulary includes lexical items that convey an additional expressive or stylistic layer beyond the basic denotational meaning.

According to Galperin (1981), such words perform not only a referential function but also an expressive and pragmatic function, signaling the speaker's emotional state, evaluative judgment, or communicative intent. They belong to specific functional styles—colloquial, poetic, elevated, archaic, journalistic, and others.

Types of Stylistic Coloring:

1. Emotive and Evaluative Vocabulary: These items carry connotative meaning that expresses emotional or subjective evaluation. *Examples: splendid, awful, wretched.*

2. Colloquial and Conversational Vocabulary: Characteristic of informal, everyday communication. *Examples: kid, guy, gonna, wanna.*

3. Bookish or Literary Vocabulary: Typical of formal or academic writing, elevated prose, or public speeches. *Examples: commence, therefore, notwithstanding.*

4. Poetic, Archaic, and Historic Vocabulary: Often associated with literary tradition, antiquity, or stylistically elevated narratives. *Examples: thee, thy, ere, hath.*

5. Slang and Substandard Vocabulary: Stylistically low or highly informal expressions used for stylistic effect or group identity. *Examples: cool, cringe, dude.*

Functions of stylistically colored vocabulary

- Expressive and emotive function enhances the emotional and aesthetic effect of speech (Arnold, 2015).

- Stylistic differentiation helps distinguish genres, registers, and functional styles.

- Pragmatic function indicates communicative intent such as irony, solidarity, politeness, or aggression.

Through stylistic coloring, vocabulary becomes a powerful tool that goes beyond mere information exchange.

Vocabulary of restricted usage encompasses lexemes limited to specific domains, professions, social groups, or geographical regions. These restrictions arise due to specialized communicative needs, cultural traditions, or group identity markers (Crystal, 2010).

Types of Restricted Vocabulary

1. Professional Terminology: Terms used by experts in specialized fields such as medicine, law, engineering, or linguistics. *Examples: myocardial infarction, jurisdiction, phoneme, algorithm.* Terminology is characterized by precision, stability, and low stylistic coloration (Grishina, 2011).

2. Professional and Social Jargon: Lexicon used informally within professional or social groups, often not widely understood outside them. *Examples: debug, code blue, freshman fifteen.*

3. Argot: Secretive or coded vocabulary used historically by criminals or marginalized groups. *Examples: stash, snitch, loot.* Argot serves as a marker of in-group solidarity and secrecy.

4. Dialectal Vocabulary: Words belonging to specific regional varieties of a language. *Examples: lass (Scotland), y'all (Southern U.S.).*

5. Slang: Informal vocabulary used predominantly by youth or subcultures; although slang is stylistically colored, it is also socially restricted (Eble, 1996). *Examples: lit, vibe, ghost (v.).*

Characteristics of Restricted-Use Vocabulary

- It is often unintelligible to outsiders.
- It may evolve rapidly, with words entering and leaving usage quickly.
- It strengthens group cohesion and identity.
- It may serve as a marker of professional competency (terminology) or social belonging (slang, jargon).

Comparative Analysis: A systematic comparison reveals several distinctions and areas of overlap.

Criterion	Stylistically Colored Vocabulary	Restricted-Usage Vocabulary
Primary Basis	Stylistic or expressive value	Social, professional, or geographical limitations
Function	Expresses attitude, tone, emotion	Serves specialized or group-specific communication
Accessibility	Widely understood but stylistically marked	May be incomprehensible to outsiders
Stability	Varies: poetic forms stable, slang unstable	Terminology stable, slang/argot unstable

Many lexemes fit both categories:

- Slang is both stylistically colored and socially restricted.
- Jargon can be stylistically neutral within the group but stylistically marked outside it.
- Dialect words acquire stylistic coloring when used outside their native region.

Thus, the boundaries between categories are fluid rather than rigid, reflecting the dynamic nature of language.

The study of these lexical categories is important for several domains:

1. Lexicology and Functional Stylistics: They reveal mechanisms of language variation and stylistic stratification.
2. Sociolinguistics: Restricted vocabulary provides insight into group identity, social stratification, and linguistic change.
3. Translation Studies: Accurate rendering of stylistic coloring and restricted vocabulary is essential for preserving cultural nuance.
4. Language Pedagogy: Learners benefit from understanding stylistic distinctions and domain-specific vocabulary.

Conclusion. Stylistically colored vocabulary and vocabulary of restricted usage represent essential dimensions of lexical semantics and language variation. While stylistically colored vocabulary highlights expressive and pragmatic aspects of communication, vocabulary of restricted usage underscores the social, professional, and regional differentiation of language. Their interaction

demonstrates the complex interplay between linguistic form, communicative function, and social context. A comprehensive understanding of these categories enriches linguistic research and enhances practical competence in communication, translation, and teaching.

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SHORT-TERM VEGETATION COVER CHANGE ANALYSIS (2020–2025) IN THE LOWER AMU DARYA STATE BIOSPHERE RESERVE USING SENTINEL-2 DATA

Abstract. *This study analyzes the vegetation cover changes in the Lower Amu Darya State Biosphere Reserve during the period 2020–2025 using remote sensing (RS) techniques. Based on NDVI (Normalized Difference Vegetation Index) data, the condition of vegetation, its degradation level, and the spatial dynamics of vegetation cover were determined.*

Keywords: *Lower Amu Darya State Biosphere Reserve, GIS, Remote Sensing (RS), NDVI, Google Earth Engine (GEE), Tugai forests, Sentinel-2, Ecosystem, Landscape, Field surveys, Ecological monitoring.*

Introduction

Under current global climate change conditions, one of the most pressing environmental processes in our region is the ecological transformation occurring in the Aral Sea basin. Among the major challenges is the reduction of forested areas due to drought and other anthropogenic impacts, which in turn have a significant effect on the regional ecosystem balance.

Regular monitoring and assessment of changes in natural ecosystems are among the most essential directions of ecological research. The condition and temporal changes of vegetation cover serve as key indicators in assessing environmental stability and in analyzing the influence of human activities on ecosystems.

Vegetation indices—particularly NDVI—are widely used to assess vegetation density and health conditions. The main objective of this research is to identify the changes in vegetation cover in the Lower Amu Darya State Biosphere Reserve between 2020 and 2025, and to calculate their spatial distribution (in hectares).

The Lower Amu Darya State Biosphere Reserve is located in the lower course of the Amu Darya River, between the Tuyamuyun Reservoir and the Aral Sea, across a wide alluvial plain. The territory borders the Aral Sea to the north, the Ustyurt plateau to the west, the Zangyuz Karakum to the south, and the Kyzylkum desert to the east. It adjoins Gurlan district of Khorezm region and the Beruni and Amu Darya districts of the Republic of Karakalpakstan [1].

The reserve is situated about 90 km from the city of Nukus and 44 km from the center of Beruni district. Its total area covers 68,717.8 hectares, consisting of three zones: the core zone (11,568.3 ha), buffer zone (6,731.4 ha), and transition zone (50,418.1 ha) [1].

Remote sensing and GIS-based studies of forest resources have been conducted by Otokhonov O.D. and Matchanov M.J. (2024) using the Khorezm oasis as a case study. In their work, tugai forests were digitized using GIS technologies, vegetation cover was analyzed through remote sensing, and anthropogenic risk factors were evaluated through spatial analysis [2]. This methodological approach served as the basis for the present research.

In a study conducted by Reimbayeva J.M. (2024), the ecological condition and ornithofauna of the Lower Amu Darya Biosphere Reserve were analyzed. The author highlighted that the decline in vegetation cover—particularly reed (*Phragmites*) areas—has led to a decrease in the number of bird and other animal species in the region, thereby affecting the ecological balance of the ecosystem (Reimbayeva, 2024) [3].

Similarly, Reimov M.P. and Pulatov A.S. (2016) analyzed ecosystem services within the reserve using GIS technologies. Their research re-evaluated the zonal structure of the reserve and produced separate maps for five key types of ecosystem services: provisioning, regulating, habitat, cultural, and others. The study emphasized that the tugai forest ecosystems are undergoing degradation due to water scarcity and anthropogenic pressure, and highlighted the necessity of enhanced protection for habitat-related ecosystem services [4].

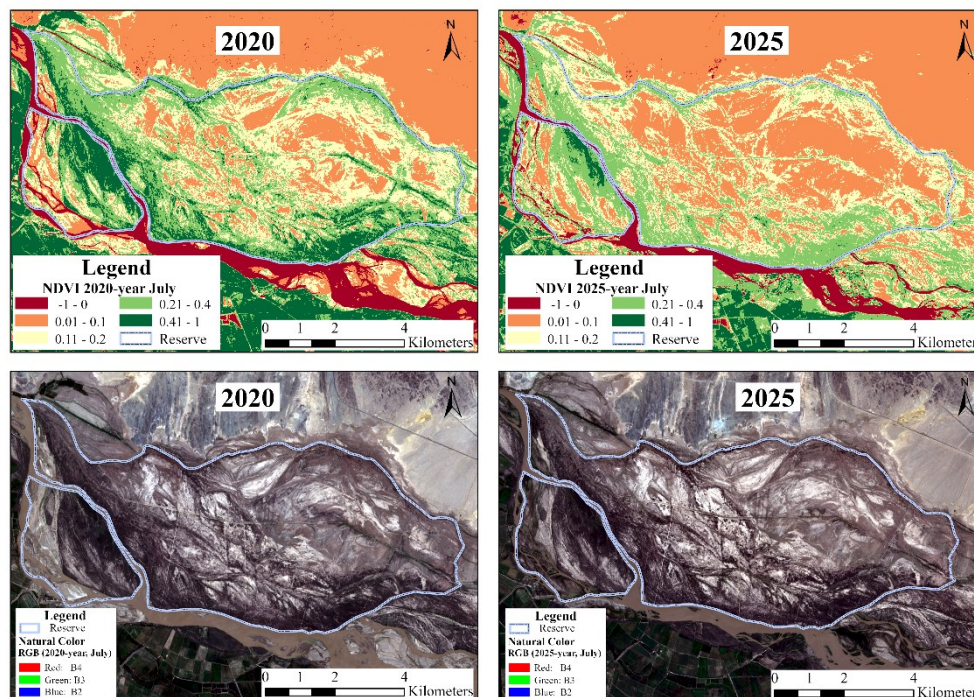
In the study conducted by Cesaro J.-D., Jolivot A., and Taugourdeau S. (2019), the ecosystems along the Lower Amu Darya riverbanks were mapped through a field mission. The research, carried out within an ecosystem-based land use and conservation project, identified the spatial distribution and condition of tugai forests and other landscape types. The work highlights the practical value of field surveys and mapping methods in assessing landscape elements and provides a valuable basis for ecological monitoring and conservation planning in the region [5].

Methods. The central part of the Lower Amu Darya State Biosphere Reserve was selected as the study area. The boundaries of the study site were digitized based on open-source geospatial data from OpenStreetMap (OSM) and Google Earth Pro platforms [6].

NDVI values were calculated using Sentinel-2 satellite imagery on the Google Earth Engine (GEE) platform [2]. NDVI is used to indicate vegetation health and density, as well as the spatial distribution of soil and water surfaces. Since the highest vegetation activity typically occurs during mid-summer and cloud cover is minimal during this period, the study used Sentinel-2 images from July with less than 10% cloud cover, and a median composite was generated to minimize atmospheric and cloud-related effects.

The satellite images were downloaded and analyzed in ArcGIS Pro. Based on the characteristics of the area, NDVI values were classified into appropriate ranges using the “Reclassify” tool. The reclassified raster images were then converted into vector format (Raster to Polygon) to calculate the area of each class in hectares (Figure 1).

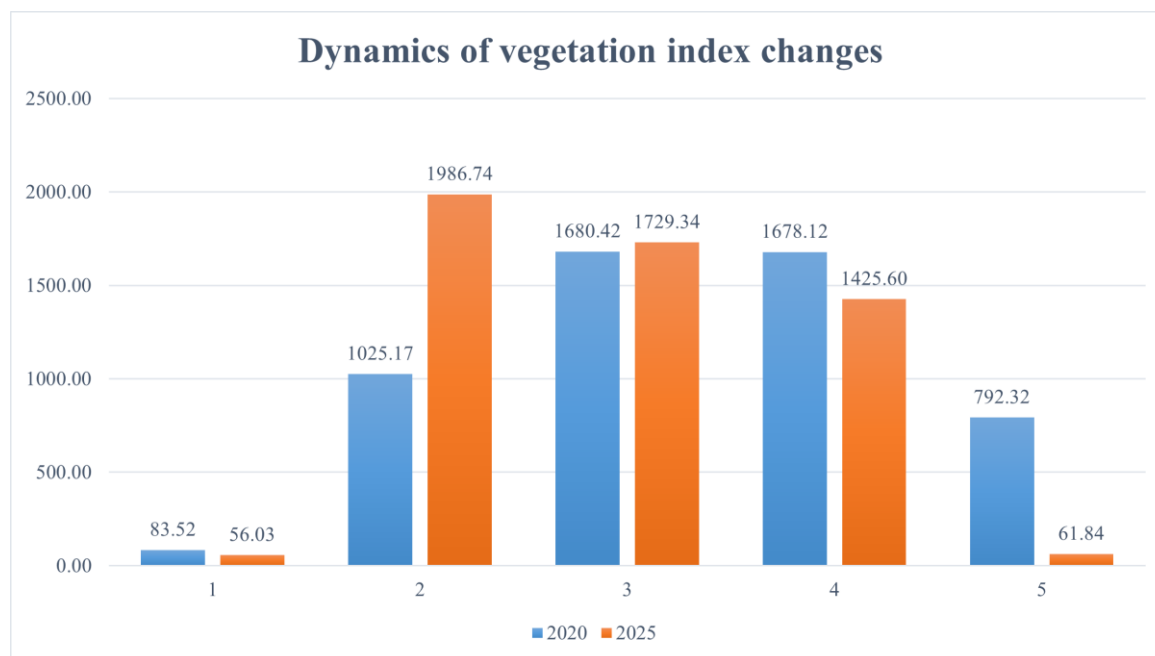
Figure 1. Vegetation cover of the Lower Amu Darya State Biosphere Reserve



Based on these results, thematic maps were designed and a final cartographic representation was created. Additionally, for visual interpretation of the area's natural condition, Natural Color composites were prepared, allowing for a realistic depiction of the land surface (Figure 1).

The NDVI analysis revealed significant changes in the vegetation cover of the Lower Amu Darya State Biosphere Reserve between 2020 and 2025. These variations indicate potential impacts on the ecosystem structure and landscape dynamics of the area (Figure 2).

Figure 2. Dynamics of vegetation index changes (hectare)



The following main trends have been identified: significant changes were observed in vegetation condition and NDVI values. Areas with the lowest NDVI values (0.01–0.10) decreased from 83.52 ha in 2020 to 56.03 ha in 2025, indicating a slight reduction in sparsely vegetated or degraded areas.

In contrast, the 0.11–0.20 NDVI range increased from 1025.17 ha to 1986.74 ha, suggesting an expansion of transitional or recovering ecosystems.

For the moderate NDVI range (0.21–0.40), the area increased slightly from 1680.42 ha to 1729.34 ha, indicating a relatively stable vegetation condition.

However, higher NDVI values (0.41–0.60) declined from 1678.12 ha to 1425.60 ha, reflecting degradation in some densely vegetated zones.

Meanwhile, very high NDVI values (0.61–0.80) showed a dramatic decrease from 792.32 ha to 61.84 ha, suggesting a significant loss of dense tugai forests and shrub-covered areas.

Overall, the increase in low and medium NDVI values alongside the decline in high NDVI classes indicates a general trend of vegetation density reduction across the study area.

Conclusions

The conducted research revealed that between 2020 and 2025, significant quantitative and qualitative changes occurred in the vegetation cover of the Lower Amu Darya State Biosphere Reserve. According to the NDVI analysis results, areas with high vegetation values have decreased, while low-value zones have expanded. This indicates ongoing vegetation degradation and disruption of the natural ecological balance.

The main causes of these changes include alterations in the Amu Darya River's flow direction, reduced water levels, and increased soil salinity. These factors have negatively affected the condition of tugai forests and forest ecosystems in general.

Throughout the research process, remote sensing technologies (Sentinel-2) and GIS methods were effectively applied. This approach enabled the identification of vegetation dynamics, calculation of area changes, and cartographic representation of landscape transformations within the study region.

At the same time, it is necessary to continue the research, assess the accuracy of the results, and compare them with other remote sensing and ground-based observation data. Such an approach will help to gain a deeper understanding of vegetation changes and their ecological implications in the Lower Amu Darya region.

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SEPSISDA ENDOKRIN TIZIM DISBALANSI VA KORTIZOL–INSULIN O‘ZARO TA’SIRI

***Annotatsiya:** Ushbu maqolada sepsisli bemorlarda kortizol va insulin gormonlari o‘zaro ta’sirining klinik ahamiyati o‘rganildi. Tadqiqot natijalari sepsis jarayonida endokrin tizimning disbalansi glyukoza almashinuvining buzilishi, stress giperglikemiyasi va insulin rezistentligi rivojlanishiga olib kelishini ko‘rsatdi.*

***Kalit so‘zlar:** sepsis, kortizol, insulin, stress giperglikemiyasi, endokrin disbalans, insulin rezistentligi, gipotalamo-gipofizar-adrenal o‘qi.*

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ENDOCRINE SYSTEM IMBALANCE AND CORTISOL–INSULIN INTERACTION IN SEPSIS

***Abstract:** This article explores the clinical significance of the interaction between cortisol and insulin hormones in patients with sepsis. The study results demonstrated that endocrine imbalance during the septic process leads to impaired glucose metabolism, the development of stress-induced hyperglycemia, and insulin resistance.*

***Keywords:** sepsis, cortisol, insulin, stress hyperglycemia, endocrine imbalance, insulin resistance, hypothalamic–pituitary–adrenal axis.*

KIRISH

Sepsis — bu infektsiyaga javoban organizmda tizimli yalligʻlanish va metabolik buzilishlar bilan kechuvchi ogʻir holat boʻlib, u koʻpincha gipotenziya, koʻp aʼzoli yetishmovchilik va yuqori oʻlim koʻrsatkichlari bilan namoyon boʻladi. Sepsis patogenezining asosiy komponentlaridan biri endokrin tizim javobi, xususan **kortizol va insulin muvozanatining** buzilishidir.

Kortizol stress holatida energiya resurslarini safarbar etadi, glukoneogenezni faollashtiradi va yalligʻlanish mediatorlarini kamaytiradi. Ammo ortiqcha giperkortizolizm hujayra darajasida insulin signalini susaytirib, **insulin rezistentligiga** sabab boʻladi. Natijada **stress giperglikemiyasi** rivojlanadi, bu esa sepsis kechishini ogʻirlashtiradi.

TADQIQOT MAQSADI

Sepsis bilan ogʻrigan bemorlarda kortizol va insulin gormonlarining oʻzaro bogʻliqligini aniqlash, ularning glyukoza almashinuvi va klinik koʻrsatkichlarga taʼsirini baholash.

MATERIALLAR VA USULLAR

Tadqiqot Andijon davlat tibbiyot instituti klinikasining reanimatsiya boʻlimida 2024-yilda oʻtkazildi.

Tadqiqot ishtirokchilari: 30 nafar bemor (17 erkak, 13 ayol), oʻrtacha yosh – 49 ± 8 yil.

Tanlash mezonlari: sepsis klinik belgilari, laborator infektsiya markerlari (CRP, PCT) va SOFA ≥ 2 ball.

Chiqarish mezonlari: diabet, buyrak yoki jigar yetishmovchiligi, gormonal dori qabul qilayotgan bemorlar.

Barcha bemorlarda 1-, 3- va 5-kunlarda quyidagilar oʻlchandi:

- plazma kortizol darajasi (nmol/L),
- insulin (mkIU/ml),
- glukoza (mmol/L),
- arterial bosim va yurak urish tezligi.

Maʼlumotlar statistik tahlil qilindi (SPSS 25.0), $p < 0.05$ darajasida ahamiyatli deb hisoblandi.

NATIJALAR

1-kun natijalari:

- Kortizol: 892 ± 135 nmol/L,
- Insulin: 31.5 ± 6.2 mkIU/ml,
- Glukoza: 11.7 ± 2.3 mmol/L.

3-kun:

- Kortizol: 710 ± 110 nmol/L,
- Insulin: 28.3 ± 5.4 mkIU/ml,
- Glukoza: 9.8 ± 1.9 mmol/L.

5-kun:

- Kortizol: 546 ± 95 nmol/L,
- Insulin: 25.1 ± 4.7 mkIU/ml,
- Glukoza: 7.9 ± 1.6 mmol/L.

Kortizol darajasining pasayishi bilan birga insulin sezuvchanligining qisman tiklanishi kuzatildi. Kortizol va glyukoza orasidagi korrelyatsiya $r = +0.78$ ($p < 0.01$), insulin va glukoza orasida esa $r = -0.65$ ($p < 0.05$) qayd etildi.

MUHOKAMA

Natijalar shuni ko'rsatdiki, sepsisda **kortizol darajasi keskin oshadi**, bu gipotalamo-gipofizar-adrenal tizimning stressga javobini bildiradi. Ammo bu jarayon metabolik muvozanatni buzadi: insulin sezuvchanligi kamayadi, glyukoza darajasi oshadi.

Tadqiqot natijalari Marik (2021) va Bornstein (2022) tomonidan qayd etilgan ma'lumotlar bilan mos keladi. Ularning tadqiqotlarida ham kortizolning ortishi va insulin signalining pasayishi sepsisda giperglikemiyaning kuchaytirishi ko'rsatilgan.

Bu holatni nazorat qilishda **glyukoza monitoringi** va **kortikosteroid dozalashni individuallashtirish** muhim ahamiyatga ega. Kortizol darajasi haddan tashqari yuqori bo'lgan bemorlarda "relativ adrenal yetishmovchilik" xavfi ham ortadi.

XULOSA

Sepsisda endokrin tizim disbalansi – bu patologik stress javobidir. Kortizolning ortishi organizmning adaptatsion mexanizmlarini qo'llab-quvvatlashda, insulin rezistentligini kuchaytiradi va giperglikemiyaning yuzaga keltiradi. Tadqiqot kortizol va insulin monitoringi sepsisli bemorlarning davolash natijalarini yaxshilash uchun muhimligini tasdiqlaydi.

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AXBOROT TEXNOLOGIYALARI DARSLARIDA KAGGLE.COM DATASETLARIDAN FOYDALANISH

Annotatsiya. Maqola axborot texnologiyalari darslarida kaggle.com datasetlaridan foydalanishning ta'limiy samaradorligiga bag'ishlangan. Tadqiqotda platformaning didaktik imkoniyatlari, o'quv jarayoniga integratsiyalash usullari va talabalarning amaliy ko'nikmalarini rivojlantirishdagi roli tahlil qilingan. Natijalar kaggle datasetlaridan foydalanish talabalarning nazariy bilimlarini amaliyotga tatbiq etish qobiliyatini oshirishi va ularni kasbiy faoliyatga samarali tayyorlashini ko'rsatdi.

Kalit so'zlar. Axborot texnologiyalari ta'limi, kaggle platformasi, dataset, amaliy mashg'ulotlar, talabalar ko'nikmalari, ta'lim sifati, o'quv jarayoni, zamonaviy ta'lim texnologiyalari, kasbiy kompetensiyalar, ma'lumotlar bilan ishlash.

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USING KAGGLE.COM DATASETS IN INFORMATION TECHNOLOGY CLASSES

Annotation. This article examines the educational effectiveness of using kaggle.com datasets in information technology classes. The study analyzes the platform's didactic capabilities, integration methods into the educational process, and its role in developing students' practical skills. Results showed that using kaggle datasets enhances students' ability to apply theoretical knowledge in practice and effectively prepares them for professional activities.

Keywords. Information technology education, kaggle platform, dataset, practical classes, student skills, quality of education, educational process, modern educational technologies, professional competencies, data handling.

Kirish. Hozirgi zamon axborot texnologiyalari ta'limida nazariy bilimlarni amaliy ko'nikmalarga aylantirish muhim vazifa hisoblanadi. Talabalar o'quv jarayonida ko'pincha sun'iy yoki juda soddalashtirilgan ma'lumotlar bilan ishlaydilar, bu esa ularning kasbiy tayyorgarligiga salbiy ta'sir ko'rsatadi. Zamonaviy mehnat bozori esa real ma'lumotlar bilan ishlash, murakkab muammolarni hal qilish va doimiy o'z-o'zini rivojlantirish qobiliyatiga ega

mutaxassislarni talab qiladi. Kaggle.com platformasi axborot texnologiyalari darslarida ushbu muammolarni hal qilishning samarali vositasi bo'lib xizmat qiladi. Platforma real dunyo ma'lumotlari, turli xil amaliy vazifalar va global hamjamiyat tajribasiga kirish imkoniyatini beradi.

Adabiyotlar tahlili. Kaggle platformasi 2010-yilda ta'lim va tadqiqot maqsadlarida yaratilgan bo'lib, bugungi kunda 13 milliondan ortiq foydalanuvchiga ega [1]. Platforma google kompaniyasi tarkibiga kiradi va ma'lumotlar tahlili sohasida dunyodagi eng yirik ta'lim-tadqiqot hamjamiyati hisoblanadi.

Zamonaviy tadqiqotlar shuni ko'rsatadiki, real ma'lumotlar bilan ishlash tajribasi talabalarning o'zlashtirish darajasini 40-50% ga oshiradi [2]. Kaggle platformasi esa ana shunday tajribani ta'minlash uchun barcha zarur vositalarni taqdim etadi.

Tadqiqot metodologiyasi. Tadqiqot ishida axborot texnologiyalari fanlarini o'qitishda kaggle.com platformasidan foydalanishning pedagogik samaradorligi o'rganilgan. Tadqiqot davomida talabalarning nazariy bilimlari va amaliy ko'nikmalarini baholash, o'quv jarayoniga platformani integratsiyalash usullari tahlil qilingan.

Muhokama va natijalar. Kaggle platformasi axborot texnologiyalari darslarida quyidagi imkoniyatlarni taqdim etadi:

1. O'quv jarayoniga integratsiyalash

Platformadagi datasetlar turli axborot texnologiyalari fanlarida qo'llanilishi mumkin. Ma'lumotlar tuzilmalari va algoritmlarni real datasetlarda sinash, sql so'rovlarini haqiqiy ma'lumotlar ustida mashq qilish, ma'lumotlarni vizualizatsiya qilish va interaktiv dasturlar yaratish, mashinali o'rganish algoritmlarini real vazifalar ustida o'rgatish.

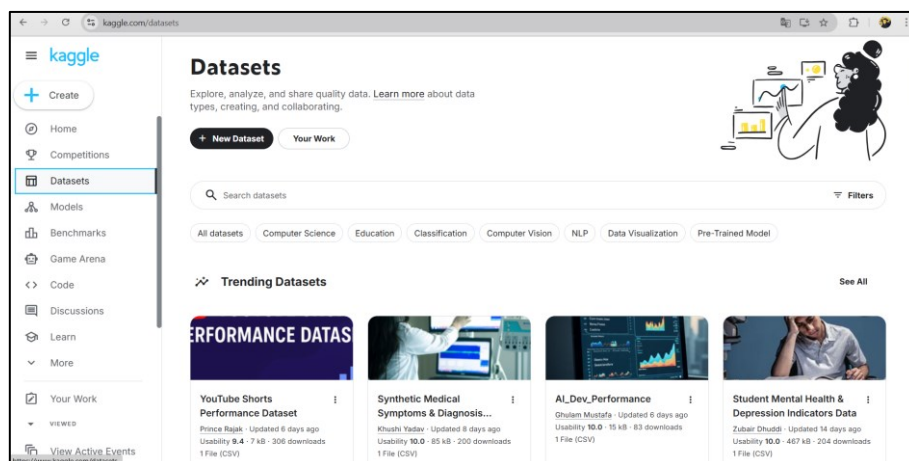
2. Amaliy mashg'ulotlarni tashkil etish

Kaggle platformasi orqali o'qituvchilar turli darajadagi amaliy topshiriqlar yaratishlari mumkin. Platformada 50,000 dan ortiq turli sohalarga oid dataset mavjud: *biznes va iqtisodiyot, sog'liqni saqlash, ta'lim tizimi, ekologiya va atrof-muhit, sport va madaniyat, texnologiya va innovatsiyalar.*

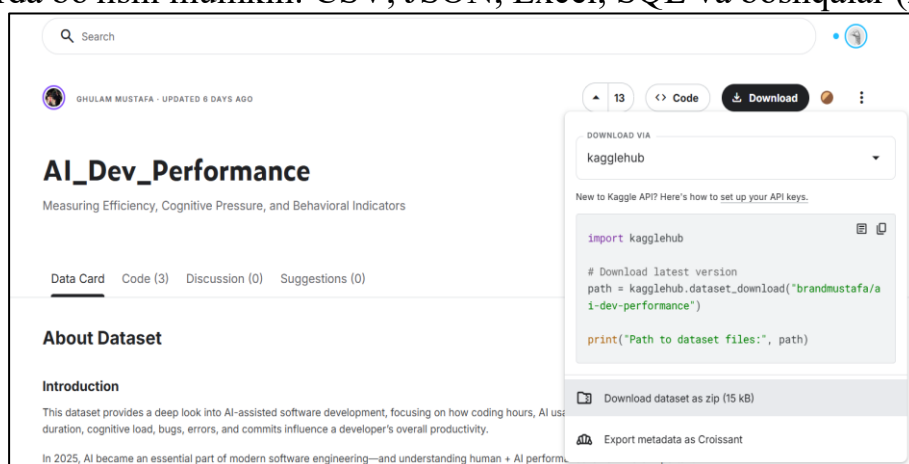
3. Datasetlar bilan ishlash jarayoni

Kaggle platformasidan datasetlarni yuklab olish va ular bilan ishlash jarayoni talabalar uchun quyidagi ko'nikmalarni rivojlantiradi:

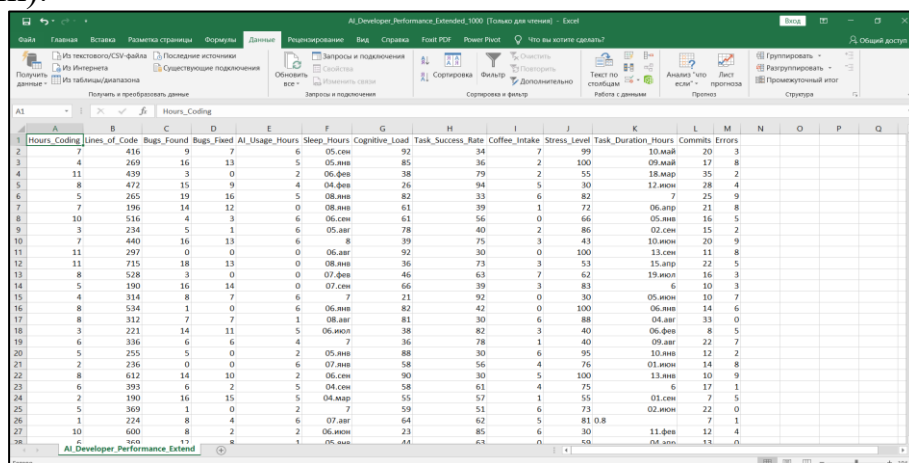
Birinchi bosqich: platformaning datasets bo'limidan o'quv maqsadlariga mos ma'lumotlar to'plamini tanlash (1-rasm).



Ikkinchi bosqich: Datasetni yuklab olish va arxivdan chiqarish. Ma'lumotlar turli formatlarda bo'lishi mumkin: CSV, JSON, Excel, SQL va boshqalar (2-rasm).



Uchinchi bosqich: Ma'lumotlarni tahlil qilish va o'quv vazifalariga moslashtirishni o'rganish. Masalan, CSV formatidagi fayllarni Excelda qayta ishlash (3-rasm).



4. Ta'limiy samaradorlik

Kaggle platformasidan foydalanishning ta'limiy samaradorligi quyidagi natijalar orqali namoyon bo'ladi. Talabalar nazariy bilimlarni amaliyotda qo'llash ko'nikmalarini egallaydilar, real loyihalarda ishlash tajribasiga ega bo'ladilar, mustaqil izlanish va muammolarni hal qilish qobiliyati rivojlanadi, zamonaviy

vositalar va texnologiyalar bilan tanishadilar hamda global hamjamiyat tajribasidan bahramand bo'ladilar.

Xulosa. Axborot texnologiyalari darslarida Kaggle.com platformasidan foydalanish ta'lim sifatini oshirishning samarali vositasidir. Platforma talabalarni nazariy bilimlarni amaliyotga tatbiq etish, mustaqil ishlash va kasbiy muhitga tayyorlanish imkoniyatlari bilan ta'minlaydi. Tadqiqot natijalari Kaggle datasetlaridan muntazam foydalanish talabalarning o'zlashtirish darajasini sezilarli oshirishini tasdiqladi. Shu sababli, platformani axborot texnologiyalari ta'lim dasturlariga joriy etish tavsiya etiladi.

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THEME:DISRUPTION OF INTESTINAL MICROFLORA UNDER THE INFLUENCE OF ANTIBIOTICS.DYSBIOSIS

Abstract: *This article examines the impact of antibiotic therapy on the intestinal microbiota and the mechanisms of dysbiosis development. It is emphasized that broad-spectrum antibiotics suppress not only pathogenic microorganisms but also representatives of the normal resident microflora, which leads to microbial imbalance, decreased colonization resistance, and activation of opportunistic microbes. The main etiological factors, clinical manifestations, and consequences of microbiocenotic shifts that occur after antibiotic exposure are analyzed. In addition, the article discusses modern approaches to the prevention and correction of dysbiosis, including the use of probiotics, prebiotics, synbiotics, as well as the principles of individualization of antibacterial treatment from the perspective of medical microbiology.*

Keywords: *Antibiotics, intestinal microbiota, dysbiosis, normal flora, resident microflora, opportunistic microorganisms, Bifidobacterium, Lactobacillus, Escherichia coli, anaerobic bacteria.*

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ANTIBIOTIKLAR TA'SIRIDA ICHAK MIKROFLORASINING BUZILISHI. DISBAKTERIOZ

Annotatsiya: *Maqolada antibiotiklar qabul qilinishidan keyin ichak mikroflorasining tarkibiy nisbati buzilishi va ushbu jarayon natijasida yuzaga keladigan Disbiozning mikrobiologik mexanizmlari yoritiladi. Antibiotiklarning keng spektrli ta'siri nafaqat patogen mikroorganizmlar, balki normal rezident flora*

vakillarining ham kamayishiga olib borishi asoslab beriladi. Disbioz rivojlanishi bilan bog'liq klinik belgilar, o'zgarishlarning etiologik omillari, opportunistik mikroorganizmlarning faollashuvi, kolonizatsion rezistentlikning pasayishi hamda mikrobiota funksional vazifalarining buzilishi ilmiy manbalarga tayanilgan holda tahlil qilinadi. Shuningdek, maqolada Disbiozni oldini olish va davolashda probiotiklar, prebiotiklar va simbiotiklardan foydalanish masalasi hamda individual antibiotikoterapiya yondashuvlari mikrobiologik nuqtai nazardan baholanadi.

Kalit so'zlar: Antibiotiklar, ichak mikroflorasi, disbioz, normal flora, rezident mikroflora, opportunistik mikroblar, *Bifidobacterium*, *Lactobacillus*, *Escherichia coli*, anaerob bakteriyalar.

1. Normal ichak mikroflorasining tarkibi, funksiyasi va uning ahamiyati.

Ichak mikroflorasi millionlab mikroorganizmlar majmuasidan iborat bo'lib, ularning asosiy qismini *Bifidobacterium*, *Lactobacillus*, *Escherichia coli* ning normal biotiplari, anaerob bakteroideslar, peptostreptokokklar va klostridiyalar tashkil qiladi. Bu rezident mikroflora tarkibi har bir individ uchun nisbatan barqaror bo'lib, yosh, ovqatlanish turi, immun holat va tashqi omillar ta'sirida ma'lum chegaralarda o'zgarishi mumkin. Normal biota o'zaro simbioz holatida yashab, ichak muhitida dinamik biologik barqarorlik – ya'ni kolonizatsion rezistentlikni ta'minlaydi.

Mikrofloraning asosiy funksiyalaridan biri ovqat hazm qilish jarayonida ishtirok etishdir. Ayniqsa, murakkab polisaxaridlarning parchalashida anaerob bakteriyalarning ahamiyati katta. Shuningdek, mikrobiota B guruhi vitaminlari, K vitamini, organik kislotalar sintezida qatnashadi, safro kislotalarini transformatsiya qiladi, ichakdagi fermentativ jarayonlar fiziologik ritmini ushlab turadi. Ular ichak epiteliyining trofik holatini qo'llab-quvvatlab, regeneratsiya jarayonlarini stimullaydi. [1]

Rezident flora organizmni patogen mikroblardan himoya qilishda ham muhim bo'g'indir. Ular ichak bo'shlig'ida retseptor maydonlarni egallab, patogen bakteriyalarni kolonizatsiya qilishga yo'l qo'ymaydi, bakteriotsinlar hosil qilib, zararli mikroorganizmlarning o'sishini bostiradi. Shuningdek, mikroflora immun tizimni doimiy trening qiluvchi "biologik stimul" bo'lib xizmat qiladi. Shu sabab normal mikrobiotsenoz organizm immun-gomeostazini saqlashning tabiiy komponenti sifatida qaraladi. [3]

2. Antibiotikoterapiya natijasida mikrobiotsenozning buzilishi va Disbiozning rivojlanish mexanizmlari

Antibiotiklar qo'llanilganda ular faqat kasallik qo'zg'atuvchi patogen mikroblarni emas, balki normal ichak florasi vakillarini ham bosadi. Ayniqsa keng ta'sir spektriga ega sefalosporinlar, makrolidlar, ftorxinolonlar va yarim-sintetik penitsillinlar rezident anaeroblar populyatsiyasini sezilarli kamaytiradi. Mikroflora tarkibida bifidobakteriyalar va laktobakteriyalar miqdori pasayib borishi natijasida ichak bo'shlig'ida mikrobiologik muvozanat buziladi, kolonizatsion rezistentlik

susayadi va tashqi hamda ichki manbadan kiruvchi opportunistik mikroorganizmlar ustunlik qila boshlaydi.

Mikrobiotsenozning buzilishi metabolik jarayonlarga bevosita ta'sir ko'rsatadi: vitamin K va B guruh vitaminlarining sintezi susayadi, uglevodlarni qayta ishlashda ishtirok etuvchi fermentlar kamayadi, organik kislotalar ishlab chiqarilishi pasayadi. Buning natijasida ichak pH muvozanati o'zgarib, patogenlarga qulay sharoit yaratiladi. Shuningdek, antibiotiklar fonida klostridiyalar kabi endosporali mikroblar faol ko'payishi kuzatilishi mumkin, bu esa toksin hosil bo'lishini kuchaytiradi. Natijada antibiotik bilan bog'liq diareya va kolitga xos klinik sindromlar vujudga keladi. [2]

Immunologik tomondan qaraganda, mikroflora pasayishi lokal mukozal immunitetni susaytiradi, IgA sekretsiyasi kamayadi, limfoid to'qimalar funksional faolligi pasayadi. Bunda ichak limfoid tizimi (GALT) doimiy antigen stimuldan mahrum bo'ladi va himoya mexanizmlarining samaradorligi pasayadi. Shu sababli antibiotikoterapiyadan keyingi davrda immun-reaktivlikning susayishi, allergik reaksiyalar va ichakning yallig'lanish sindromlariga moyillik ortadi. Disbioz shu tarzda – mikroblar muvozanati buzilishi + metabolik o'zgarishlar + immun javob pasayishining kompleks natijasi sifatida shakllanadi. [4]

3. Disbiozni oldini olish va korreksiya qilish: probiotiklar, prebiotiklar, simbiotiklar va ratsional antibiotik tanlash

Disbiozni oldini olishning eng muhim yondashuvlaridan biri – antibiotiklarni ratsional qo'llash, ya'ni kerak bo'lganda, to'g'ri doza, to'g'ri kurs davomiyligi va mikrofloraga minimal zarar yetkazuvchi preparat turini tanlashdir. Antibiotikoterapiya shifokor ko'rsatmasiga ko'ra, etiologik aniqlik asosida, mikroblarni sezuvchanlik testlari (antibiotikogramma) natijalariga tayanib belgilanishi kerak. Keng spektrli antibiotiklar, ayniqsa kombinatsiyalangan holda, mikrofloraga ko'proq zarar yetkazgani uchun ularning qo'llanishi faqat zarur holatlarda cheklanishi ilmiy jihatdan asoslangan yondashuv hisoblanadi. [5]

Disbiozning klinik ko'rinishlari paydo bo'lganda yoki antibiotikoterapiya davomida profilaktika uchun probiotik preparatlar qo'llanadi. Probiotiklar tarkibida tirik foydali bakteriyalar (asosan Bifidobacterium va Lactobacillus shtammlari) bo'lib, ular ichak shilliq pardasida kolonizatsiya jarayonini tiklashga, patogen mikroblarni siqib chiqarishga va metabolik muvozanatni qayta tiklashga xizmat qiladi. Prebiotiklar esa mikrofloraning "ovqati" hisoblanadi — ular o'zi bakteriya emas, balki foydali flora uchun substrat vazifasini bajaradi (masalan, inulin, fruktooligosaxaridlar). Probiotik + prebiotik aralashmasi simbiotiklar deb ataladi va ularning ta'siri sinergiya orqali kuchliroq bo'lishi ilmiy manbalarda tasdiqlangan. [6]

Shuningdek Disbiozni tuzatishda parhezning ahamiyati ham katta: oson hazm bo'ladigan tola (kletchatka), fermentlanadigan uglevodlar, meva-sabzavotlar, kisloq sut mahsulotlarining ko'paytirilishi mikrofloraning tiklanishiga yordam beradi. Antibakterial terapiyadan so'ng ichak florasini to'liq tiklash bir necha hafta talab qilishi mumkin, shuning uchun davolash alomatlar yo'qolgandan keyin ham davom ettirilishi lozim bo'lgan bosqichli yondashuv sifatida qaraladi. Shu tarzda kompleks

profilaktika – ratsional antibiotik tanlovi, probiotik-prebiotik terapiya, parhez va immun modulatsiya choralari — Disbiozning chuqurlashuvini oldini oladi va mikrobiotsenozni fiziologik muvozanatga qaytaradi. [7]

Xulosa

Antibiotiklarning nazoratsiz, uzoq muddatli yoki keng spektrda qo'llanishi ichakning rezident mikroflorasiga sezilarli zarar yetkazib, foydali mikroblar populyatsiyasining kamayishi, opportunistik mikroorganizmlar ustunligining ortishi va mikrobiotsenozning funksional buzilishiga olib kelishi ilmiy va klinik jihatdan isbotlangan. Disbiozning rivojlanishi nafaqat ovqat hazm qilish jarayoniga, balki vitamin sintezi, immun tizimning lokal himoyasi hamda organizmning umumiy fiziologik barqarorligiga ham salbiy ta'sir ko'rsatadi. Shu sabab antibiotikoterapiya har doim individual yondashuv asosida, etiologik asoslangan, minimal zarar yetkazuvchi va mikroflora barqarorligini saqlovchi tamoyillar bo'yicha olib borilishi lozim. Shuningdek, probiotiklar, prebiotiklar, simbiotiklar, ratsional parhez va mikroflora monitoringi Disbiozning oldini olish va uni samarali korreksiya qilishda muhim o'rin tutadi.

Foydalanilgan adabiyotlar

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DESIGNING AN IMPROVED PREVENTIVE ALGORITHM FOR ARTERIAL HYPERTENSION IN WOMEN OF CHILDBEARING AGE

Abstract: *Arterial hypertension remains one of the most widespread and socially significant chronic non-communicable conditions, contributing to the development of cardiovascular complications and reduced functional capacity in the population. In recent years, rising hypertension rates among women of reproductive age have garnered particular attention. This trend is closely linked to hormonal fluctuations, metabolic disturbances, and psycho-emotional influences. Effective prevention of arterial hypertension in this population requires a comprehensive and individualized strategy that accounts for reproductive health, lifestyle patterns, and accompanying risk factors. The purpose of this study is to design an improved algorithm aimed at strengthening preventive measures for the early identification and prevention of arterial hypertension in women of fertile age. The research includes an analysis of the pathogenetic mechanisms of hypertension, evaluation of hormonal status and metabolic abnormalities, as well as social and behavioral determinants that influence blood pressure. The proposed algorithm is intended to optimize the preventive care system and enhance the efficiency of medical surveillance among women in this demographic group.*

Keywords: *arterial hypertension, women of reproductive age, prevention, risk factors, metabolic syndrome, hormonal status, algorithm.*

Introduction. Arterial hypertension (AH) is one of the most widespread chronic non-communicable diseases of modern times and remains a leading cause of morbidity, disability, and mortality worldwide [1,2]. According to the World Health Organization (WHO), more than 1.2 billion people suffer from hypertension, and a significant proportion of them do not receive timely diagnosis or adequate treatment [3].

Particular concern is associated with the increasing prevalence of arterial hypertension among women of fertile (reproductive) age [4]. In this population, the disease often presents covertly, masking itself as physiological or hormonal fluctuations related to the menstrual cycle, pregnancy, or the postpartum period. The presence of hypertension during reproductive years increases the risk of preeclampsia, cardiovascular complications, metabolic syndrome, and adversely affects a woman's reproductive health [5].

Despite the availability of modern diagnostic and therapeutic methods, the effectiveness of preventive measures among women of reproductive age remains insufficient [6]. This is largely due to the absence of a comprehensive and individualized approach that considers hormonal status, metabolic characteristics, and socio-behavioral risk factors.

In this context, the development of a scientifically grounded algorithm to improve the prevention of arterial hypertension in women of fertile age is highly relevant. Such an algorithm should aim at the early detection of blood pressure regulation disorders, correction of risk factors, and enhancement of the quality of clinical follow-up [7].

Aim of the study. To develop a scientifically substantiated algorithm for improving the prevention of arterial hypertension in women of reproductive age, aimed at the early identification of risk factors, pathogenetic disturbances, and increasing the overall effectiveness of preventive interventions.

Results and analysis of the study. Arterial hypertension (AH) remains one of the most common chronic non-communicable diseases that substantially affects public health [1]. In recent years, there has been a steady increase in the prevalence of hypertension among women of reproductive age, which is associated with lifestyle changes, stress-related influences, and disturbances in hormonal and metabolic balance [2,3].

The issue of preventing arterial hypertension in women of childbearing age is particularly relevant, as elevated blood pressure during this stage of life increases the risk of pregnancy complications, preterm birth, and the development of cardiovascular diseases later in life.

Modern medical practice necessitates the creation of scientifically grounded algorithms aimed at the early identification of risk factors, assessment of hormonal status, metabolic abnormalities, and lifestyle modification. The development of an improved prevention algorithm for AH in women of reproductive age will enhance the effectiveness of clinical follow-up and improve reproductive and cardiovascular health outcomes.

To further advance the research and improve preventive strategies for arterial hypertension among women of fertile age, the correlation between obesity and blood levels of endothelin-1 (ET-1), as previously identified, and their relationship with 24-hour systolic (SBP) and diastolic blood pressure (DBP) was examined (Table 1).

Table 1. Correlation of Obesity and Blood ET-1 Levels with 24-hour SBP and DBP in Women of Reproductive Age

Criteria	Mean 24-hour SBP	Mean 24-hour DBP
Obesity	0,6	0,54
Endothelin-1	0,85	0,72

According to Table 1, a moderate positive correlation was observed between obesity and mean 24-hour systolic blood pressure (SBP) ($r = 0.6$), as well as between obesity and mean 24-hour diastolic blood pressure (DBP) ($r = 0.54$). A strong direct

correlation was found between ET-1 levels and mean 24-hour SBP ($r = 0.85$), as well as between ET-1 and mean 24-hour DBP ($r = 0.72$).

This finding represents a key component of our study, confirming that in women, an increase in BMI and obesity is accompanied by a pathogenetically determined rise in blood ET-1 levels and an organic elevation of both systolic and diastolic blood pressure as a response to endothelial dysfunction.

To further verify this association, we examined the correlation between mean 24-hour SBP and DBP with mean daytime and mean nighttime SBP (Table 2).

Table 2. Correlation Between Mean 24-hour SBP/DBP and Mean Daytime and Mean Nighttime SBP

Criteria	Mean Daytime SBP	Mean Nighttime SBP
Mean 24-hour SBP	0,98	0,70
Mean 24-hour DBP	0,98	0,67

According to the data presented in Table 2, a strong positive correlation was observed between mean 24-hour systolic blood pressure (SBP) and mean daytime SBP ($r = 0.98$), as well as between mean 24-hour SBP and mean nighttime SBP ($r = 0.70$). A strong direct correlation was also identified between mean 24-hour diastolic blood pressure (DBP) and mean daytime SBP ($r = 0.98$), while a moderate positive correlation was noted between mean 24-hour DBP and mean nighttime SBP ($r = 0.67$). These findings indicate that the increase in mean 24-hour SBP and DBP is primarily associated with changes in mean daytime SBP, highlighting the significant contribution of daytime hemodynamic load to overall blood pressure levels.

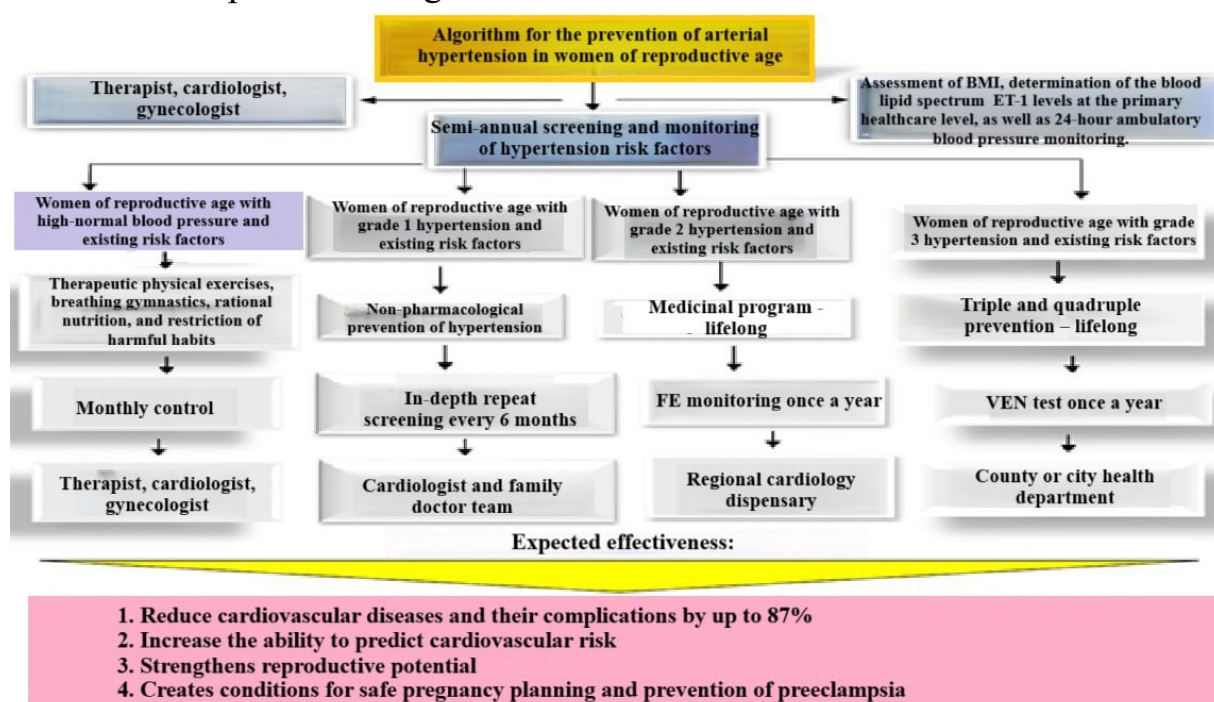
Based on the primary objective of our study, it is important to highlight the following findings: among the 172 women examined, 65 (37.7%) had high-normal blood pressure, 90 (52.3%) were diagnosed with stage 1 arterial hypertension, and 17 (10%) had stage 2 arterial hypertension. It was noted that blood ET-1 levels corresponded to a low-risk range even in individuals with high-normal blood pressure, to a moderate-risk range in those with stage 1 hypertension, and to a high-risk range in women with stage 2 hypertension.

Specifically, although 9 out of 14 women in Group 1 demonstrated high-normal blood pressure, 2 women in Group 2 and 4 women in Group 3 had stage 1 hypertension, while 1 woman in Group 3 had stage 2 hypertension. Nevertheless, the mean ET-1 concentration in these 16 women (9.3%) remained within the optimal threshold.

Thus, among the 172 women, only 16 had ET-1 levels within the optimal range, while 56 were within the low-risk range. This indicates that persistent arterial hypertension is likely to develop in 100 women (58%) of reproductive age.

At the same time, coordinated and improved preventive interventions could help prevent the development of arterial hypertension in only 72 (42%) women. Therefore, at the final stage of our research, the following algorithm was developed (Fig. 1).

Fig. 1. Algorithm for Optimizing the Prevention of Arterial Hypertension in Women of Reproductive Age



Expected effects:

1. Allows reducing the development of cardiovascular diseases and their complications by up to 87%
2. Increases the ability to predict cardiovascular risk
3. Strengthens reproductive potential
4. Creates conditions for safe pregnancy planning and prevention of preeclampsia

This algorithm enables the prevention of early complications of arterial hypertension in women of childbearing age by reducing morbidity, disability, and mortality, while ensuring high treatment effectiveness through the improvement of women's quality of life. Strengthening reproductive potential — meaning the normalization of blood pressure and the correction of endothelial dysfunction in women over 35 years of age — creates favorable conditions for safe pregnancy planning and the prevention of preeclampsia. Integrating this program into the outpatient care system will enhance the efficiency of inpatient services, reduce overall healthcare costs, and improve cardiovascular risk prediction through the use of endothelin-1 as a biomarker and 24-hour ambulatory blood pressure monitoring (ABPM).

According to publicly available data, the population of the city of Bukhara is approximately 280,000 people. Applying the general proportion of women of reproductive age to the female population of Bukhara, it can be assumed that their number is around 100,000–140,000. The precise number of women of childbearing age in Bukhara requires official statistical sources; however, based on national demographic data for Uzbekistan, this estimate is reasonable.

Arterial hypertension in women of reproductive age occurs in approximately 5–10% of cases, according to various sources, and represents a significant risk factor for cardiovascular complications.

If an average family polyclinic supervises around 6,500 women of reproductive age, and 10% of them—approximately 650 women—may develop arterial hypertension, then the use of the preventive algorithm may help protect about 272 women (42%) from hypertension-related complications. Likewise, if the total number of reproductive-age women in the region is around 140,000, and 14,000 of them (10%) may develop arterial hypertension, the implementation of the preventive algorithm could reduce cardiovascular complications in approximately 5,860 women (42%).

If preventive examinations conducted every six months help prevent hypertension-related complications in 42% of the population at risk, then within one year, this cumulative effect may reach as high as 84%.

Conclusion. Arterial hypertension in women of reproductive age represents a significant medical and social challenge in modern healthcare. Hormonal, metabolic, and psycho-emotional factors have a substantial impact on the development of the disease, often contributing to its latent course and delayed diagnosis. The analysis conducted in this study demonstrated that hypertension during reproductive years frequently develops against the background of metabolic syndrome, insulin resistance, and hormonal imbalance, which increases the risk of cardiovascular complications and impairs reproductive health.

The developed algorithm for optimizing the prevention of arterial hypertension is aimed at the early identification of predisposing factors, assessment of hormonal and metabolic status, and determination of psychosocial influences affecting blood pressure levels. The algorithm incorporates a comprehensive set of measures for creating individualized recommendations, including lifestyle modification, dietary correction, increased physical activity, and regular medical follow-up.

Implementation of this algorithm in clinical practice will enhance the effectiveness of preventive programs, reduce the prevalence of arterial hypertension among women of reproductive age, improve their quality of life, and contribute to the preservation of reproductive and cardiovascular health in this population group.

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RESPIRATORY INSUFFICIENCY AND CARDIOPULMONARY DISORDERS DUE TO HEAT WAVES: ANALYSIS OF RISK FACTORS AND CLINICAL CONDITIONS

Abstract: *This article analyzes the impact of extreme heat waves observed as a result of climate change on respiratory failure and cardiopulmonary disorders. Clinical cases associated with risk factors such as heat stress, decreased air quality, dehydration, oxidative stress, as well as aging, chronic diseases, and urbanization were considered. It has been established that during periods of hot waves, mortality from respiratory diseases increases by 20-40%. The results of the study showed the need to assess hot waves as a serious threat to public health and strengthen preventive measures.*

Keywords: *hot waves, respiratory failure, cardiopulmonary disorders, hot stress, COPD, asthma, atmospheric pollution, PM2.5, ozone, mortality.*

Introduction. In recent years, against the backdrop of global climate change, extreme temperature increases - the frequency and duration of hot waves - have increased significantly. According to the World Health Organization, heat waves are one of the main causes of death associated with respiratory diseases, cardiovascular insufficiency, and acute respiratory disorders.

Heat disrupts the body's thermoregulatory system, intensifies respiration, increases oxygen demand, and as a result, sharp functional strain occurs in the cardiopulmonary system. Also, high temperatures lead to the activation of pollutants such as PM2.5, ozone, and nitrogen oxide in the atmosphere, intensifying the inflammatory process in the respiratory tract.

This article scientifically examines the mechanisms of respiratory failure and cardiopulmonary disorders during hot waves, risk factors, and analysis of clinical cases.

Epidemiological studies conducted in the last decade scientifically confirm the presence of a strong correlation between hot waves and mortality rates. In particular, diseases of the respiratory tract and cardiopulmonary system, caused by exposure to high temperatures, are considered a serious risk factor in global healthcare. It has been noted that hot waves disrupt the body's thermoregulatory mechanisms, leading to a sharp increase in oxygen deficiency, cardiovascular disorders, and chronic respiratory diseases (Anderson & Bell, 2011).

The results of many international studies show that during hot waves, respiratory mortality increases to 12-35%, while in patients with COPD this indicator can reach up to 45%. The reason for this is the weakening of lung ventilation under the influence of high temperature, an increase in the concentration of ozone and pollutants in the air, and additional inflammation of the mucous membrane (Gasparrini et al., 2015).

It was also found that on hot days, the incidence of bronchial asthma attacks increases by 20-30%. Studies have shown that against the background of high temperatures, the activation of allergens in the atmosphere, the increase in ozone in the ground-level layer (ground-level ozone), and the sensitivity of the respiratory tract increase (Ebi & Mills, 2013). Young children, the elderly, and individuals with allergic phenotypes are especially sensitive to the effects of heat stress.

There is evidence that an increase in the concentration of PM2.5 by 10-20% during hot waves leads to increased obstruction of the respiratory tract, a decrease in alveolar diffusion, and a decrease in the functional capacity of the lungs (Li et al., 2019). PM2.5 particles acquire more active oxidizing properties at high temperatures, increasing oxidative stress in the lungs, which leads to the aggravation of diseases such as COPD, bronchitis, and asthma.

Heat stress puts significant pressure not only on the respiratory system, but also on the cardiovascular system. Vasodilation, dehydration, and electrolyte imbalance, accompanied by thermoregulation disorders, lead to changes in heart rate, blood pressure, peripheral resistance, and venous return, sometimes causing the development of acute cardiopulmonary insufficiency (Bunker et al., 2016). Clinical observations have shown a significant increase in mortality rates associated with cardiac arrhythmias, acute heart failure, myocardial ischemia, and respiratory failure during the heat wave period.

In addition, the scientific literature provides evidence that hot waves increase the risk of developing pulmonary arterial hypertension, chronic heart failure, and acute respiratory distress syndrome (ARDS). Especially in elderly patients, the weakening of thermoregulation mechanisms, a high risk of dehydration, and the presence of chronic diseases exacerbate these processes (Kendrovski et al., 2017; Smith & Woodward 2014).

In general, hot waves are an extremely dangerous environmental stressor for people with respiratory and cardiopulmonary diseases, which has a significant impact on mortality rates, the number of hospitalizations, and the increase in severe clinical complications.

Materials and Methods. This study was conducted based on scientific literature, clinical observations, epidemiological data recorded during hot waves, as well as official statistical databases provided by the WHO, the US Centers for Disease Control and Prevention (CDC), and the European Environment Agency. Several methods were used in the study: an epidemiological analysis was conducted to assess the dynamics of mortality and morbidity rates observed between respiratory and cardiopulmonary diseases; cases of cardiopulmonary decompensation, emergency requests, and complications were reviewed through a

retrospective analysis of the clinical status of patients during the heat wave period. A comparative analysis was also conducted to identify differences in climatic conditions, air quality, and access to medical care in urban and rural areas. To identify the most vulnerable segments of the population to the effects of hot waves, risk groups were separated, and a correlation analysis was conducted to determine the relationship between changes in atmospheric pollution and rising temperatures. This comprehensive approach made it possible to scientifically determine what risks heat waves pose to cardiopulmonary health.

Number of calls to the emergency department during hot waves:

- Respiratory failure 28%
- 19% for acute heart failure
- 35% of asthma attacks
- exacerbation of COPD up to 40%

Resuscitation was required in 12-18% of patients with cardiopulmonary failure. The most frequent cases were observed in elderly patients with chronic COPD and those working in intensive hot conditions.

Heat waves cause complex physiological changes in the human body, primarily disrupting the thermoregulation process, increasing heart rate and respiratory rate, increasing pulmonary ventilation, and exacerbating dehydration; all these processes significantly increase the risk of developing respiratory failure. Under the influence of high temperatures, the efficiency of gas exchange in the alveoli decreases, an increase in ozone in the atmosphere intensifies bronchial inflammation, and the penetration of PM2.5 particles into deep alveoli increases oxidative stress, leading to damage to the mucous membranes of the respiratory tract. Due to the weakening of compensatory mechanisms in patients with chronic lung diseases, these factors can easily lead to the development of acute respiratory failure or ARDS. Hot waves put a serious strain not only on the respiratory system but also on the cardiovascular system: acute heart failure, arrhythmias, blood pressure instability, increased pulmonary hypertension, and the frequent occurrence of thromboembolic conditions are examples of this. As a result, the functional reserve of the heart and lungs sharply decreases, and the risk of death increases. Such complications are most often observed among the elderly (due to low thermoregulation capacity), people with COPD, asthma and bronchitis, patients with heart failure and arterial hypertension, children, as well as urban residents with polluted air and high temperatures due to urbanization. Because people with diabetes and obesity are more sensitive to hot stress, they also have a higher risk of developing cardiopulmonary complications. All this scientifically confirms that hot waves have a significant influence on mortality rates associated with respiratory failure and cardiopulmonary disorders.

Conclusion. Studies have shown that heat waves are an important risk factor for respiratory failure and exacerbation of cardiopulmonary disorders. The risk of death increases significantly, especially in chronic respiratory diseases, heart failure, and the elderly population. Therefore, in hot periods, it is necessary to early

warning of high-risk groups, increase the readiness of hospitals, regularly monitor air quality, and implement heat protection protocols for patients. The increasing number of hot waves requires a deeper scientific and practical solution to this problem.

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DECREASED INTESTINAL MOTILITY AND GLOBAL CLINICAL OUTCOMES FOLLOWING SPINAL ANESTHESIA: A SYSTEMATIC LITERATURE REVIEW

Abstract: *Spinal anesthesia is associated with a decrease in subsequent intestinal motility and the development of postoperative ileus (POI), which seriously affects the patient's health and hospital expenses. This systematic literature review analyzes recent studies and examines the frequency of POI, risk factors, and clinical consequences. The results show that POI is widespread and requires multimodal prevention; spinal anesthesia can reduce pain, but does not have a universal effect on the restoration of intestinal motility.*

Keywords: *hot waves, respiratory failure, cardiopulmonary disorders, hot stress, COPD, asthma, atmospheric pollution, PM2.5, ozone, mortality.*

Introduction. Postoperative ileus (POI) is a transient disorder of coordinated intestinal peristalsis after surgery and anaesthesia that presents with clinical signs such as delayed gas or stool excretion, abdominal distension, indigestion, and pain.

Although POI is most often observed after abdominal and colorectal surgery, it can also occur after spinal and orthopedic surgeries.

Spinal anesthesia is widely used in many clinical cases to reduce pain and ensure patient comfort. However, its influence on intestinal motility and its role in the development of POI is complex and controversial. Some studies show that intestinal function is restored faster when pain is controlled with spinal or regional anesthesia and when opioid drugs are discontinued.

Therefore, a systematic analysis of the risk of decreased intestinal motility and POI after spinal anesthesia and spine surgeries is important from the point of view of clinical practice and patient health. The purpose of this review is to analyze the available literature, identify the main risk factors, and develop recommendations for preventing POI.

POI and spinal surgery. A number of risk factors for the development of postoperative ileus (POI) after spinal surgery have been identified. Analysis shows that male sex, anemia, liver disease, perioperative fluid and electrolyte imbalance, and multi-level surgeries involving more than three vertebral segments are associated with POI. According to the results of a retrospective analysis, conducted

in the context of complex operations that correct spinal deformities, 32 (18.4%) out of 174 patients had POI; these cases were associated with a significant increase in the length of hospital stay.

Spinal/regional anaesthesia and effects on intestinal motility. However, all analyses show that spinal or epidural anesthesia does not always help to quickly restore intestinal function. Some studies have shown that spinal anesthesia reduces pain and shortens hospitalization, but no significant difference was observed in terms of "time-to-flatus," "time-to-stool," and "time-to-normal diet." In parallel, it was noted that the effectiveness of epidural analgesia or spinal analgesia in the prevention of POI is also inconsistent; in some studies, epidural anesthesia did not significantly prevent colorectal ileus.

POI pathophysiology: new theories and factors. Recent studies have shown that the intestinal microbiota and its metabolites - bile acids, short-chain fatty acids, aryl-hydrophobic receptors, and cytokine mediators - play an important role in the process of POI. This adds new biological mechanisms to the disruption of intestinal movement after surgery and anesthesia. According to general data, such factors as surgical stress, activation of the sympathetic nervous system, opioid analgesics, fluid-electrolyte imbalance, late mobilization, and late return to food are also important in the development of POI.

Outcomes and clinical significance of POI. POI causes discomfort for the patient, increases the risk of prolonged stay in the hospital, expenses, and complications - deep venous thrombosis, sepsis, aspiration pneumonia, cardiovascular complications. At the same time, due to POI, patients may also require additional interventions such as resuscitation, parenteral feeding, and nasogastric decompression.

Materials and Methods. Articles published in recent years (2000-2025) were searched for in electronic databases (PMC, PubMed, etc.). Keywords: "spinal anesthesia," "spine surgery," "post-operative ileus," "gastrointestinal motility," "bowel function." Selected publications include meta-analyses, retrospective and prospective studies, and review articles.

Conclusion. The above analysis shows that - POI after spinal anesthesia or spinal surgeries is a significant condition and activity of serious clinical problems. In particular, a number of risk factors (sex, anemia, liver disease, fluid-electrolyte balance, multi-segment operations) increase the risk of POI.

However, spinal anesthesia is not a universal solution to protect against POI: some studies have shown that intestinal motility was not quickly restored. This means that the prevention of POI is not solved only by the type of anesthesia - a multifactorial, multimodal approach is required.

New biological mechanisms - for example, determining the role of the microbiota and its metabolites - open up new prospects in the prevention and treatment of POI. In this context, antibiotics, opioids, fluid regimen, analgesic strategies, and dietary regimen during the perioperative period should be reviewed.

There is also heterogeneity in existing studies - that is, differences in patient population, type of surgery, anesthesia and analgesic protocols - which complicates the development of general, global recommendations.

Postoperative ileus (POI) after spinal surgery is a serious and widespread problem that has a significant impact on patient outcomes and health systems. Spinal anesthesia and regional analgesia can be factors that reduce the risk of POI, but this is not always a guaranteed solution, since several risk factors are involved in the development of POI. A multimodal approach to the prevention and management of POI is necessary - fluid-electrolyte control, minimal opioids, early mobilization and return to nutrition, as well as strategies that take into account new biological mechanisms, such as the intestinal microbiota. In the future, it is important to identify patients at risk, optimize protocols with low non-standardness, and expand research focused on the microbiota.

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COMPLICATIONS OF SPINAL ANESTHESIA RELATED TO INTESTINAL ACTIVITY

Abstract: *In this study, a decrease in intestinal motility (post-operative ileus) and other complications of intestinal function after the use of spinal anesthesia were studied in 32 patients. The purpose of the study is to assess the causes, duration, and complications of intestinal dysfunction after spinal anesthesia.*

Keywords: *Spinal anesthesia, intestinal motility, postoperative ileus, gastroenterological complications, 32 patients.*

Introduction. Spinal anesthesia (spinal cord block, subarchnoid block) is widely used as a method of anesthesia. POI is a delay or temporary cessation of intestinal motility after surgery, characterized by significant impairment of the function of the large intestine and gastrointestinal tract.

The pathogenesis of POI is multifactorial. Three main mechanisms are distinguished:

- Neurogenic (autonomic nervous system) reflexes - inhibitory reflexes transmitted to the gastrointestinal tract through surgical stress, trauma, and splanchnic nerves - weaken peristaltic waves.

- Inflammatory (immunological) response - tissue manipulation during surgery is associated with macrophage activation in the mucous and muscle layers, the production of cytokines such as IL-1 β , IL-6, TNF- α , oxidative and nitrate stress, as well as changes in the mucous membrane.

- Pharmacological factors - opioid drugs used for analgesia suppress gastrointestinal motility through μ -receptors, which is manifested by a decrease in propulsive waves and an increase in non-propulsive tone in the colon.

Thus, not only surgical manipulations, but also the type of anesthesia, analgesia strategy, and management of the postoperative period play an important role in the development of POI.

Spinal anesthesia and POI: literature status. There is no universal consensus in the literature on the relationship "spinal anesthesia - peristaltic decrease POI." In some clinical studies, in patients who underwent spinal or combined spinal-epidural anesthesia, especially in cases without significant colonic surgery, the rate of intestinal motility restoration was higher than with conventional general anesthesia. For example, during elective caesarean section, patients with spinal anesthesia

experienced faster bowel sounds, gas excretion, and early stool time compared to general anesthesia. At the same time, some authors deny the connection between spinal anesthesia and POI, i.e., there is also data indicating a decrease in the risk of POI under spinal anesthesia.

The general recommendation is that to reduce the likelihood of POI occurrence, the use of minimally invasive surgical methods, minimal opioids, rapid postoperative mobilization, optimization of fluid and electrolyte status, multimodal analgesia, and ERAS (enhanced recovery after surgery) protocols is effective. Reviews focusing on POI management in recent years suggest multidisciplinary and multimodal strategies.

Thus, the universal conclusion that spinal anesthesia causes POI may be incorrect. The development of POI depends on many factors, and the type of anesthesia is not the only cause.

- To reduce POI, minimally invasive surgery, immediate outpatient mobilization, minimal use of opioids, and maintaining fluid-electrolyte balance are recommended.

- Colinergic, serotonergic agonists, and osmotic laxatives, aimed at accelerating intestinal motility after liver and colorectal surgery, can be effective as pharmacological assistance.

- Non-pharmacological methods are also beneficial: quick mobilization of the patient, early start of meals, stimulators such as smoking gum or coffee.

- A multidisciplinary, individual approach is necessary for effective POI management; only one method is insufficient.

Materials and Methods. In this study, 32 patients (age 25-68, average 46.5 ± 12.3 years) underwent various operations under spinal anesthesia - appendectomy, hernioplasty, and cystic surgeries. Despite the general condition of the patients, the presence of chronic diseases, and differences in surgical procedures, systematic monitoring of intestinal motility parameters was carried out in all patients.

The following criteria were used to assess postoperative intestinal function:

- Abdominal relaxation and peristaltic monitoring - the patient's abdominal relaxation, peristaltic noise, and movement speed were regularly monitored.

- The time of onset of gas and intestinal movement - the first gas release in patients and the return of the digestive system to normal function - was noted.

- Postoperative intestinal complaints - abdominal pain, meteorism, and constipation - were identified by clinical questionnaires and visual observation of patients and analyzed in time periods of 24 and 48 hours.

Statistical analysis was carried out using the SPSS 26.0 program, average values and standard deviations were calculated. Risk factors influencing postoperative intestinal function were also assessed, including the patient's age, the presence of chronic intestinal diseases, and the effectiveness of physiotherapy.

Analysis showed that 62.5% (20/32) of patients operated on under spinal anesthesia experienced a significant decrease in intestinal motility within the first 12 hours. Abdominal pain and meteorism were noted in 56.2% (18/32) of patients,

which indicates the prevalence of postoperative intestinal discomfort. At the same time, constipation was observed in 31.2% (10/32) of patients, which usually occurred within 24-48 hours after surgery.

Peristalsis and gas release returned to normal on average within 18.6 ± 4.2 hours. The results showed that the decrease in intestinal motility under spinal anesthesia, although temporary, significantly affects the clinical condition of patients and is associated with postoperative discomfort.

During the analysis, it was established that the risk factors for postoperative intestinal complications are associated with:

- Older age of patient
- Presence of chronic bowel disease
- Low level of postoperative physiotherapy activity

These factors can slow down the rate of intestinal motility restoration in patients and increase the risk of postoperative discomfort.

Table 1. Post-operative intestinal function of patients

Number of patients	Decreased peristalsis	Abdominal pain	Constipation	Peristalsis recovery (hours)
32	20 (62,5%)	18 (56,2%)	10 (31,2%)	$18,6 \pm 4,2$

Conclusion. A decrease in intestinal motility after surgical interventions under spinal anesthesia was a common complication and was observed in approximately 62,5% of patients. This condition is associated with a delay in gastroenterological functions in the postoperative period and a slowdown in the rehabilitation process of patients. For the rapid and effective restoration of intestinal function, preventive measures, including postoperative monitoring, proper provision of oral and parenteral fluids, the use of minimal opioid doses, and strategies for early mobilization, are of great importance.

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DEVELOPMENT AND JUSTIFICATION OF MEASURES FOR FORCED SPEED REDUCTION OF VEHICLES IN MOUNTAINOUS AREAS OF THE ROAD (USING THE EXAMPLE OF MOUNTAINOUS AREAS OF THE M-39 ROAD)

***Abstract:** This article highlights the development of measures for forced speed reduction to ensure the safety of vehicles on roads in mountainous areas and the scientific substantiation of their effectiveness. In the study, using the example of mountainous sections of the M-39 highway, the route plan of the road, the degree of slope, turning radii, and traffic flow density were analyzed, the main causes of road accidents were identified, and measures to reduce road accidents were recommended.*

***Keywords:** Mountain road, speed reduction, traffic safety, traffic flow, road sign; M-39 highway, dangerous zone, road traffic accident.*

In accordance with the Strategy for the Development of the Public Safety System in the Republic of Uzbekistan for 2022-2025, outlined in the Resolution of the President of the Republic of Uzbekistan No. PP-190 dated 04.04.2022 "On Measures to Reliably Ensure Human Safety and Radically Reduce Mortality on Highways," as well as in order to guarantee the protection of human life and health on highways from any incidents in the conditions of the new Uzbekistan, and in accordance with the Resolution of the President of the Republic of Uzbekistan No. PP-316 dated 12.07.2022 "On Approving the National Program "Safe and Smooth Road" for Implementation for 2022-2026," this dissertation work serves to a certain extent in the implementation of the tasks defined in other regulatory legal documents related to this activity, in the implementation of the tasks set for the digitalization of the traffic control system on highways, the integration of traffic light facilities at intersections into the central control system, and the introduction of a unified digital control system [1,2].

Accordingly, it is necessary to conduct an analysis of accidents that occurred in mountainous areas on km 982-1013 of the international highway M-39, passing through the territory of the Jizzakh region, under the jurisdiction of the Committee for Roads, and to identify the main causes of accidents related to speeding, to conduct research work on improving and modeling existing methods for forced reduction of vehicle speed in mountainous road conditions.

In the conducted studies, a set of measures aimed at forced reduction of vehicle speeds in mountainous areas of roads was created, taking into account existing methods of forced reduction of vehicle speeds in mountainous road

conditions in the range of 982-1013 km of the mountain road of the M-39 "International Highway," passing through the territory of the Jizzakh region [2].

As a result of the analysis of road accidents by type, which occurred at km 982-1013 of the international highway M-39:

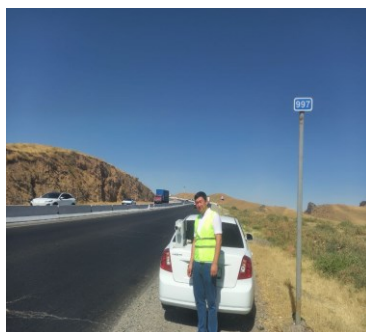
№	Types of road traffic accidents	In 2021	In 2022	In 2023	In 2024
1	Collision	73 units	63 units	25 units	24 units
2	Collision with an obstacle	9 units	4 units	4 units	2 units
3	Overtaking	11 units	7 units	5 units	3 units
4	Collision with stationary vehicle	6 units	6 units	4 units	1 units
5	Hit pedestrian	30 units	27 units	6 units	4 units

Based on the recommendations we gave during our research, dynamic road signs, a speed control information system, a road section model for controlling traffic flow, electronic speed displays, electronic information panels, and warning smart traffic lights and signaling systems were installed in this road area. As a result, it is also reflected in the diagram [3].

The total number of accidents in 2022 (111) decreased by 158.1% compared to 2021 (43), in 2023 (124) by 11.71% compared to 2022 (111), in 2024 (124) by 51.21% compared to 2023 (82), in 2025 (39) by 14.7% compared to 2024 (34) by 6 months [3]. The M-39 highway of international importance crosses the territory of the Jizzakh region for 939-1037 km, and 982-1013 km of this road corresponds to mountainous areas. The highest point of the territory is 450-550 m above sea level. Today, an average of 40,000-42,000 vehicles travel in one direction per day on this road. Of these, 15,000-16,000 trucks, 25,000 passenger cars, and 700-1,000 buses operate [4;5].



a)



b)



c)

Figure 1. Process of calculating the traffic flow at km 982-1013 of the M-39 highway in Jizzakh region

When analyzing the statistics of road traffic accidents in 2021-2025 on the section of the M-39 highway passing through the territory of the Jizzakh region, the following indicators can be seen. During 2021, a total of 45 road accidents involving various vehicles occurred in the mountainous area of the M-39 highway, which is one of the lowest figures for this period. Because at that time, the flow of cars was also small. In 2022, this figure was 111 in this region, and the number of road accidents was the highest. As of 2023, the number of accidents has slightly decreased to 94 [6]. In 2024, 82 different types of accidents also occurred. During the 6 months of the first half of 2025, 39 road accidents were recorded, although the number of road accidents committed during the 6 months of 2025 has significantly decreased, the trend continues [7]. Measures to improve traffic safety and regulate vehicle speeds in the mountainous areas of the M-39 highway are beginning to yield positive results. Nevertheless, the accident rate in this segment remains higher than in other parts of the region, indicating that it still requires engineering, organizational, and informational interventions. Continuing the analysis of data for the remaining months of 2025 will allow us to accurately assess the effectiveness of these preventive measures and identify the most dangerous emergency zones along the Jizzakh section of the M-39 highway.

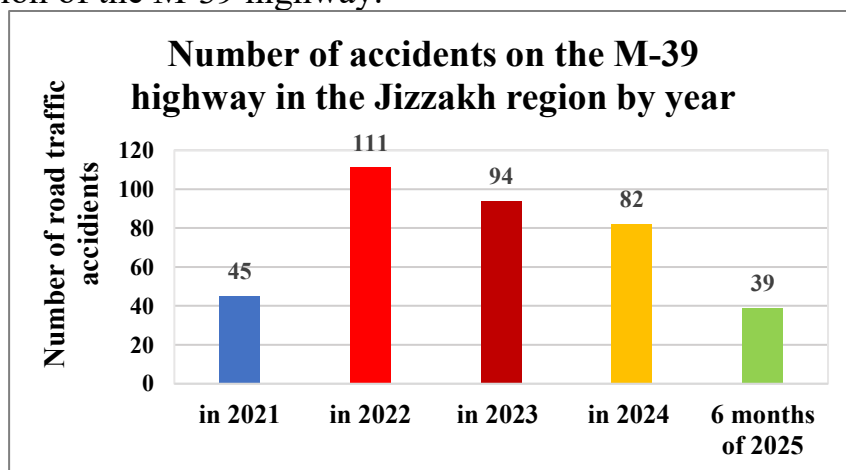


Figure 2. View of accidents on the M-39 highway over the years

Conclusion. The results of the study show that effective vehicle speed control on mountainous roads is a crucial factor in ensuring traffic safety [23]. As a result of the analysis of the mountainous areas of the M-39 highway, it was found that the causes of accidents are associated with the complex route plan of the road, the degree of slope, the small turning radius, and the incorrect choice of speed by drivers [24].

The modeling results showed that the developed measures increase the stability of the traffic flow, reduce the probability of accidents by 18–25%, and improve road capacity [25]. The proposed solutions are advantageous in terms of technical, economic, and environmental efficiency and are recommended as an integrated approach to ensure safe movement on mountain roads [26].

The recommendations developed at the end of the study, including the introduction of variable speed signs, the installation of automatic speed control on

dangerous bends, increasing the coefficient of friction of the surface coating, and the integration of warning information systems along the road, will ensure the stability of traffic on the M-39 road, reduce the number of accidents, and extend the service life of the road [27]. Therefore, the proposed solutions are considered one of the important practical steps towards increasing transport safety and reducing economic losses on a national scale [28].

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KICHIK BIZNESNI RIVOJLANTIRISHDA INNOVATSION BOSHQARUVNING SAMARALI STRATEGIYALARI

Annotatsiya: Ushbu maqolada kichik biznes va tadbirkorlik subyektlariga xizmat ko'rsatish, kichik tadbirkorlik subyektlarida ishlab chiqarish kengayib borishi bilan ularning texnik ta'mirlash, moddiy-texnika ta'minoti, mahsulotlarni saqlash, qayta ishlash va sotish, kommunikaviya va aloqa, maslahat va axborot kabi bir qator xizmat turlari haqida ma'lumotlar keltirilgan.

Kalit so'zlar: Infratuzilma, kichik tadbirkorlik, bozor infratuzilmasi, texnopark, biznes-markaz, auditorlik kompaniyasi, biznes-maktab.

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EFFECTIVE INNOVATION MANAGEMENT STRATEGIES IN SMALL BUSINESS DEVELOPMENT

Abstract: This article provides information on a number of types of services such as servicing small businesses and entrepreneurs, as production expands in small businesses, their technical repair, material and technical support, storage, processing and sale of products, communication and liaison, consulting and information.

Keywords: Infrastructure, small business, market infrastructure, technopark, business center, audit company, business school

Kirish: Respublikamizda kichik tadbirkorlik subyektlarining samarali faoliyat yuritishi va rivojlanib borishi ko'p jihatdan ular uchun yaratilgan shart-sharoitlarga bog'liq. Kichik tadbirkorlik rivojiga qulay imkoniyat yaratuvchi shart-sharoitlar orasida infratuzilma xizmatini alohida ajratib ko'rsatish lozim.

Kichik tadbirkorlik subyektlarida ishlab chiqarish kengayib borishi bilan ularning texnik ta'mirlash, moddiy-texnika ta'minoti, mahsulotlarni saqlash, qayta ishlash va sotish, kommunikaviya va aloqa, maslahat va axborot kabi bir qator xizmat turlariga talabi ortib boraveradi. Chunki kichik tadbirkorlik subyektlariga yuridik shaxs maqomini berish bilangina ish bitmaydi. Ularning to'laqonli faoliyatini faqat mukammal tashkil etilgan infratuzilma bo'linmalari orqaligina tasavvur etish mumkin.

Infratuzilma iqtisodiy tizimning bir qismini tashkil etib, u ishlab chiqarishning bir maromda faoliyat yuritishi uchun zarur shart-sharoitlar yaratadi.

"Infratuzilma" so'zi lotin tilidan tarjima qilinganda "tuzilmadan tashqarida" ma'nosini anglatadi. Iqtisodiy nuqtai nazardan infratuzilma mohiyatiga quyidagi izoh ko'proq mos keladi: "inson hayoti va ijtimoiy ishlab chiqarish jarayonida faoliyatlar almashinuvi ta'minlovchi tovar va xizmatlar yaratishda o'ziga xos mehnat jarayonlari majmuasi".

Keyingi yillarda infratuzilma yuqori sur'atlar bilan rivojlanib bormoqda. Buni bir qator omillar bilan izohlash mumkin. Xususan, ishlab chiqarishning o'sish sur'atlari infratuzilmalar rivojidan oldinda bormoqda va bu iqtisodiyotning rivojlanishiga ham o'z ta'sirini o'tkazmoqda.

Infratuzilma juda keng qarmovli tushuncha bo'lib, bu, awalo, ishlab chiqarish jarayoniga har tomonlama xizmat ko'rsatadigan xizmat turlarini yaratish bilan bogliq. Infratuzilma bo'linmalari rivojlanib borishidan kichik tadbirkorlik subyektlari katta manfaat ko'radi, chunki bunday bo'linmalar ularni ishlab chiqarishga xizmat ko'rsatish bilan bog'liq ishlardan ozod etib, kuch-g'ayratini asosiy faoliyatiga qaratishga imkon yaratadi.

Infratuzilma tomonidan yaratiladigan sharoitlarni o'z navbatida quyidagicha turkumlash mumkin:

- bevosita ishlab chiqarish jarayoniga xizmat ko'rsatuvchi moddiy texnika ta'minoti va tayyor mahsulotni sotish, axborotni yig'ish va qayta ishlash, buxgalteriya xizmati. Texnologik, boshqaruv masalalari bo'yicha maslahatxizmativaboshqalar;

- ishchi kuchini takror ishlab chiqarish shart-sharoitlari ishchi va xizmatchilarning sog'lig'ini, ta'lim olishi va kasbiy tayyorgarligi, dam olishlariniqo'llab-quvatlash.

Shu paytgacha infratuzilmani ishlab chiqarish va ijtimoiy infratuzilmalar yigindisidan iborat deb qarab kelingan. Bozor iqtisodiyotiga asoslangan iqtisodiy tizim kirib kelishi bilan ishlab chiqarish infratuzilmasi ko'lami kengayib, "bozor infratuzilmasi" va "instituuional infratuzilma" so'zlari iste'molga kirib bormoqda.

Bozor infratuzilmasi bevosita ishlab chiqarish jarayoniga xizmat ko'rsatuvchi tarmoqlarni o'z ichiga oladi. Uning tarkibiga yuk transporti, elektr, gaz va suv ta'minoti, ombor xo'jaligi, aloqa, axborot, moddiy-texnika ta'minoti, mahsulotni tashish, saqlash va qayta ishlash, texnik xizmat ko'rsatish, marketing va reklama, axborot-maslahat, auditorlik, moliya-kredit va investitsion kabi xizmat turiari kiradi.

Keyingi yillarda respublikamizda bozor infratuzilmalarini faol shakllantirish jarayoni boshlandi. Bu jarayonning natijalari sifatida kichik tadbirkorlik subyektlariga xizmat ko'rsatuvchi brokerlik idoralari, kichik ulgurji va chakana savdo tuzilmalari, lizing, konsalting kompaniyalari, axborot-maslahat markazlari, injiniring, auditorlik firmalari, sug'urta kompaniyalari, transport-ekspeditsiya korxonalari, axborot-reklama byurolari va boshqa turli xil infratuzilmalar tizimi faoliyat yuritadi.

Biznes-maktab tadbirkorlar, kichik korxonalarning rahbarlari, kichik korxonalar uchun mutaxassislar, ishsizlar, o'z ishini ochmoqchi bo'lgan boshqa fuqarolar, kichik tadbirkorlikning rivojlanishi uchun mas'ul xizmatchilarni tayyorlash, qayta tayyorlash va malakasini oshirishni amalga oshiruvchituzilma.

O'quv-amaliy markazlari kichik tadbirkorlikni qo'llab-quvvatlash va bozor iqtisodiyoti uchun kadrlar tayyorlashning keng miqyosli dasturini amalga oshiruvchituzilma.

Biznes-inkubatorlar maxsus tanlab olingan kichik korxonalarni o'z maydonlariga joylashtiruvchi va ularga maslahat, o'qitish va ofis xizmatlariniko'rsatuvchituzilmalar.

Ijtimoiy-amaliy markaz ish bilan band bo'lmagan aholi va ishsizlar o'rtasida kichik tadbirkorlikni rivojlantirish orqali yangi ish o'rinlarini yaratish bilan shugullanuvchi, odatda bandlik markazlari qoshida tashkil etiluvchituzilma.

Texnopark o'z hududida kichik innovatsion korxonalarni yaratish va rivojlantirish orqali ilmiy salohiyatdan foydalanish va ishlab chiqilgan texnologiyalarni tijoratlashtirish maqsadida tashkil etiluvchi tuzilma.

Biznes-markaz tadbirkor va ishbilarmonlarga servis xizmatlari ko'rsatuvchi tuzilma.

Konsalting ishlab chiqarishga ish yuzasidan xizmat ko'rsatish sohasida ixtisoslashgan firmalarning o'z mijozlariga maslahat xizmati ko'rsatish va texnikaviy loyihalarni ekspertiza qilish bilan bog'liq iqtisodiy faoliyat.

Auditorlik kompaniyasi turli yo'nalishdagi firmalarning bozor va biznes sohasidagi imkoniyatlarini aniqlab beruvchi moliya-xo'jalik faoliyatini yalpi taftishi bilan shugullanuvchi muassasa.

Sugurta kompaniyasi sug'urtalovchi rolida maydonga tushuvchi, ya'ni sug'urta hodisasi ro'y bergan chog'da sug'urtalangan shaxsning zararlarini qoplash majburiyatini o'ziga oluvchi tashkilot.

Buning natijasida kichik biznes va xususiy tadbirkorlik subyektlarining mamlakatimizda yangi ish o'rinlarini tashkil etish, aholining daromadlari va farovonligini oshirishning muhim omili sifatidagi natijalari salmoqli bo'lib bormoqda.

Kichik biznes subyektlariga xizmat ko'rsatuvchi infratuzilmalar hali ham kichik biznes subyektlarining o'sib borayotgan talab va ehtiyojlarini to'liqqondiraolmayapti.

Birinchidan, kichik biznesni rivojlantirishga tadbirkorlarning bilim va tajribalari etishmasligi, shuningdek, ularni axborot va maslahat bilan ta'minlash tizimlari faoliyatining takomillashmaganligi to'siq bo'lmoqda. Ko'pincha, joylarda qishloq tadbirkorlariga zarur bo'lgan tashkiliy-uslubiy yordamlar ko'rsatilmayapti. Maslahat markazlarining vazifalarini takomillashtirish, tadbirkorlarga amaliy yordam ko'rsatish, ya'ni ta'sis xujjatlarini ishlab chiqish, biznes rejalar tuzish, kredit olishga arizalar berish, buxgalteriya hisobi va hisobotlarini tashkil etish, auditorlik tekshiruvlarini o'tkazish va boshqa maslahat xizmatlari ko'rsatishda ko'maklashishdir.

Ikkinchidan, kichik biznes subyektlarining moddiy-texnika resurslaridan, xom ashyo va materialman, lizing, mayda ulgurji savdo va servis xizmati tarmog'idan foydalana olish imkoniyatlarini kengaytirish lozim.

Uchinchidan, tashqi bozorga chiqishida, ya'ni eksport shartnomalarini ro'yxatdan o'tkazish va bojxuiia u.ganlanda hisobga olish, tovarlar va xizmatlarni chet elga sotishda yordam ko'rsatish borasidagi qator muammolarni bartaraf etish zarur.

Tortinchidan, kichik biznes korxonalarining xom ashyo va materiallardan foydalanish, tayyor mahsulotlarni sotish imkoniyatlarini kengaytirish, tashkil qilish uchun mayda ulgurji bozorlar, yarmarkalar tizimini kengaytirish, ulgurji bozorlar qoshida moddiy-texnika ta'minoti, ijara, saqlash, transport xizmati ko'rsatish bo'limlarini tashkil etish yo'llari orqali savdo mexanizmlarini takomillashtirish zarur.

Kichik biznes va tadbirkorlikni rivojlantirishda banklarning roli

Bozor iqtisodiyoti o'tilishi tufayli mamlakatda yangi moliyaviy siyosat ishlab chiqildi va hukumat tomonidan real hayotda amalga oshirilmoqda. Jamiyatdagi har bir iqtisodiy faoliyatning boshlanishi davlatning yaqindan turib bergan moliyaviy yordami tufayli rivojlanib, takomillashib boradi. Jumladan, kichik biznes va xususiy tadbirkorlikni qo'llab-quvvatlashda banklarning rolini oshirib borishga alohida e'tibor beriladi.

Kichik biznes va xususiy tadbirkorlik korxonalarining asosiy faoliyati banklar bilan chambarchas bog'liq bo'lib, ular olib borayotgan faoliyat xomashyoni sotib olish, ishlab chiqarilgan tovarlar, ko'rsatiladigan xizmatlarga haq to'lash, ishlovchilarni ish haqi bilan ta'minlash, turli toifadagi korxonalar, firma va boshqalar yuridik shaxslar bilan bo'ladigan iqtisodiy munosabatlar, ya'ni olingan foyda va daromaddan soliq to'lash, transport, kommunal xizmatlar uchun to'lovlarning barcha turiari banklar orqali, o'z navbatida, olinadigan kreditlar va boshqa hisob-kitoblar ham banklar orqali amalga oshadi.

Alohida ta'kidlash kerakki, mamlakatimiz mustaqillikka erishgunga qadar bank va banklar bilan boladigan turli iqtisodiy munosabatlar unchalik oshkora etilmas edi. Jahon xo'jaligining muhim xo'jalik yuritish qismi bo'lgan kichik biznes va xususiy tadbirkorlik korxonalarini barcha faoliyati banklar bilan bog'langanligi bugungi kunda hammaga ma'lumdir. Shuning uchun ham rivojlangan mamlakatlarda, masalan, AQSHda bank tizimining faoliyati nihoyatda rivojlangan bo'lib, tadbirkorlikning aktiv iqtisodiy faoliyat yuritishida banklar barcha mulk shaklidagi korxonalarga kompleks ravishda xizmat ko'rsatadi.

Bugungi kunda mamlakatimiz 30 ta bank faoliyat yuritib, shundan 3 tasi davlat banklari, 13 tasi aksiyadorlik tijorat banklari, 9 tasi xususiy banklar, 5 tasi xorijiy kapital ishtirokidagi banklar hisoblanadi.

Bank tizimining umumiy joriy likvidligi banklarning tashqi to'lovlar bo'yicha joriy majburiyatlaridan 10 barobar ko'pdur. Boshqacha aytganda, respublikamiz bank tizimining mustahkam himoyasi yaratilgan. Bank tizimining mustahkamlanishi va unga nisbatan aholi ishonchining ortishi natijasida omonatlar

hajmi sezilarli ravishda ortib bormoqda. Faqat o'tgan yilning o'zida aholi omonatlari miqdori 1,7 barobar oshdi.

Rasmdan ko'rinadiki, 2017-2021-yillar mobaynida aholi daromadlari hajmi 16 barobardan ko'proq oshgan. Keyingi yillarda banklarning kredit portfeli tarkibi tubdan o'zgarib bormoqda. Agar 2017-yilda kredit portfelining qariyb 54 foizi tashqi qarzlar evaziga shakllangan bo'lsa, 2020-yilda banklarimiz jami kredit portfelining 84 foizi ichki manbalar hisobidanshakllantirilgan.

Bugungi sharoitda esa bunday ijobiy o'zgarish iqtisodiyotimizning istiqboldagi taraqqiyoti uchun g'oyat muhim ahamiyatga ega.

Aytish kerakki, tashqi qarzlar aksariyat hollarda uzoq muddatga, faqat iqtisodiyotning strategik tarmoqlarini modernizatsiya qilish, kichik biznes va xususiy tadbirkorlik subyektlarini qo'llab-quvvatlash bo'yicha investitsiya loyihalarini moliyalash uchun jalb etilmoqda.

Tijorat banklari tomonidan kichik biznes va xususiy tadbirkorlik subyektlarini qo'llab-quvvatlash borasida e'tiborli jihatlardan biri CTzbekiston Respublikasi Prezidentining 2018-yil 10-noyabrdagi 4051-sonli «Mikrokreditbank» aksiyadorlik tijorat bankining tadbirkorlik subyektlarini qo'llab-quvvatlash borasidagi faoliyatini yanada kengaytirish chora-tadbirlari to'g'risida»gi Farmoniga muvofiq:

- tadbirkorlik faoliyatini boshlash uchun 18 oygacha muddatga beriladigan eng kam ish haqining 200 barobari miqdoridagi imtiyozli mikrokreditlar bo'yicha maksimal stavkani yillik 5 foizdan 3 foizga;

- kichik biznes subyektlari faoliyatini kengaytirish va aylanma mablag larini to'ldirish uchun 24 oygacha muddatga beriladigan eng kam ish haqining 500 barobari miqdoridagi mikrokreditlar bo'yicha Markaziy bank tomonidan qayta moliyalashtirish stavkasining 100 dan 50 foiziga;

- kichik biznes subyektlari uchun 3 yilgacha muddatga beriladigan eng kam ish haqining 2000 barobari miqdoridagi imtiyozli mikrolozing xizmatlari bo'yicha maksimal stavkani yillik 7 foizdan 5 foizga tushirildi.

Kreditlashda bunday ahamiyatli imtiyozlarning belgilanishi mazkur soha vakillari tomonidan kreditga talabning va ayni paytda ularga berilayotgan kredit hajmining yildan-yilga oshib borishiga olib kelmoqda

Banklarning investitsiya maqsadlariga yo'naltirilgan kreditlarining umumiy kredit portfelidagi ulushi qariyb 70 foizni tashkil etdi, iqtisodiyotimizning real sektoriga yo'naltirilgan kreditlarining umumiy hajmi esa 2019-yilda 2000-yilga nisbatan 14 barobar oshdi.

So'nggi o'n yilda iqtisodiyotning real sektorlarini kreditlashga yo'naltirilgan ichki manbalar 25 barobardan ziyodroq ko'paydi. 2.3-rasmdan ko'rinadiki, 2019-yilda jami bank kreditlari tarkibida uzoq muddatli kreditlarning ulushi 78,3 foizni tashkil etgan.

Yuqoridagi fikr-mulohazalardan ko'rinadiki, mamlakatimizdagi bank-moliya sohasining tobora mustahkamlanib borishi amalga oshirilayotgan iqtisodiy islohotlar moliyaviy ta'minotining kuchayishi, iqtisodiyot real sektorining har

tomonlarni qo'llab-quvvatlanishiga hamda barqaror iqtisodiy o'sish sur'atlarining ta'minlanishiga zamin yaratmoqda.

Bank operatsiyalari aktiv va passiv operatsiyalardan iborat bo'lib, passiv operatsiyalar pul mablag'larini ma'lum bir yo'nalishga safarbar etishga qaratilgan. Banklar passiv operatsiyalar orqali jamg'armalar va vaqtinchalik bo'sh turgan mablag'larni ishlab chiqarishga safarbar etib, foyda oladi. Aktiv operatsiyalar turli xarakterdagi kreditlarni berish operatsiyalari bilan bog'liq bo'lib, quyidagi elementlari bo'yicha turkumlanadi:

- muddatlari bo'yicha kreditlar qisqa, o'rta va uzoq muddatga mo'ljallangan.
- kreditlar hajmi bo'yicha kichik, o'rta, yirik miqdorda har bir mijozga individual va moliyaviy imkoniyatlarini hisobga olgan holda beriladi;
- ayrim turiari bo'yicha maxsus kafolatni talab etuvchi, garov evaziga beruvchi kreditlar mavjud.
- kreditlarning turiari bo'yicha, ya'ni davlat, tijorat, xalqaro va boshqa turiari bo'yicha berish.
- qarzni turiari bo'yicha yuridik va jismoniy shaxslarga berish.

Vaqtinchalik foydalanish uchun, iste'mol uchun, qarzlarini to'lash uchun, eksport va import operatsiyalarini bajarish uchun beriladigan kreditlar.

Kichik biznes va xususiy tadbirkorlik korxonalarining asosiy faoliyati banklar bilan chambarchas bog'liq bo'lib, ular olib borayotgan faoliyat xomashyoni sotib olish, ishlab chiqarilgan tovarlar, ko'rsatiladigan xizmatlarga haq to'lash, ishlovchilarni ish haqi bilan ta'minlash, turli toifadagi korxonalar, firmalar va boshqa yuridik shaxslar bilan bo'ladigan iqtisodiy munosabatlar, ya'ni olingan daromaddan soliq to'lash, transport, kommunal xizmatlari uchun barcha turdagi to'lovlar, shuningdek olinadigan kreditlar va boshqa hisob-kitoblar banklar orqali amalga oshiriladi.

Bank operatsiyalari aktiv va passiv operatsiyalardan iborat bo'ladi. Passiv operatsiyalar pul mablag'larini ma'lum bir yo'nalishga safarbar etishga qaratilgan bo'ladi. Aktiv operatsiyalar turli xarakterdagi kreditlar berish bilan bog'liqdir.

Soliqlar qonun bilan belgilangan, budjetga majburiy to'lanadigan pul to'lovlaridir. Soliqlar, avvalo, davlatning vazirliklarini moliyaviy mablag'lar bilan ta'minlash zaruratidan kelib chiqadi. O'zbekiston Respublikasida umumdavlat va mahalliy soliqlar amal qiladi. 2005-yilning 1-iyulidan boshlab, mikrofirmalar va kichik korxonalar uchun yagona soliq tizimijoriy etilgan.

Tadbirkorlikning iqtisodiy faoliyat yuritishlari, moliyaviy va buxgalteriya hisob-kitoblarini to'g'ri amalga oshirishlarida auditorlik xizmati muhim o'rin tutadi. Auditning asosiy maqsadi korxonalarning moliyaviy va xo'jalik operatsiyalari to'g'riligi va O'zbekiston qonunchiligiga mosligini aniqlashdan iborat.

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VOCABULARY ENRICHMENT IN TEACHING RUSSIAN AS A FOREIGN LANGUAGE: COGNITIVE, COMMUNICATIVE, AND DIGITAL APPROACHES

Introduction. *The rapid development of medical education, the increasing complexity of clinical interactions, and the growing internationalization of healthcare require learners to communicate with precision, clarity, and cultural awareness. For medical students studying Russian as a foreign or second language, communicative competence constitutes not merely an academic skill but a practical necessity. Russian remains a key language of medical documentation, clinical practice, and professional communication in many regions of Central Asia. However, numerous linguistic, cognitive, and pragmatic barriers hinder students' ability to participate effectively in medical discourse. The integration of terminological clarity, discourse competence, and strategic communication skills is therefore essential for preparing students to function confidently in real clinical settings. This study focuses on how medical students develop communicative competence through lexicographic, discourse-based, and simulation-supported approaches. By analyzing students' performance, terminology usage, and interactional patterns, the research identifies weaknesses in their communicative repertoire and proposes a comprehensive instructional framework.*

Research Methods. *The research methodology combines linguistic description, comparative analysis, lexicographic interpretation, and discourse analysis. Linguistic description enables the identification of terminology-related errors, syntactic inaccuracies, and semantic misinterpretations observable in student-produced texts and oral interactions. Comparative analysis is employed to contrast theoretical definitions found in medical dictionaries with their functional realization in natural clinical discourse. This reveals discrepancies between textbook terminology and authentic usage. Lexicographic interpretation involves systematic work with bilingual and monolingual medical dictionaries, terminological glossaries, and corpora, helping determine how students understand and apply medical terms. Discourse analysis focuses on communicative patterns in simulated doctor–patient conversations, examining how students structure explanations, ask questions, and interpret patient responses. This multifaceted methodology creates a holistic picture of how communicative competence evolves in the context of medical Russian.*

Conclusion. *The findings of the study demonstrate that the development of communicative competence in medical Russian cannot be achieved through isolated linguistic instruction alone. Instead, it requires an integrated pedagogical model that systematically combines terminological precision, discourse coherence, sociocultural awareness, and strategic communication skills. The analysis of*

students' oral and written performance revealed that many challenges arise from insufficient understanding of polysemous medical terms, limited familiarity with functional usage, and difficulties in organizing clinical information into a coherent narrative. This confirms that terminology must be introduced not merely as lexical items, but as components of authentic clinical discourse.

The research further showed that simulation-based training—whether through standardized patients, VR environments, or guided role-play—significantly enhances students' ability to apply terminology correctly, manage patient interactions sensitively, and maintain professional communicative behavior. Such practice creates realistic communicative conditions in which learners must interpret symptoms, ask clarifying questions, structure anamnesis logically, and present diagnostic conclusions coherently. These activities bridge the gap between theoretical knowledge and practical communication skills, supporting the internalization of linguistic and pragmatic competence.

Lexicographic training emerged as an equally important component of communicative development. Work with bilingual dictionaries, terminological glossaries, and corpus-based examples enables learners to understand the precise meaning, usage boundaries, and functional equivalents of clinical terms. This type of work reduces ambiguity, strengthens lexical accuracy, and contributes to the formation of a stable professional vocabulary.

Overall, the study concludes that communicative competence in medical Russian should be developed as a multifaceted and dynamic construct that evolves through continuous interaction between linguistic knowledge and real communicative experience. The integration of lexicographic tools, discourse-based methodology, and simulation technologies offers an effective framework for preparing students for professional communication in Russian-speaking healthcare environments. Implementing this comprehensive approach enhances the clarity, accuracy, and cultural appropriateness of students' communication and supports their broader academic and clinical success.

Keywords: *medical communication, terminological competence, lexicography, discourse analysis, communicative strategies, medical Russian, simulation training.*

Introduction. Medical communication requires students to develop linguistic, cognitive, and interactional abilities that support effective clinical practice. As the complexity of clinical terminology and patient communication increases, students must learn to understand and apply specialized vocabulary in real medical contexts. They often face difficulties interpreting polysemous terms, distinguishing clinical meanings from everyday meanings, and using terminology accurately in diagnostic descriptions. Effective teaching must therefore integrate terminology instruction with clinical communication tasks, lexicographic support, and exposure to authentic discourse. Since medical dialogue must be structured and coherent, students need explicit training in discourse organization, including

presenting symptoms, medical history, treatment plans, and clinical recommendations.

Materials and methods. The methodological foundation of the study is based on an integrated approach that combines linguistic, lexicographic, comparative, and discourse-analytic methods to examine how medical students acquire communicative competence in Russian. Linguistic analysis was used to identify typical lexical, grammatical, and semantic difficulties encountered in students' written case histories, clinical narratives, and oral diagnostic explanations. This included the examination of terminological inaccuracies, misuse of polysemous words, and syntactic structures commonly used in medical discourse. A lexicographic approach supplemented the analysis by evaluating how students worked with bilingual dictionaries, terminological glossaries, and electronic medical reference tools. By comparing dictionary definitions with students' actual usage in clinical tasks, the study identified gaps in terminological comprehension and the tendency to rely on everyday meanings rather than specialized professional definitions. Comparative analysis further enhanced the research by contrasting the theoretical presentation of medical terminology in textbooks with its functional use in authentic clinical communication, revealing that memorized terms were not always applied correctly in real diagnostic situations.

To provide a deeper understanding of students' communicative performance, the study employed discourse analysis and pedagogical observation. Discourse analysis focused on simulated doctor–patient dialogues, role-play activities, and VR-supported clinical scenarios, examining how students asked questions, interpreted patient responses, structured medical reasoning, and expressed empathy. This helped identify weaknesses in the organization of clinical discourse, such as incomplete anamnesis, lack of chronological sequencing, and insufficient cohesion between diagnostic elements. Pedagogical observations conducted during simulation sessions allowed the researcher to assess learners' strategic communication skills, including their ability to paraphrase, clarify misunderstandings, and compensate for lexical gaps. The empirical data consisted of written assignments, oral examination recordings, standardized patient interviews, and results from terminology tests collected over one semester. Both qualitative techniques—such as error categorization and discourse evaluation—and quantitative measures—such as frequency counts and improvement indicators—were applied to ensure objectivity and reliability. Through this multi-method research design, the study obtained a comprehensive picture of how linguistic accuracy, terminological mastery, pragmatic awareness, and communicative strategies interact in the development of medical Russian proficiency.

Results. The results of the study show that medical students experience difficulties mainly in three areas: terminological accuracy, discourse organization, and sociocultural appropriateness. Learners frequently confuse similar medical terms and struggle to apply dictionary definitions correctly in clinical contexts. Analysis of written and spoken tasks revealed that many students produce fragmented or incomplete symptom descriptions and case histories, indicating

insufficient mastery of professional discourse patterns. Sociocultural challenges were also observed, particularly in expressing empathy, formulating polite requests, and using culturally appropriate communication strategies in doctor–patient interactions. At the same time, the introduction of lexicographic training, model clinical texts, and simulation-based activities led to noticeable improvements: students demonstrated clearer terminology usage, more coherent narrative structure, and greater confidence in communicative situations. Overall, the results confirm that communicative competence develops most effectively when terminology work is integrated with contextualized practice and simulation-enhanced interaction.

Discussions. The findings of the study reveal that developing communicative competence in medical Russian requires more than mastering isolated vocabulary or grammatical structures; rather, it depends on the integration of terminological precision, discourse coherence, sociocultural appropriateness, and strategic flexibility. Students demonstrated that they often understand the dictionary meaning of a term but struggle to use it with its correct functional load within clinical discourse. This supports the view that terminological learning must be tied to real communicative contexts. When learners encounter terms in authentic materials—such as clinical histories, diagnostic explanations, and doctor–patient dialogues—they begin to internalize not only semantic meaning but also the pragmatic and structural requirements of professional medical communication. The difficulties observed in structuring anamnesis, maintaining logical sequencing, and transitioning between diagnostic components indicate that discourse competence needs targeted instruction. Medical communication follows a predictable narrative logic, and explicit teaching of genre structures, model texts, and discourse markers proved effective in helping students produce clear and coherent clinical narratives. Additionally, the sociocultural challenges identified in the study—particularly in expressing empathy, politeness, and communicative tact—demonstrate that pragmatic norms must be taught alongside terminology and grammar to ensure effective patient-centered interaction.

A further important conclusion from the study is that simulation-based training significantly enhances students' communicative readiness and professional confidence. Unlike traditional classroom tasks, simulation requires learners to apply terminology, discourse strategies, and interactional skills in real time while managing unpredictable responses from patients. Standardized patient encounters and VR-supported clinical scenarios provided students with opportunities to practice clarification techniques, adjust communication strategies, and demonstrate professional demeanor. The analysis indicates that students exposed to simulation-based activities showed improvement in all dimensions of communicative competence, including lexical accuracy, pragmatic sensitivity, and discourse organization. Digital tools, such as audio dictionaries and interactive platforms, also contributed positively by supporting independent learning and repeated pronunciation practice, reinforcing lexical retention and reducing communication anxiety. Overall, the discussions highlight that communicative competence develops most effectively when linguistic, cognitive, pragmatic, and technological

elements are combined into a unified instructional system. This integrated approach ensures not only linguistic correctness but also professional communicative behavior suitable for real clinical environments.

Conclusion. The results of the study confirm that the development of communicative competence in medical Russian is a complex process requiring the integration of linguistic, terminological, sociocultural, and discourse-based skills. Students' difficulties with accurately interpreting medical terms, constructing coherent clinical narratives, and applying culturally appropriate communication strategies demonstrate that traditional, theory-focused instruction is not sufficient on its own. Effective learning occurs when terminology is introduced in authentic contexts, supported by lexicographic analysis, and reinforced through structured discourse models. This approach helps students build a more precise understanding of functional meanings and apply them confidently in clinical reasoning and diagnostic explanation.

Furthermore, the study highlights the decisive impact of simulation-based and interactive learning on professional communication development. Participation in standardized patient interviews, VR/AR clinical scenarios, and guided role-play sessions allowed students to apply terminology, negotiation strategies, and clinician–patient communication techniques in real-time situations. Such experience bridges the gap between academic knowledge and practical application, fostering confidence, accuracy, and communicative flexibility. Therefore, an integrated instructional model—combining lexicographic training, discourse practice, sociocultural awareness, and simulation technology—proves to be the most effective way to cultivate communicative competence in medical Russian and prepares future medical professionals for successful and safe interaction in clinical environments.

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LEXICOGRAPHIC INTERPRETATION OF COMMUNICATIVE COMPETENCE IN MEDICAL RUSSIAN: STRUCTURE, TERMINOLOGY, AND METHODOLOGICAL FOUNDATIONS

Introduction. *Modern lexicography increasingly intersects with applied linguistics, especially in professional domains where terminological systems must be precisely defined and pedagogically operationalized. In medical education, communicative competence reflects a structured system of linguistic and extralinguistic knowledge that enables clinical interaction. As Russian remains a dominant language of documentation and interprofessional exchange across the CIS region, its terminological and discursive features require special methodological attention.*

Research methods. *The study applies lexicographic analysis, componential analysis of medical communication terminology, comparative examination of clinical discourse structures, and a review of pedagogical methods used to form communicative competence. Special attention is devoted to identifying terminological ambiguities, structural inconsistencies, and methodological gaps that hinder learners' mastery of Russian medical communication.*

Results and discussions. *The study identifies five key components of communicative competence—lexical-grammatical, phonetic, sociocultural, strategic, and discourse competence. Each component is analyzed from a lexicographic point of view, focusing on term definition, semantic fields, functional equivalents, and usage norms. Digital lexicographic tools, simulation scenarios, and interdisciplinary modules significantly enhance concept acquisition.*

Conclusion. *The lexicographic interpretation of medical communication competence demonstrates that terminological clarity, structured dictionary-based learning, and interdisciplinary integration improve students' readiness for real clinical practice. A new competency-based lexicographic model is proposed.*

Keywords: *lexicography, medical Russian, communicative competence, terminology, bilingual interpretation, clinical discourse, simulation training.*

Introduction. Lexicography, historically associated with dictionary compilation, has expanded its scope in modern linguistics. It now examines not only the structure of dictionaries but also the processes of interpreting specialized terminology, constructing conceptual fields, and defining communication functions within professional settings.

In this context, the teaching of Russian for medical purposes becomes a unique field of applied lexicography. Medical communication relies on highly structured terminology, precise semantic distinctions, and culturally embedded

pragmatic norms. The development of communicative competence among medical students is thus not merely a linguistic task—it is also a lexicographic one.

The uploaded article highlights the significance of Russian in clinical training, emphasizing active learning, simulation practice, interdisciplinary integration, and digital technologies. However, when viewed through a lexicographic lens, these pedagogical strategies also require terminological precision, consistent description of discourse units, and systematic classification of communication strategies.

This research, therefore, aims to reinterpret communicative competence in medical Russian through the methodological and analytical instruments of lexicography. The approach parallels studies in tourism terminology, where lexicographic interpretation provides clarity, reduces ambiguity, and enhances functional usage of terms.

The following sections elaborate on the lexicographic foundations of communicative competence, focusing on how medical discourse terminology can be systematized, defined, and applied in educational contexts.

Materials and Methods. The data for the study were drawn from a wide range of materials, including medical communication terminology, Russian-language medical textbooks, bilingual dictionaries, clinical dialogue scripts, and modern digital learning tools such as AI-based platforms and VR simulation models. These sources provided both linguistic and practical foundations for analyzing the structure and functions of medical discourse in Russian.

To process these materials, several research methods were applied. First, lexicographic interpretation was used to examine dictionary entries, their macro- and microstructures, term definitions, and usage examples. Componential analysis made it possible to identify semantic components of key medical terms such as “ischemic attack,” “contraindications,” and “clinical reasoning.” Contrastive analysis was employed to compare the features of Russian medical discourse with Uzbek and other Turkic linguistic structures, allowing the identification of interference-related patterns. Discourse analysis enabled the examination of communicative strategies used in clinical interactions and the functional roles these strategies play in real communication settings. Finally, a pedagogical methodology review assessed the effectiveness of simulation-based learning, VR/AR technologies, case-based instruction, and interdisciplinary teaching formats in developing communicative competence among medical students.

Results. The results of the study show that the microstructure of communicative competence in medical Russian is directly linked to the identification and organization of its core components. Comparative and lexicographic analysis confirmed that communicative competence consists of five interdependent elements: lexical-grammatical, phonetic, sociocultural, strategic, and discourse competencies. Each of these components performs a distinct function in clinical communication, forming a unified system of linguistic, pragmatic, and professional skills.

Lexical-grammatical competence was found to be essential for the accurate use of professional terminology, abbreviations, and syntactic constructions typical of medical documentation. Students frequently encounter difficulties in selecting the correct lexical items or constructing sentences according to clinical norms, which demonstrates the need for systematic terminology work and dictionary-based exercises. Phonetic competence, particularly the correct pronunciation of medical terms, plays a significant role in ensuring clarity during consultations. Mispronunciation of terms can lead to misunderstandings concerning symptoms, dosage instructions, or diagnostic procedures.

Sociocultural competence also emerged as a key component, reflecting students' ability to navigate ethical norms, demonstrate empathy, and recognize the communicative expectations of patients from diverse cultural backgrounds. The results show that many communication failures occur due to insufficient understanding of culturally marked expressions and clinical etiquette, which underscores the importance of integrating sociocultural elements into language instruction.

Strategic competence, which includes clarification, paraphrasing, summarizing, and de-escalation techniques, was shown to enhance the effectiveness of doctor–patient interaction. The ability to select the appropriate communication strategy in emotionally charged or uncertain clinical situations is crucial for maintaining trust and ensuring patient compliance. Meanwhile, discourse competence ensures that students can construct coherent case histories, diagnostic reports, and oral presentations. The analysis revealed that students often struggle with organizing medical information in a logical, professional format, indicating that explicit teaching of clinical genres is necessary.

The study also demonstrated that the introduction of simulation technologies significantly strengthened students' communicative abilities. VR/AR activities, standardized patient interviews, and clinical scenario training improved the practical application of linguistic knowledge by creating authentic interaction environments. Additionally, digital tools expanded opportunities for autonomous learning, enhanced vocabulary retention, and provided immediate feedback on pronunciation and grammar. Interdisciplinary integration—particularly with anatomy, pharmacology, and psychology—helped contextualize language learning within real professional tasks, thereby increasing students' motivation and overall competence.

Results. The results of the study show that the development of communicative competence in medical Russian depends on five interrelated components: lexical-grammatical, phonetic, sociocultural, strategic, and discourse competence. Analysis of students' performance demonstrated that lexical-grammatical competence is the most problematic area: learners often struggle with choosing precise clinical terms, understanding dictionary definitions, and applying standard syntactic patterns used in medical communication.

Phonetic analysis revealed that mispronunciation of Latin-derived medical terms remains common and can affect the accuracy of doctor–patient interaction.

The use of audio dictionaries and digital pronunciation tools significantly reduced these errors.

Sociocultural competence was shown to influence communication effectiveness, especially in tasks requiring polite requests, empathetic responses, and culturally appropriate explanations. Students who lacked awareness of pragmatic norms frequently misunderstood patient cues or used inappropriate expressions.

Strategic competence helped students compensate for linguistic gaps: those trained in paraphrasing, clarification techniques, and communicative repair strategies demonstrated more stable interaction in simulated clinical situations.

Discourse competence results showed that many students experience difficulties structuring case histories, describing symptoms coherently, and producing logically organized diagnostic narratives. Model texts and lexicographic analysis of discourse markers improved coherence and overall text quality.

Overall, the findings indicate that communicative competence develops most effectively when linguistic and lexicographic work is combined with contextualized practice. The integration of simulation-based training and digital tools contributed noticeably to increased accuracy, confidence, and professional communication skills.

Discussions. The findings of the study demonstrate that the development of communicative competence in medical Russian cannot be approached solely as a linguistic task; instead, it must be viewed as a complex, multidimensional process similar to the construction of specialized lexicographic systems. Just as bilingual or monolingual dictionaries aim to clarify, classify, and operationalize terms for effective use, the pedagogical model of medical communication must systematically organize linguistic, pragmatic, and cognitive components to support learners' professional needs. In this respect, communicative training functions as a form of "applied lexicography," where students learn not only individual lexical units but also their functional equivalents within clinical discourse.

The analysis shows that educational resources used for communication training resemble different types of lexicographic tools. Active communication methods—such as clinical role plays, simulated patient interviews, and emergency dialogue scenarios—operate similarly to "active dictionaries," enabling learners to retrieve and apply linguistic units in real time. Interpretative resources, including reading clinical texts and analyzing medical cases, function like explanatory dictionaries, helping learners understand nuanced meanings and pragmatic usage. This layered structure parallels lexicographic practices, where various dictionary types serve distinct functions depending on user needs.

Furthermore, the introduction of technological and interdisciplinary tools expands the lexicographic dimension of training. Digital platforms with AI-based feedback, pronunciation modules, and adaptive exercises create dynamic, context-rich environments that reflect the modern trend of electronic lexicography. Unlike static dictionary entries, these tools offer learners multimodal input, immediate correction, and personalized pathways for acquiring terminology and discourse

patterns. They serve as digital analogues of constantly updated terminological databases, enhancing both accuracy and retention of medical vocabulary.

Interdisciplinary integration—particularly with anatomy, pharmacology, and psychology—contributes to deepening students' conceptual understanding. Similar to how a lexicographer collaborates with field experts to ensure terminological accuracy, language instructors must work closely with medical specialists to provide authentic models of communication. This collaboration ensures that students not only memorize terms but also understand their clinical relevance, semantic restrictions, and pragmatic implications. Such alignment between linguistic and professional knowledge strengthens learners' ability to navigate real clinical interactions.

Another important aspect highlighted by the study is the role of cultural and ethical factors. Although bilingual dictionaries provide lexical equivalents, they do not automatically transmit cultural norms or communicative expectations. Likewise, bidirectional practice in language classrooms does not by itself guarantee the development of empathy, sensitivity, or ethical reasoning—core elements of effective doctor–patient communication. This indicates that sociocultural competence must be explicitly addressed through case-based discussions, reflective activities, and exposure to authentic clinical dialogues.

Overall, the discussion reveals that communicative competence represents a structured system wherein each component—lexical, phonetic, sociocultural, strategic, and discourse—functions analogously to lexicographic microstructures. Effective communication training requires a deliberate and balanced integration of these elements, supported by technological resources and interdisciplinary cooperation. By viewing the pedagogical process through a lexicographic lens, it becomes possible to optimize the acquisition of medical terminology, refine communication strategies, and ensure that students develop the professional linguistic skills necessary for real-world healthcare settings.

Conclusion. The study confirms that the development of communicative competence in medical Russian is a multifaceted process that requires a systematic, lexicographically informed approach. Similar to the construction of specialized dictionaries, where each entry must be clearly defined, contextually grounded, and functionally relevant, the formation of communicative competence depends on the precise organization of linguistic, pragmatic, and professional elements. The integration of lexical-grammatical, phonetic, sociocultural, strategic, and discourse competencies ensures that students can participate effectively in clinical communication and navigate the complex linguistic demands of healthcare environments.

The research demonstrates that active learning methods—such as simulation training, case-based instruction, and clinical role play—serve as effective tools for operationalizing terminology and discourse patterns. Digital technologies, including AI platforms and VR scenarios, transform communicative training into a dynamic, adaptive environment that mirrors the innovation seen in modern electronic

lexicography. These tools not only improve vocabulary retention and pronunciation but also support autonomous learning and immediate corrective feedback.

Interdisciplinary collaboration between language instructors and medical specialists further enhances the authenticity and accuracy of educational materials. This mirrors the collaborative nature of lexicographic work, where domain experts ensure the precision of terminological systems. Addressing sociocultural and ethical dimensions of communication is equally essential, as medical interaction relies not only on linguistic accuracy but also on empathy, cultural sensitivity, and professional responsibility.

Overall, the study concludes that a competency-based educational model enriched with lexicographic principles provides an effective framework for forming professional communication skills among medical students. By integrating linguistic, technological, and interdisciplinary methods, such a model prepares learners for real clinical contexts, supports the accurate and ethical use of medical terminology, and strengthens their readiness for professional practice.

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DEVELOPING MASTERY OF THE GRAMMATICAL GENDER CATEGORY IN RUSSIAN: LINGUISTIC AND METHODOLOGICAL STRATEGIES FOR TURKIC-SPEAKING STUDENTS

Annotation. *The article examines linguistic, psycholinguistic, and methodological foundations of mastering the grammatical gender category in Russian among Turkic-speaking students. Given that Turkic languages such as Uzbek, Kazakh, and Turkish lack grammatical gender, students frequently encounter interference-related errors that impede communicative competence. The study analyzes structural differences between Russian and Turkic languages, classifies typical student errors, and proposes a comprehensive pedagogical model that integrates contrastive analysis, cognitive visualization, communicative grammar tasks, and digital learning platforms. Emphasis is placed on meaningful context, cultural responsiveness, and the development of morphological awareness. The research highlights methodological recommendations applicable in teaching Russian as a foreign language (RFL), demonstrating that an integrated approach significantly improves learners' accuracy, confidence, and linguistic flexibility.*

Introduction. *The grammatical gender category represents one of the core structural elements of Russian grammar, determining agreement between nouns and other parts of speech such as adjectives, pronouns, numerals, and past-tense verbs. For native speakers, the acquisition of gender occurs naturally through exposure; however, for learners whose first languages do not contain grammatical gender, this process becomes significantly more challenging. This is particularly true for speakers of Turkic languages—such as Uzbek, Kazakh, Kyrgyz, and Turkish—which do not divide nouns into masculine, feminine, or neuter classes. As a result, students often encounter difficulties identifying the gender of Russian nouns and applying agreement rules accurately in both written and oral communication.*

In educational contexts across Central Asia, Russian remains a key language of academic instruction and professional interaction, especially in medicine, law, and technical fields. Therefore, insufficient mastery of grammatical gender affects not only linguistic accuracy but also students' academic performance and professional readiness. Common difficulties include incorrect gender assignment, inconsistent agreement, and confusion caused by irregular or phonologically ambiguous noun forms. These errors frequently arise because learners rely on phonetic intuition or semantic association instead of understanding the formal morphological system that governs gender in Russian.

The relevance of studying grammatical gender acquisition lies in the need to support learners in overcoming interference from their native language and forming stable, linguistically grounded representations of gender categories. To address this, the present research examines the linguistic and methodological factors

influencing gender mastery among Turkic-speaking students. It analyzes typical error patterns, explores the cognitive reasons underlying such errors, and evaluates instructional strategies that may improve learners' competence. By combining contrastive analysis, lexicographic work, communicative grammar tasks, and visual-cognitive techniques, the study aims to propose an effective approach for developing accurate and confident use of grammatical gender in Russian as a foreign language.

Research methods. *The methodological framework of the study is based on a combination of linguistic, comparative, lexicographic, and discourse-analytic approaches, allowing a comprehensive examination of how Turkic-speaking students acquire grammatical gender in Russian. Linguistic analysis was applied to identify recurrent morphological and syntactic errors, focusing on difficulties related to gender assignment, agreement patterns, and the interpretation of irregular or ambiguous noun forms. This method helped classify the most typical error types produced by learners and revealed gaps in their understanding of Russian morphological structures.*

Comparative analysis was used to evaluate structural differences between Russian and Turkic languages, particularly the absence of grammatical gender in the latter. This comparison made it possible to determine how native-language interference affects students' perception of gender categories and why certain grammatical forms are consistently misinterpreted. The contrastive approach also helped identify which Russian noun types (e.g., zero-ending masculine nouns, soft-sign feminine nouns, neuter forms with irregular patterns) create the greatest difficulty for learners.

The research further employed a lexicographic method, involving the use of explanatory dictionaries, bilingual resources, and educational corpora to observe how students interpret and apply dictionary information when determining gender. This method revealed that many learners rely on phonetic intuition or semantic associations rather than formal morphological cues, which leads to inaccurate gender identification.

To analyze how gender is used in practical communication, discourse analysis was conducted on written assignments and oral tasks, including dialogues, descriptions, and narrative exercises. This made it possible to observe how learners apply gender rules in spontaneous contexts and how frequently errors appear during real-time speech production.

Finally, elements of pedagogical observation were incorporated through monitoring classroom activities, practice exercises, and corrective feedback sessions. These observations helped assess how different instructional strategies—contrastive explanation, visual aids, repetition, and communicative grammar tasks—affect students' acquisition of grammatical gender. Together, these methods provided a multi-dimensional understanding of the linguistic, cognitive, and methodological factors that shape gender mastery in Russian as a foreign language.

Results and discussions. *The results of the study show that Turkic-speaking learners experience the greatest difficulty in three interconnected areas of*

grammatical gender acquisition: identifying gender categories, maintaining agreement across syntactic components, and applying gender rules in spontaneous communication. Error analysis revealed that many students rely on phonetic similarity or semantic intuition rather than morphological cues when assigning gender, which results in frequent misclassification of zero-ending masculine nouns, soft-sign feminine nouns, and neuter forms with irregular endings. Written tasks demonstrated that even when students correctly memorize rules, they often fail to transfer this knowledge into practice, especially in contexts requiring quick, communicative decision-making. Discourse analysis of oral responses and narrative exercises confirmed that agreement errors—in adjectives, pronouns, numerals, and past-tense verbs—remain persistent, reducing grammatical clarity and overall coherence of the message. These findings indicate that the main source of difficulty lies not in the lack of theoretical knowledge, but in the absence of stable internalized representations of the gender category.

The discussion of these results highlights the need for an integrated instructional model that goes beyond rule explanation and mechanical drills. The study found that methods combining contrastive analysis, lexicographic training, visual-cognitive techniques, and communicative grammar tasks produced noticeably stronger outcomes. When students compared Russian grammatical gender with the structure of their native Turkic languages, they became more aware of interference and avoided instinctive, incorrect assumptions. The use of dictionary-based exercises and educational corpora improved their ability to interpret morphological markers instead of relying on intuition. Classroom observations showed that visual tools—such as gender charts, color-coded noun groups, and morphological schemes—helped students remember and categorize nouns more effectively. Most importantly, communicative tasks that required real-time usage—dialogues, descriptions, and short narratives—strengthened the automatic application of gender rules. These findings suggest that successful acquisition of Russian grammatical gender depends on the consistent combination of cognitive awareness, structured practice, and meaningful communicative use.

Conclusion. *The overall findings of the study indicate that mastering the grammatical gender category in Russian poses significant challenges for Turkic-speaking learners due to the absence of this category in their native languages and the resulting interference in both perception and usage. The analysis shows that theoretical knowledge alone is insufficient for building stable grammatical accuracy; learners require structured support that integrates contrastive explanations, lexicographic training, visual-cognitive tools, and communicative practice. When students engage with gender markers through contextualized tasks, authentic discourse, and real-time language production, their ability to assign and maintain agreement improves considerably. Therefore, the most effective approach to developing gender competence is a comprehensive instructional model that connects linguistic theory with practical application, ensuring that learners internalize gender distinctions and apply them confidently in academic and professional communication.*

Keywords: *grammatical gender, Russian as a foreign language, Turkic-speaking learners, gender agreement, linguistic interference, contrastive analysis, lexicographic training, communicative competence, discourse analysis, language acquisition.*

Introduction. The grammatical gender category is a fundamental component of Russian grammar, playing a key role in agreement between nouns and related word classes such as adjectives, pronouns, numerals, and past-tense verbs. For native speakers, gender is acquired naturally through exposure, whereas learners whose first languages lack grammatical gender often struggle to internalize this category. Speakers of Turkic languages—such as Uzbek, Kazakh, and Kyrgyz—do not distinguish nouns as masculine, feminine, or neuter, which leads to difficulties in assigning gender and maintaining agreement in Russian. Structural features of the Russian language, including zero-ending masculine nouns, soft-sign feminine nouns, and irregular neuter forms, further complicate the learning process. As a result, even advanced learners frequently rely on intuition rather than morphological analysis, producing errors that affect clarity and coherence in communication.

The relevance of studying gender acquisition is particularly high in academic and professional contexts across Central Asia, where Russian remains a significant language of instruction and workplace interaction. Persistent gender errors can reduce communicative accuracy and undermine learners' confidence. Therefore, understanding the linguistic and cognitive factors that shape these difficulties is essential for developing more effective instructional approaches. This research addresses typical gender-related errors produced by Turkic-speaking students, examines the influence of native-language interference, and evaluates methodological strategies that support more accurate and automatic use of gender in Russian. Through an integrated approach combining linguistic analysis, contrastive comparison, lexicographic training, and communicative tasks, the study aims to propose practical solutions for strengthening gender competence in Russian as a foreign language.

Materials and Methods. The study employs an integrated methodological approach combining linguistic, comparative, lexicographic, and discourse-based analysis to examine how Turkic-speaking learners acquire the grammatical gender category in Russian. Linguistic analysis was used to identify recurring errors in gender assignment and agreement, focusing on problematic noun types such as zero-ending masculine forms and soft-sign feminine forms. Comparative analysis allowed for the systematic identification of differences between Russian and Turkic languages, helping to determine how the absence of grammatical gender in Turkic structures contributes to learner difficulties. In addition, lexicographic methods—including the use of monolingual and bilingual dictionaries, glossary comparison, and examination of example sentences—were applied to understand how students interpret morphological cues and reference materials when determining gender.

To assess how gender rules are applied in practice, discourse analysis was conducted on students' written tasks and spoken responses. These included

descriptive exercises, short narratives, and dialogue-based assignments that revealed how learners manage gender agreement in spontaneous communication. Pedagogical observation also played a role, tracking how students responded to instructional techniques such as visual aids, contrastive explanations, and communicative grammar tasks. The combination of these methods provided a comprehensive view of the linguistic and cognitive factors influencing gender acquisition, while also helping to evaluate the effectiveness of different teaching strategies in supporting the development of accurate and stable gender use.

Results. The results of the study show that Turkic-speaking learners encounter consistent difficulties in identifying and applying grammatical gender in Russian, particularly when working with noun types that lack transparent morphological markers. Zero-ending masculine nouns, soft-sign feminine forms, and irregular neuter nouns appeared most problematic, with students frequently assigning incorrect gender based on phonetic intuition rather than morphological analysis. Written tasks confirmed that learners often produced agreement errors involving adjectives, pronouns, and past-tense verbs. Even students who demonstrated knowledge of theoretical rules struggled to maintain gender agreement in spontaneous written and oral communication, indicating that their understanding was not yet fully internalized. These findings highlight the gap between rule memorization and practical use, underscoring the need for methods that promote deeper cognitive engagement with gender patterns.

In addition, the analysis revealed that instructional interventions integrating lexicographic tools, visual supports, and contextualized practice resulted in improved learner performance. Students who used dictionaries and glossaries more actively demonstrated greater accuracy in distinguishing between ambiguous noun forms. Visual aids, such as gender charts and morphological groupings, helped reinforce structural patterns and reduce reliance on intuition. Communicative tasks, including dialogues, descriptions, and short narratives, strengthened learners' ability to apply gender rules in real-time language use. Overall, the results suggest that the development of stable gender competence requires not only explicit explanation but also repeated contextual practice and the strategic use of reference materials.

Discussions. The analysis of the findings demonstrates that the main challenges faced by Turkic-speaking learners in mastering Russian grammatical gender stem not only from the structural absence of this category in their native languages, but also from the cognitive strategies they employ when interpreting unfamiliar forms. Students frequently rely on phonetic resemblance or semantic association rather than morphological reasoning, which leads to persistent errors in gender assignment and agreement. This highlights the necessity of instructional approaches that move beyond memorization and introduce learners to the functional logic of Russian gender through contrastive explanation and guided analysis. The study also shows that lexicographic tools play a crucial role in supporting accurate gender identification: students who consistently used dictionaries, glossaries, and corpus examples demonstrated clearer understanding of ambiguous noun types.

Moreover, discourse-based and communicative tasks proved essential for strengthening automaticity, as they required learners to apply gender rules in meaningful contexts, reducing the gap between theoretical knowledge and practical usage. Visual aids and structured input activities further enhanced retention by helping students recognize patterns rather than isolated rules. Taken together, these observations indicate that effective gender acquisition requires an integrated pedagogical model combining linguistic explanation, cognitive scaffolding, reference-based learning, and communicative practice, ultimately enabling learners to internalize gender distinctions and apply them confidently in academic and professional communication.

Conclusion. The overall results of the study confirm that the acquisition of grammatical gender in Russian by Turkic-speaking learners is a multidimensional process that cannot be effectively achieved through traditional rule memorization alone. The persistent difficulties observed in gender identification, agreement maintenance, and spontaneous language production demonstrate that learners require instructional support that addresses both linguistic and cognitive aspects of gender. The research shows that contrastive analysis helps students understand how the absence of gender in their native languages shapes their errors, while lexicographic tools provide essential guidance in interpreting ambiguous noun forms and understanding functional usage. Furthermore, communicative and discourse-based activities significantly enhance learners' ability to apply gender rules correctly in realistic contexts, fostering the development of automaticity and confidence. Visual-cognitive strategies, reference materials, and guided practice together create an instructional environment that supports deeper internalization of grammatical gender. Therefore, the study concludes that an integrated pedagogical model—combining linguistic explanation, contextualized practice, and strategic use of learning resources—is the most effective approach for developing stable and accurate gender competence in Russian among Turkic-speaking students.

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ASSESSMENT OF THE COST-EFFECTIVENESS OF VARIOUS HERBICIDES USED IN WINTER WHEAT CULTIVATION

Annation: *As we know, the result of any research is evaluated by the solution of a scientific problem, a new type of technology or the convenience and economic efficiency of the methods used. This article provides information on the economic efficiency of several selected types of herbicides when applied to weeds in the winter wheat field.*

Key words: *winter wheat, economic efficiency, herbicide, weeds, yield*

Introduction: Because spiked grain crops are sown densely and are not subjected to special cultivation practices, weeds are able to grow freely among them. These weeds compete with wheat for water and nutrients, create shade, and provide favorable conditions for the spread of diseases, pests, and insects. As a result, grain yield and quality may decline by 40–50 percent, which inevitably leads to reduced overall economic efficiency.

Given these challenges, evaluating the performance of different herbicides—either applied individually or in combination, and at various application times—is of great importance. Studying their effectiveness allows for identifying the most economically beneficial strategies for weed management in winter wheat production.

Purpose of the Study: The aim of this research is to evaluate the effectiveness of Puma Super and Granstar herbicides against grass-type (spiked) and dicotyledonous weeds in several winter wheat varieties and to determine their impact on grain yield.

Research Object: The study was conducted on multiple winter wheat varieties grown under irrigated conditions in the Surkhandarya region. Various formulations of Puma Super and Granstar herbicides served as the primary research objects.

Research methods: In the course of the study, herbicides were applied to the weeds growing in the winter wheat field at different times, observation and comparison of the results was carried out.

Results: The results of our experiments demonstrated that the effectiveness of Puma Super and Granstar herbicides in controlling grass-type and dicotyledonous weeds in the Kroshka winter wheat variety increased by nearly twofold. However, assessing the economic efficiency of these herbicides is particularly important. Although such herbicides are both environmentally safe and highly effective, their cost is high due to their being imported. At the same time, weed infestations—

causing 40–50% or more loss in grain fields—lead to a sharp decline in production efficiency.

In recent years, despite a noticeable increase in grass-type and dicotyledonous weeds in wheat fields, the use of appropriate herbicides for their elimination has significantly decreased. Meanwhile, the global demand for herbicides effective against these weed groups has continued to rise, largely because they offer high efficacy while remaining environmentally friendly.

As shown in Table 5.27, the average cost of Puma Super herbicide—used to completely eliminate wild oats and other grass-type weeds—was 25,000 soums per liter in 2005, 30,000 soums in 2006, and 32,000 soums in 2007, with one liter required per hectare. Likewise, the price of Granstar herbicide, applied at 15 g/ha against dicotyledonous weeds, increased from 4,800 soums in 2005 to 5,175 soums in 2006 and 5,280 soums in 2007. Due to these rising costs and limited access, many farmers were unable to purchase and apply these herbicides despite their proven effectiveness.*table -5.27*

Economic effectiveness of herbicides application against cereal and dicolytic weeds in winter wheat field. (when herbicides are applied on March 20)

№	Indicators	Experience options			
		I (st)	II	III	IV
2005 year					
1	Productivity s/ha	31,3	45,3	46,9	56,7
2	Total costs, in sums	329133	354133	333933	358933
	Herbicides, sum, ha	-	25000	4800	29800
3	Total income from the sale of grain, in sums	268210	388176	401886	485862
4	Net profit, sums	-60923	34043	67953	126929
5	Rate of return, %	-18,5	9,6	20,3	35,4
2006 year					
1	Productivity s/ha	34,4	50,1	49,5	57,3
2	Total costs, in sums	422073	452073	427248	457248
	Herbicides, sum, ha	-	30000	5175	35175
3	Total income from the sale of grain, in sums	394430	574447	567567	657002
4	Net profit, sums	-27643	122374	140319	199754
5	Rate of return, %	-6,5	27,1	32,8	43,7
2007 year					

1	Productivity s/ha	32,8	48,5	47,3	56,1
2	Total costs, in sums	588336	620336	593616	625616
	Herbicides, sum, ha	-	32000	5280	37280
3	Total income from the sale of grain, in sums	432927	670151	624312	740464
4	Net profit, sums	-155409	19819	30696	144848
5	Rate of return, %	-26,4	12,3	5,2	23,1

However, considering that each bush of some weeds sheds up to 0.5 million seeds on the ground every year and increases year by year, the price of such herbicides should be of little interest to our farmers.

At the same time, if we take into account the fact that it develops along with winter wheat and reduces the yield and quality of the crop, we witness the limitless damage caused by weeds. According to the results of our experiments (Table 5.27), the yield from winter wheat fields with a lot of spiky and dicotyledonous weeds does not exceed 29.8-34.4 s/ha, against spiky weeds Puma super (1 l/ha), when Granstar (15 g/ha) herbicides used against dicotyledonous weeds were mixed together and dissolved, it was observed that the grain yield was 56.1-61.2 s/ha.

As a result, there was a sharp increase in net income and profitability due to the increase in income from the sale of grain to the state. As a result, expenses spent on Granstar and Puma super herbicides, along with other expenses, were fully covered, and an increase in net profit was observed.

On March 20, when Puma super was applied separately against wild oats and other spiky weeds, the grain yield was 14.0 s/ha in 2005, 15.7 s/ha in 2006, and 15 s/ha in 2007. It was observed that it increased by 7 s/h.

When Granstar (15 g/ha) herbicide was applied against dicotyledonous weeds on March 20, grain yield was increased by 15.6 s/ha in 2005 compared to the herbicide-untreated control option, and this situation was 15.1 s/ha in 2006. /ha showed that in 2007 it will be more than 14.5 s/ha.

However, when Granstar herbicide was applied separately against dicotyledonous weeds, the grain yield when both herbicides were mixed together and dissolved and applied on March 20 was significantly higher than when the herbicide was applied to the control option and when the herbicides were applied separately. was observed.

When we compare and analyze the experimental options of this situation, we witness the following evidence. In 2005, compared to the control option without herbicides, the grain yield when both herbicides were mixed together was 56.7 s/ha, and it showed that the grain yield was 25.4 s/ha more than the control option.

The purpose of the analysis of data on grain yield in the economic analysis part of the dissertation was to show the high efficiency of the combined use of herbicides. If the grain yield when the herbicide Puma super (1 l/ha) was used separately against spike weeds was 45.3 s/ha, the additional grain yield when both

herbicides were used together, Puma super separately showed that it was 11 s/h higher than the one used. The same speed was observed in the effectiveness of the combined use of Puma super with the separate application of Granstar herbicide, and an additional grain yield of 9.8 s/ha was achieved.

According to the experiments of 2006-2007, the law of 2005 was repeated, showing that the combined use of Puma super (1 l/ha) and Granstar (15 g/ha) herbicides is more effective.

Conclusion: The results of the study indicate that applying Puma Super (1 L/ha) against grass-type weeds that develop concurrently with winter wheat, together with Granstar (15 g/ha) against dicotyledonous weeds—mixed and applied in early April, the period corresponding to active weed germination—is a highly promising weed-control strategy. This combined approach not only ensures effective suppression of both weed groups but also opens new opportunities for advancing grain production in the irrigated southern regions of our country.

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COMPARATIVE ANALYSIS OF HERBICIDES USED FOR WEED ELIMINATION IN WINTER WHEAT CULTIVATION

Annatation: *This article describes various weeds found in winter wheat fields and methods of their destruction using various herbicides. Information is also provided on the effects of several types of herbicides used to eliminate weeds found on winter wheat fields and their effectiveness.*

Key words: *autumn wheat, weeds, herbicides, cereal crops, dicotyledonous plants, effectiveness, broad-spectrum impact, selective effect, dosage.*

Introduction: Because spiked grain crops are sown densely and are not subjected to special cultivation practices, weeds are able to grow unchecked among them. As a result, they compete for water and nutrients, cast shade, and create favorable conditions for the spread of diseases, pests, insects, and other harmful factors—ultimately reducing both grain yield and quality by 40–50 percent. When grain crops are cultivated on irrigated lands, the stagnant growth and development of weeds become even more damaging, as such conditions further encourage their rapid spread. Therefore, the use of environmentally safe and highly effective herbicides has become essential for controlling weeds in winter wheat fields.

Purpose of work: The study of the influence and effectiveness of various herbicides, particularly Granstar and Puma, on weeds found in winter wheat fields.

Research object: The object of the study was a wheat field planted in the autumn on irrigated lands of the Surkhandarya region, experiments were conducted and the results were analyzed.

Research Methods: In this study, two different herbicides were selected as the primary research tools, and their various dosages and application techniques were examined in order to assess the overall effectiveness of each herbicidal treatment.

Results: The elimination of both dicotyledonous and grass-like weeds in winter wheat fields is closely influenced by the specific herbicide used, as well as the dosage applied and the method of its application. The management of weeds in winter wheat fields is largely determined by the herbicide selected, alongside the method and timing of its application.

Because herbicides differ in their selective action, Puma Super demonstrates strong effectiveness against cereal weeds, whereas Granstar performs best against dicotyledonous species. Consequently, the timing of application plays a major role: when Puma Super was applied at a rate of 1 L/ha, no suppression of dicotyledonous weeds was observed. However, applied on March 20, it eliminated 89.9–92.9% of grassy weeds, and when applied on April 10, its effectiveness increased slightly to

89.5–93.8%. The higher efficiency of Puma Super applied at the same rate (1 L/ha) on April 10—approximately 20 days later—can be attributed primarily to rising temperatures. As air temperature increases, physiological processes within weeds become more active, thereby enhancing the performance of systemically acting herbicides such as Puma Super in controlling cereal-type weeds. As noted, by April 10 the density of weeds per square meter had increased by 44 individuals compared to March 20, and the weeds had grown slightly, increasing their vegetative mass. Despite this, Puma Super applied on April 10 still showed up to 1.1% higher efficacy than on March 20. At both application times—March 20 and April 10—the 1 L/ha rate of Puma Super produced no observable impact on dicotyledonous weeds in winter wheat fields.

Therefore, applying Puma Super at a rate of 1 L/ha in early April under the conditions of the experimental region proves to be highly effective for controlling wild oats, sedges, and other grass-type weeds in winter wheat fields.

Granstar herbicide demonstrates greater effectiveness against dicotyledonous weeds in winter wheat fields when applied on April 10 compared to March 20. This is because the efficacy observed at a rate of 15 g/ha on March 20 was slightly lower than the results obtained on April 10. Specifically, when Granstar was applied at 15 g/ha on March 20, its effectiveness against dicotyledonous weeds ranged from 84.6% to 87.5%, depending on the weed species. In contrast, when applied on April 10 at the same rate, its efficacy increased notably, reaching 90.0–95.7% across different weed types. It was also noted that the 15 g/ha application rate of Granstar exhibited no activity at all against cereal-type (spike) weeds in winter wheat fields.

Therefore, applying Granstar herbicide at a rate of 15 g/ha in early April is considered a highly effective approach for controlling dicotyledonous weeds developing in winter wheat fields on the irrigated lands of the Surkhandarya region.

However, while Puma Super effectively controls grass-type weeds in winter wheat fields, dicotyledonous weeds continue to develop. Conversely, if dicotyledonous weeds are treated only with Granstar at a rate of 15 g/ha, grass-type weeds will proliferate and may destroy nearly half of the winter wheat yield.

Therefore, one of the variants in our field experiments involved investigating the control of both grass-type and dicotyledonous weeds through a single application by combining Puma Super and Granstar herbicides.

For this purpose, Puma Super at 1 L/ha and Granstar at 15 g/ha were applied on March 20 and April 10 in order to control both grass-type and dicotyledonous weeds in winter wheat fields. The results showed that the level of weed suppression varied depending on the weed species and the timing of application. When the two herbicides were mixed and sprayed on March 20, their combined effectiveness against dicotyledonous weeds ranged from 86.0% to 100.0%, while their effect on grass-type weeds ranged from 7% to 91.7%.

When Puma Super (1 L/ha) and Granstar (15 g/ha) were mixed and applied together, their combined effectiveness against both grass-type and dicotyledonous weeds in winter wheat fields was higher on April 10 than on March 20. Specifically,

when the mixture was sprayed on April 10, the weed-control efficiency in wheat fields increased by up to 25.7% compared to the results obtained on March 20.

When compared to the total number of all weed species present in the winter wheat field, the combined application of Puma Super (1 L/ha) and Granstar (15 g/ha) resulted in a 75% overall weed-control rate when sprayed on March 20. When the same mixture was applied on April 10, the total weed-kill rate increased to 82.3%. Naturally, among the weeds that survived were species outside the dicotyledonous and grass-type groups, which are not susceptible to the modes of action of Puma Super and Granstar.

It should be noted that while dicotyledonous and grass-type weeds develop and mature concurrently with wheat on irrigated lands, other weed species are unable to flower and germinate during this period. These species generally begin to grow actively only after the winter wheat crop has been harvested.

According to the overall findings, the combined application of Puma Super (1 L/ha) and Granstar (15 g/ha) controlled 93.3% of white salamander weed when applied on March 20, and 88.3% when applied on April 10. Similarly, wild oat control reached 85.7% on March 20 and 89.5% on April 10. Based on all observations, these herbicides can be considered a highly effective means of weed management in winter wheat fields toward the end of April. During this period, although both weed density and wheat growth have increased significantly, the germination of newly emerging dicotyledonous and grass-type weeds has ceased, eliminating the need for repeated herbicide applications.

Conclusion: Because winter wheat is sown in narrow rows on the soil surface, herbicide treatments are applied using tractor-mounted sprayers, and the movement of tractor wheels can expose, damage, or destroy a certain portion of the wheat plants. For this reason, combining compatible herbicides and applying them in a single treatment—targeting both dicotyledonous and grass-type weeds simultaneously—serves as an efficient and practical weed-control strategy.

Therefore, we recommend that in the Surkhandarya region—as well as in other regions—Puma Super (1 L/ha) and Granstar (15 g/ha) be mixed and applied in early April, after the winter wheat plants have fully emerged, as an effective method for controlling both dicotyledonous and grass-type weeds in winter wheat fields.

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COMPETENCIES FORMED IN STUDENTS DURING THE TEACHING OF BIOLOGY

Abstract. *This article, first of all, when teaching biology, examines the basic competencies that are and should be developed in students, as well as the basic ideas, theories, laws and concepts of biology, and the formation of a scientific worldview in students. and that it is necessary to create an education system inextricably linked with the formation of a conscious attitude of man towards nature and society, and opinions were also expressed about the requirements for teachers when transmitting biology to students.*

Keywords. *Perfect personality, scientific worldview, thinking, ecological culture, aesthetic education, economic education, physical education, hygienic education, labor education.*

The successful fulfillment of the task of shaping a well-rounded individual and citizen first of all requires the development of a scientific worldview in students. Biology, regarded as one of the leading sciences about nature, carries significant responsibility in forming students' scientific outlook. Therefore, the content of school biology as a subject possesses great potential for fostering a scientific worldview in learners.

Forming a scientific worldview. Students' study of the subject of biology leads them to understand the principles governing the structure, development, and vital functions of biological objects. This knowledge forms the system of students' scientific worldview and convictions. Their scientific worldview is based on understanding biological laws from the perspective of the historical development of the relationship between "nature-human-society." In studying the topic "The Plant as an Integral Organism," included in the botany curriculum, the knowledge that serves as a basis for shaping students' scientific worldview is systematized, and opportunities arise to apply nature conservation skills in practice. This biological knowledge, to a certain extent, determines students' attitudes toward the environment and even their behavior. Therefore, the teacher must prepare thoroughly for teaching this topic and, drawing students' attention to these concepts, guide them toward understanding the importance of natural resources for nature and human life, as well as toward the conclusion that these resources must be preserved.

To cultivate ecological awareness in students, the following tasks must be carried out: Ensuring that students acquire scientific knowledge about the integrity of nature and the interrelationship between society and the natural world, and helping them develop the ecological understanding, skills, and competencies necessary for forming a conscious attitude toward nature; Helping them understand

the broad significance of nature and its components, and recognize the difference between renewable and non-renewable resources; Developing motivations for using natural resources efficiently, preserving environmental cleanliness, participating in greening and resource-replenishing activities, and taking an active role in socially beneficial work.

It should be kept in mind that developing ecological culture in students is a fundamental component of the educational and upbringing efforts aimed at nurturing a well-rounded individual.

Aesthetic education. The National Program for Training Personnel places strong emphasis on developing a rich aesthetic worldview in learners. As is known, aesthetics is the science concerned with the elements, conditions, and principles of beauty. Aesthetic education is aimed at nurturing a sense of beauty, emotions, and artistic taste. Aesthetics fosters a desire to create beauty in one's surroundings—whether in work, in social life, or in personal life. The ability to see, perceive, create, and do things beautifully is one of the key tasks of education. In natural science lessons, the teacher highlights the beauty of plants when studying their organs, flowers, fruits, and plant cover. In doing so, students' attention is drawn to the external beauty of plants, while also teaching them to perceive the hidden beauty of their life processes, their harmony with the environment, and their role in nature and human life. In cultivating students' aesthetic education, the orderliness, comfort, and beauty created in the biology classroom, the school's "living nature corner," and the experimental plots play an important role.

Economic education. The transition of our country to a market economy necessitates providing students with economic education within the teaching-learning process. In botany, zoology, and general biology classes, students become familiar with issues such as increasing the productivity of plants and animals, improving field fertility, fundamentally changing attitudes toward soil and land, and enhancing both the quantity and quality of agricultural products. The teacher must integrate economic education into the lesson in accordance with the content of the topic being studied.

Physical education is an integral part of shaping a well-rounded individual and ensures students' harmonious spiritual-moral, intellectual, and aesthetic development. Physical education yields the expected outcomes—such as preserving and strengthening one's health, adhering to hygienic norms in daily activities, and developing motor skills—only when it is carried out in close connection with students' intellectual and moral upbringing. In the methodology of teaching biology, the issues of physical education are addressed through the study of the human body's structure, vital processes, and development.

Hygienic education is based on knowledge about the conditions necessary for maintaining and strengthening students' health and the ways to create these conditions. In teaching natural science, hygienic education occupies an important place and is implemented in accordance with the content of each topic.

Labor education. Labor education plays an important role in nurturing a well-rounded individual. For this reason, the continuous education system emphasizes an

essential task: guiding students toward choosing a profession that aligns with the current stage of scientific and technological development, the needs of the state and society, and the students' own interests and abilities, while also fostering in them the skills of both work and academic labor. Labor education creates the foundation for implementing the principle of close connection between theory and practice in teaching, developing positive motivation toward productive work, forming a careful attitude toward tools and equipment, and encouraging cooperation among students.

In the process of conducting laboratory and practical exercises included in the curriculum, students develop academic work skills such as using a microscope, preparing micro-preparations and sets, and working independently with textbooks, visual aids, and handouts. These skills may later develop into professional work skills aligned with the occupations the students choose in the future.

In carrying out labor education, the teacher should focus on preparing students psychologically for work activities, improving their work culture, and developing the skills needed to properly organize mental and physical work by applying the theoretical knowledge they have acquired. One of the main tasks of labor education is to cultivate diligence—a core quality of a well-rounded individual. In this process, it is recommended to use our people's rich spiritual heritage—such as hadiths, wise stories, and proverbs—to support students' harmonious moral, intellectual, emotional-volitional, psychological, and physical development.

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PEDAGOGICAL AND PSYCHOLOGICAL COMPETENCE OF THE TEACHER IN BIOLOGY LESSONS

Abstract. *This article provides information about the work of future teachers to improve the educational system in biology lessons, regularly improve their knowledge, skills and qualifications, and develop professional competence.*

Keywords. *competence, education, lesson, communication, education, computer, innovation, biological and pedagogical methodology, teaching methods, cognitive activity of students, subject-subject relations, general, individual and small group learning.*

Improving the education system sets specific requirements for future teachers to work on themselves and to continuously develop their knowledge, skills, and competencies. In fulfilling these important tasks, one of the key objectives is to develop the teacher's professional competence, enhance their innovative activity, and foster interest in innovative processes as well as the skills for scientific inquiry—achieved through the introduction of innovative technologies into the teaching–learning process.

In the interactions that take place during biology lessons, the factor that represents the teachers' shared interests is the common goal. All teachers naturally possess a certain degree of activity and aptitude for achieving this goal. However, if the established goal does not serve the common interests or is not coordinated in a timely and appropriate manner, then future teachers' understanding of that goal—as well as their interpretation of the purpose, content, and essence of mutual communication and relationships—will depend on the level of their pedagogical competence.

In developing professional competence in teachers, the process of mutual interaction is reflected through a number of factors that influence the effectiveness of this process. Based on this idea, we will now discuss the factors that directly affect this process and serve as means for developing teachers' professional competence.

One of the means of developing professional competence in teachers during biology lessons is the environment in which they work and live. This environment is considered an external factor that facilitates the mutual interaction of subjects involved in the process of developing teachers' professional competence. In such an educational–upbringing environment, the process of competence development arises through communication among participants and through the teacher's self-development. This factor is influenced by parents, the social environment, and the modern demands of society.

The sincerity and effectiveness of communication, information exchange, and interpersonal relationships among teachers depend, on the one hand, on the novelty and reliability of the information being shared, and on the other hand, on the extent to which their understanding and competence in a given area have been formed and developed.

In the emergence of communication among them—that is, in the exchange of information and the development of relationships—the underlying goal plays a decisive role in shaping these interactions either positively or negatively. In turn, this also influences the development of the teacher's professional competence.

In modern conditions, a teacher's ability to organize and manage a biological–pedagogical environment is of great importance. This ability, grounded in the teacher's professional specialization and preparedness—including rich pedagogical experience—enables the coordination of teachers' knowledge, skills, and competencies and ensures the effectiveness of the educational process, thereby demonstrating the teacher's professional competence.

It is essential for biology teachers in educational institutions to be able to organize and manage the pedagogical process on a scientific basis, as well as to create a favorable learning environment. To achieve this, they must be knowledgeable about various modern management methods and apply them effectively; be able to identify directions for developmental ideas; consistently study advanced practices and scientific–technical achievements; integrate them into their own work; and, within the teaching–learning process, promote teachers' independent activity in order to increase their subjectivity and engagement.

Organizing education on the basis of modern requirements—such as computerization and the use of computer networks—and introducing new pedagogical technologies into the education system, as well as promoting effective practices, are considered some of the most important tasks in the field of education.

Scientific knowledge is the reflection of objective reality in the human mind. Knowledge that reflects the laws of the surrounding world, the properties of objects and phenomena, and their interrelationships is considered scientific knowledge. Scientific knowledge requires experimentation, investigation, analysis, verification, and similar processes. As humanity expands its scientific understanding, it gradually approaches a more accurate comprehension of reality. There also exist forms of knowledge that have not yet been scientifically proven, and such knowledge still requires human analysis and deeper study. In the educational process, we must provide students with knowledge that has been verified, established, and tested in practice.

The scientific nature of education is necessary in order to create appropriate conditions for students to recognize, understand, and master the laws reflected in the learning materials. Understanding theoretical principles—explaining material on a scientific basis—is an important indicator of this process and defines the characteristics of students' cognitive activity. Although scientific knowledge remains scientific, it may reflect reality at different levels of depth. Scientific explanation is essential at all stages of education and in every class. One of the

functions of the principle of scientificity is to ensure that the system of theoretical information is understood in terms of how deeply it reflects the surrounding world. The principle of scientificity requires that students of all age groups and various educational institutions be provided with scientifically reliable and practically verified information.

In the process of acquiring scientific knowledge, students develop a scientific worldview and firm convictions, and their thinking becomes more advanced. To educate and prepare highly qualified national specialists, it is essential to ensure that learners master scientific knowledge that corresponds to the current level of scientific and technological development. Along with this, it is advisable to familiarize students with scientific research methods. The principle of scientificity applies both to the content and to the methods of teaching—that is, textbooks, instructional materials, curricula, and academic programs must all be developed on a scientific basis.

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ASSESSMENT OF WINTER WHEAT HEIGHT AND LODGING RESISTANCE DURING HERBICIDE-MEDIATED WEED MANAGEMENT

Annotation: *This article describes the effects of various herbicides on weeds found in winter wheat fields. Additionally, the impact of herbicide application on the growth and lodging resistance of winter wheat is discussed.*

Key words: *winter wheat, resistance, herbicide, weeds, yield*

Introduction: Scientific evaluations reveal that research on the adverse influence of weeds on wheat lodging in heavily infested grain fields is scarce, and measures aimed at mitigating this problem have been insufficiently explored. T. Kh. Khodjakulov underscores the necessity of breeding lodging-resistant wheat varieties, given the substantial yield losses associated with lodging in cereal crops.

Furthermore, N. Khalilov proposed optimizing seeding rates as a means of improving lodging resistance in wheat. Contributions by Z. A. Ibragimov in the Kashkadarya region and Sh. Kh. Rizaev in the Samarkand region also represent significant advancements in this research domain.

Purpose of the Study: To assess the height and lodging resistance of winter wheat under the influence of herbicide-based weed control.

Research Object: Winter wheat grown in irrigated fields, along with various types of herbicides used for weed management, served as the primary research objects.

Research Methods: Herbicides were applied to winter wheat plots, followed by systematic monitoring and analysis of the resulting changes.

Results: As a result of scientific work, the results of the irrigated lands of Surkhandarya region between 2005 and 2007 were analyzed and presented in the form of a table.

Height and lodging resistance of winter wheat when using herbicides against weeds. (when herbicides were applied on March 20)

№	Experience options	Height, cm	Lying down, score
		The wax is in the ripening phase X±SX	The wax is in the ripening phaseX±SX
2005 yil			
1	Control option without herbicides (st)	90,8 -	4,0 -
2	Puma super 1,0 l/ga	92,3 ± 1,5	4,5 ± 0,5
3	Granstar 15 g/ga	91,8 ± 1,0	4,5 ± 0,5
4	Puma super 1,0 l/ga Granstar 15 g/ga	95,3 ± 4,5	5 ± 1,0
2006 year			
1	Control option without herbicides (st)	91,0 -	4,0 -
2	Puma super 1,0 l/ga	92,8 ± 1,8	4,5 ± 0,5
3	Granstar 15 g/ga	92,0 ± 1,0	4,5 ± 0,5
4	Puma super 1,0 l/ga Granstar 15 g/ga	96,1 ± 5,1	5 ± 1,0
2007 year			
1	Control option without herbicides (st)	90,2 -	4,0 -
2	Puma super 1,0 l/ga	92,5 ± 2,5	4,5 ± 0,5
3	Granstar 15 g/ga	91,5 ± 1,3	4,5 ± 0,5
4	Puma super 1,0 l/ga Granstar 15 g/ga	95,8 ± 5,6	5 ± 1,0
2005-2007 average over the years			
1	Control option without herbicides (st)	90,7 -	4,0 -
2	Puma super 1,0 l/ga	92,5 ± 1,8	4,5 ± 0,5
3	Granstar 15 g/ga	91,8 ± 1,1	4,5 ± 0,5
4	Puma super 1,0 l/ga Granstar 15 g/ga	95,7 ± 5,0	5 ± 1,0

These and other circumstances require the development of new technologies for the elimination of damage caused by weeds in the fields of winter wheat and other grain crops in each region and variety.

From the results of our experiments, it was found that Puma super (1 l/ha) was used to eliminate common spike and dicotyledonous weeds in the fields where the Kroshka variety of winter wheat is grown under the conditions of the irrigated

grassy barren soil region of the Surkhandarya region.) and Granstar (15 g/ha) herbicides, when applied separately and together on March 20 and April 10, showed an increase in height and dormancy tolerance, depending on the types of herbicides and methods of application, duration.

The maximum growth and lodging of winter wheat coincides with its wax ripening phase. For this reason, one-time monitoring of growth and lodging was carried out in the experimental options where herbicides were used and in the control option where herbicides were not used, and the results are presented in Tables 4.2.3.14 and 4.2.3.15. During this period, the height and lodging indicators of winter wheat changed in favor of experimental options with herbicides, and the maximum display of height and lodging was observed.

When the height of winter wheat was analyzed according to the tabular data, the height of the Kroshka variety at the wax ripening stage when herbicides were applied on March 20 was 90.8 cm in the control option without herbicides, Puma super (1 l/ha), 1.5 cm when Granstar (15 g/ha) was used, and 4.5 cm when Puma super and Granstar were used together at the specified standards.

The same situation was repeated in 2006-2007 when herbicides were mixed together and applied, compared to the variants where herbicides were applied separately and when herbicides were not applied, the height of the plant was 5.1-5.6 cm higher.

When herbicides were applied on March 20, it was observed that the height of wheat was proportional to that of the untreated control. For this reason, it was observed that when herbicides were applied individually on March 20, 2005, the lodging was 4.5 points, and in the control option without herbicides, it was 4. When herbicides were used together, it was observed that the incidence of lodging was 5 points without being observed at all. The same parameters were repeated in 2006-2007, when Puma super (1 l/ha) and Granstar (15 g/ha) herbicides were mixed together, and a single application on March 20 ensured the stunted growth of wheat. The staying power is also guaranteed to be significantly improved.

Conclusion: Therefore, when Puma Super (1 L/ha) and Granstar (15 g/ha) are applied together against grass-type and dicotyledonous weeds in winter wheat fields, the removal of these competing weeds allows the crop to grow more vigorously and uniformly. As a result, wheat plants not only exhibit improved growth and development but also show a marked increase in lodging resistance.

Even when herbicides were applied on April 10, at a time when weeds had fully germinated, the height and lodging resistance of winter wheat closely mirrored the results obtained from the March 20 applications, differing by only 1–2 cm depending on the treatment variant.

Supporting this conclusion, an analysis of the 2005–2007 average data shows that when Puma Super (1 L/ha) was applied on March 20, wheat height increased by 1.8 cm compared to the untreated control. Against the Granstar (15 g/ha) background, plants were 1.1 cm taller, and when both herbicides were applied together, plant height increased by 5.0 cm. In trial variants where the herbicides were used separately, increases ranged from 2.7 to 2.9 cm, while the combined

application resulted in an increase of 5.7 cm. Importantly, this increase in height did not lead to higher rates of lodging.

These findings indicate that the combined application of Puma Super (1 L/ha) and Granstar (15 g/ha) not only effectively eliminates both grass-type and dicotyledonous weeds but also promotes healthy, unrestricted wheat growth and contributes to significantly improved lodging resistance.

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GEOLOGIYADA YER TARAQQIYOTI BOSQICHLARINING QISQACHA TAHLILI

***Annotatsiya.** Ushbu maqolada geologik nuqtai nazardan Yer taraqqiyoti bosqichlari ya'ni geologik vaqt birliklarida yerni rivojlanishini aks ettiruvchi vaqt me'zonlari tahlili keltirilgandir. Xususan, Yer po'sti geologik rivojlanish tarixida voqealarning ketma-ketligi asosida turlicha o'zgarishlar ketma-ketligida hosil bo'lgan tog' jinslari joylashishi jihatlari tahlil qilingan va xulasalar berilgan.*

***Kalit so'zlar:** geologik vaqt birliklari, geoxronologik jadval, stratigrafiya, tog' jinsi, qazilma, matmatik jins, cho'kindi jins, metamorfik jins, intruziv, evolyutsiya, eon, era, davr, iqlim, foydali qazilma, geofizika.*

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BRIEF ANALYSIS OF THE STAGES OF EARTH'S DEVELOPMENT IN GEOLOGY

Abstract. This article presents an analysis of the stages of Earth's development from a geological perspective, i.e., time criteria reflecting the Earth's development in geological time units. In particular, based on the sequence of events in the history of the geological development of the Earth's crust, the features of the location of rocks formed in the sequence of various changes were analyzed and conclusions were drawn.

Keywords: geological time units, geochronological table, stratigraphy, rock, fossil, matmatic rock, sedimentary rock, metamorphic rock, intrusive, evolution, eon, era, period, climate, mineral resource, geophysics.

Kirish. Yer taraqqiy etishini tushunish uchun geologik vaqt birliklari masalasini tushuntiruvchi geoxronologik jadval ishlab chiqildi. Dastlab stratigrafik shkala bilan birlashtirilgan geoxronologik jadval (shkala) 1881-yilda Bolonyada (Italiya) bo'lib o'tgan Xalqaro geologik kongressning 2-sessiyasida davrlarga bo'lingan, davrlar ketma-ketligi sifatida tuzilgan va tasdiqlangan; o'shandan beri doimiy ravishda takomillashtirilmoqda.

Geoxronologiya (yunoncha “geo” – yer, “chronos” – vaqt, “logos” – fan) – Yer qobig'i va unda sodir bo'lgan geologik jarayonlar, shuningdek, tirik organizmlarning evolutsiyasi vaqtini o'rganuvchi fan. U geologik hodisalarni vaqt o'qi bo'ylab joylashtirishga, ularning davomiyligini aniqlashga va bir-biri bilan aloqadorligini tushunishga yordam beradi.

O'rganilish tarixi. Geoxronologik jadvalni yaratish qadim zamonlardan boshlangan, ammo ilmiy asoslari bilan XVII asrdan rivojlana boshlagan:

Nikolaus Steno (XVII asr): Stratigrafiyaning asosiy prinsiplarini (ustma-ust yotish, gorizontallik) shakllantirgan.

William Smith (XVIII-XIX asr): Buyuk Britaniyada qazilma qoldiqlarining (fauna va flora ketma-ketligi) geologik qatlamlarni identifikatsiya qilish va nisbiy yoshini aniqlashdagi ahamiyatini ko'rsatgan. U “ingliz geologiyasining otasi” deb tan olinadi.

Charles Lyell (XIX asr): “Geologiya prinsiplari” asarida uniformitarizm g'oyasini ilgari surgan va kaynozoy erasini davrlarga bo'lishda qazilma molluskalaridan foydalangan.

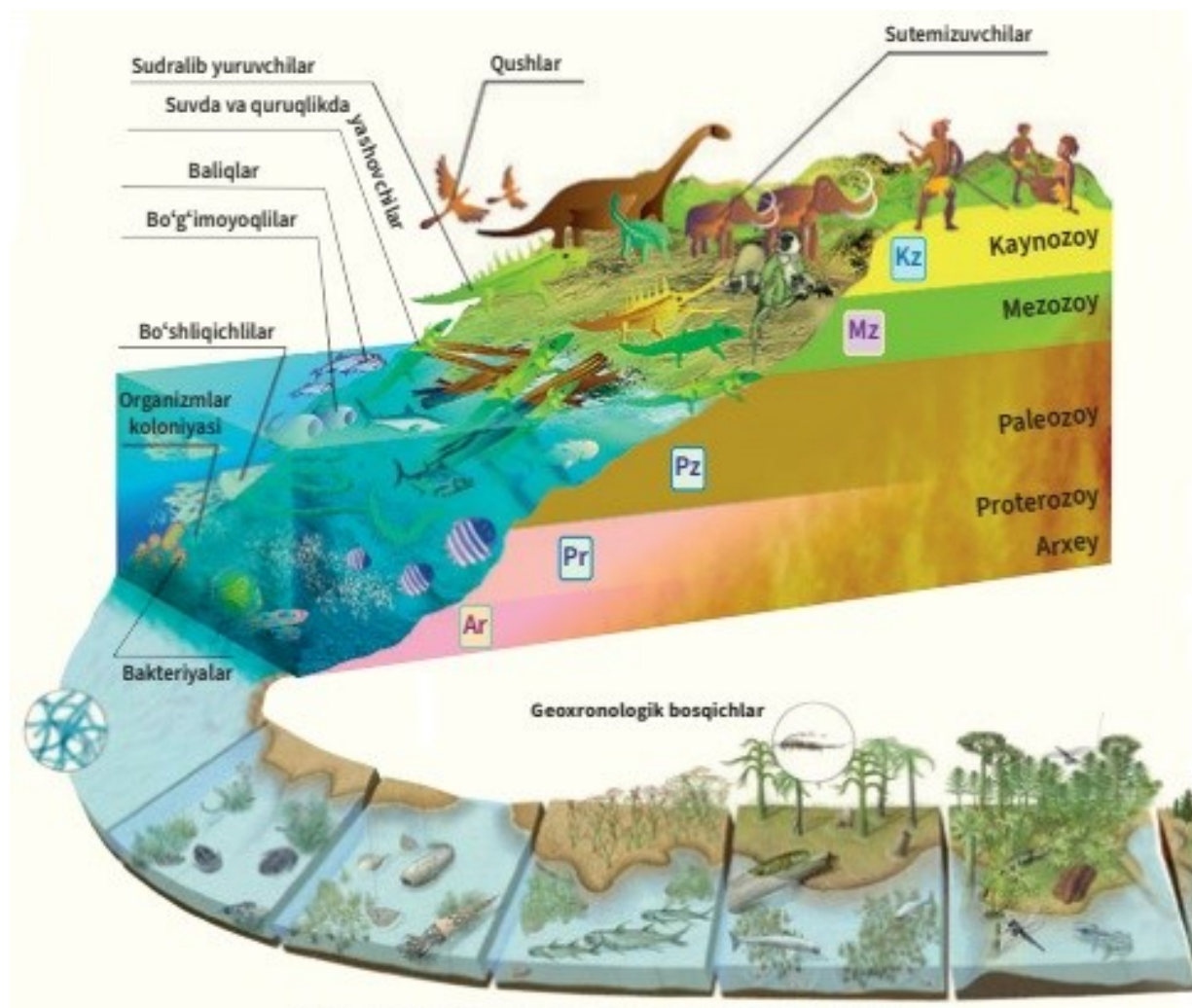
Muhokoma. Yer po'stining geologik rivojlanish tarixida voqealarning ketma-ketligi asosan turlicha kelib chiqishga ega bo'lgan tog' jinslarida qayd etilgan. Ulardan birlari (cho'kindi va vulkanogen) qatlam deb ataluvchi eng oddiy shakllarni hosil qiladi. Ular bir-biriga ketma-ket yotadi. Boshqalari esa (intruziv magmatik jinslar) o'lchami va shakli bo'yicha murakkab tanalarni hosil qiladi. Ularning vujudga kelgan vaqtini aniqlash muhim vazifa hisoblanadi.

Geologiyada nisbiy va mutlaq yosh (geoxronologiya) tushunchalari mavjud.

Geoxronologik jadval – bu Yer sayyorasining 4.6 milliard yillik tarixini xronologik tartibda aks ettiruvchi, geologik vaqtning tasniflovchi jadval (shkala) dir. Bu shkala olimlar uchun Yer qobig'ini tashkil etuvchi tog' jinslari qatlamlarini, ularda saqlanib qolgan hayot qoldiqlarini (fasillarni) va sayyoramizda sodir bo'lgan muhim geologik hodisalarni o'rganishda asosiy qo'llanma bo'lib xizmat qiladi.

Uning yordamida biz hayotning evolyutsiyasi, iqlimning global o'zgarishlari, qit'alarining harakati va Yer yuzasini shakllantirgan boshqa jarayonlarni izchil tushunish imkoniyatiga ega bo'lamiz. Ushbu referatda geoxronologik jadvalning tuzilishi, yoshni aniqlash usullari va Yer tarixining asosiy bosqichlari tahlil qilinadi.

Eon: Eng yirik vaqt birligi, yuz millionlab yoki milliardlab yillarni o'z ichiga oladi. Yer tarixi ikki asosiy eonga bo'linadi: Kembriygacha yoki Kriptozooy va Fanerozooylardir.



1-rasm. Yerning geologik (xronologik) rivojlanishi

Era: Eonning bir qismi bo'lib, hayot shakllaridagi global o'zgarishlar bilan ajralib turadi va beshta nom bilan ataladi Arxey, Proterazoy, Palezoy, Mezazoy va Kaynazoy. Xususan, Fanerozooy eoni tarkibida uchta era bo'lib: Paleozoy (qadimgi hayot), Mezozoy (o'rta hayot) va Kaynozoy (yangi hayot).

Davr: Eraning bo'linishi bo'lib, o'ziga xos tog' jinslari sistemalari va organizmlar guruhining rivojlanishi bilan tavsiflanadi. Masalan, Mezozoy erasi Trias, Yura va Bo'r davrlariga bo'linadi.

Epoxa: Davrning kichikroq qismi bo‘lib, yanada aniqroq geologik va biologik o‘zgarishlarni aks ettiradi. Masalan, Kaynozoy erasining Paleogen davri Paleotsen, Eotsen va Oligotsen epoxalariga bo‘linadi.

Geoxronologik jadvalning mohiyati. Geoxronologik jadval – bu Yerning to‘liq geologik tarixini (taxminan 4.6 milliard yil) vaqt birliklariga bo‘luvchi standartlashtirilgan tizim. U Yer qobig‘i jinslarining shakllanishi, tektonik harakatlar, iqlim o‘zgarishlari va organik dunyoning rivojlanish bosqichlarini aks ettiradi. Jadval ikki asosiy turdagi birliklardan iborat:

Stratigrafik birliklar: Jinslar qatlamlariga (qalinligi bo‘yicha) oid bo‘lib, Yer qobig‘idagi haqiqiy jinslar majmuasini ifodalaydi.

Geoxronologik birliklar: Vaqt oralig‘ini bildiradi va bu vaqt ichida tegishli stratigrafik birliklar shakllanganligini ko‘rsatadi.

Geologik vaqtni aniqlash ikki asosiy usulga asoslanadi: nisbiy va absolut.

Nisbiy geoxronologiya. Bu usul hodisalar yoki jins qatlamlarining ketma-ketligini (ya'ni, qaysi biri oldinroq, qaysi biri keyinroq sodir bo‘lganini) aniqlashga qaratilgan, ammo ularning aniq yoshini bermaydi.

Ustma-ust yotish qonuni (Steno printsipi): Deformatsiyalanmagan cho‘kindi jinslar qatlamlari gorizontol holatda joylashgan bo‘lib, pastki qatlamlar doimo yuqori qatlamlarga nisbatan qadimiydir.

Organik qoldiqlar (fauna ketma-ketligi) qonuni (William Smith): Har bir geologik davr o‘ziga xos tirik organizmlar turlari bilan tavsiflanadi. Shu sababli, bir xil tipdagi qazilma qoldiqlariga ega bo‘lgan jins qatlamlari bir xil yoshda hisoblanadi. Bu biostratigrafiyaning asosidir.

Kesib o‘tish munosabatlari qonuni: Biror jins qatlamini yoki geologik strukturasini kesib o‘tgan boshqa jins yoki struktura, kesib o‘tgan qatlamdan yoshroq bo‘ladi (masalan, magmatik intruziyalar yoki yoriqlar).

Radiometrik yoshni aniqlash: Ba’zi radioaktiv izotoplarining (masalan, uran, toriy, kaliy) vaqt o‘tishi bilan barqaror izotoplarga parchalanish tezligi ma’lum va doimiydir. Jinsdagi radioaktiv “ona” izotop va uning “qiz” izotopining nisbatini o‘lchash orqali jinsning yoshini aniqlash mumkin.

Uran-qo‘rg‘oshin (U-Pb) usuli: Eng aniq usullardan biri, 1 million yildan bir necha milliard yilgacha bo‘lgan yoshdagi jinslar uchun ishlatiladi.

Kaliy-argon (K-Ar) usuli: Vulqon jinslari va ba’zi metamorfik jinslarning yoshini aniqlashda qo‘llaniladi (yuz ming yildan milliard yilgacha).

Rubidiy-stronsiy (Rb-Sr) usuli: Katta yoshdagi magmatik va metamorfik jinslar uchun.

Uglerod-14 (C-14) usuli: Organik moddalar, arxeologik topilmalar va yaqin geologik o‘tmish (taxminan 50 000-60 000 yilgacha) uchun qo‘llaniladi.

Ilmiy va amaliy ahamiyati. Geoxronologik jadval nafaqat fundamental ilmfan uchun, balki amaliy geologik izlanishlar uchun ham beqiyos ahamiyatga ega.

Yer evolutsiyasini tushunish olimlarga Yerning qanday shakllanganini, qit’alarning qanday harakat qilganini, okeanlarning paydo bo‘lishi va yo‘qolishi, iqlimning milliardlab yillar davomida qanday o‘zgarganini va hayotning oddiy organizmlardan murakkab turlargacha qanday rivojlanganini tushunishga yordam

beradi. Har bir geologik davr ma'lum bir jins qatlami, iqlim sharoiti va o'ziga xos biologik olam bilan bog'liq.



2-rasm. Yerning geologik vaqt birliklari.

Foydali qazilmalarni qidirish. Neft, tabiiy gaz, ko'mir, turli metall rudalari va boshqa foydali qazilmalarning shakllanishi ma'lum geologik davrlarga to'g'ri keladi. Geoxronologik jadval yordamida geologlar konlarning ehtimoliy joylashuvini prognoz qilishlari, ularning yoshini aniqlashlari va qidiruv ishlarini samarali rejalashtirishlari mumkin. Masalan, ko'mir konlari asosan toshko'mir davrida, neft va gaz esa mezozoy va kaynozoy davri cho'kindilarida uchraydi.

Paleogeografik rekonstruksiya jadval yordamida qadimgi qit'alarning joylashuvi, dengizlar va okeanlarning tarqalishi, tog' tizmalarining paydo bo'lishi va eroziyasi kabi paleogeografik sharoitlarni qayta tiklash mumkin. Bu Yer yuzasining millionlab yillar davomidagi o'zgarishlarini tushunishga xizmat qiladi.

Geologik xavf-xatarlarni baholashda jadvalni o'rni. O'tmishdagi seysmik faollik, vulqon otilishi yoki relyefdagi boshqa o'zgarishlarni geoxronologik nuqtai nazardan tahlil qilish, hozirgi va kelajakdagi geoxavf-xatarlarni baholashda muhim ahamiyat kasb etadi.

Xulosa. Geoxronologik jadval – bu Yer fanlarining fundamental vositasi bo'lib, u bizga sayyoramizning chuqur tarixini tartibga solish, tushunish va tahlil qilish imkoniyatini beradi. Nisbiy va absolut yoshni aniqlash usullari, shuningdek, stratigrafiya va biostratigrafiya prinsiplari tufayli olimlar Yerning milliardlab yillik evolutsiyasini batafsil o'rganmoqdalar. Jadvalning doimiy takomillashuvi va yangi tadqiqot usullarining joriy etilishi bilan Yerning o'tmishiga oid bilimlarimiz yanada boyimoqda, bu esa kelajakda yanada aniqroq ilmiy kashfiyotlar va amaliy yechimlarga yo'l ochadi.

Tarixiy-geoxronologik jarayonlarni chuqur o'rganish natijasida nafaqat fundamental ilmiy bilimlar boyitiladi, balki hududda ro'y beradigan geologik xavf-xatarlarni oldindan aniqlash, tabiat resurslaridan oqilona foydalanish va barqaror rivojlanishni ta'minlash imkoniyatlari kengayadi.

Kelgusida zamonaviy geologik, geofizik va axborot-kommunikatsiya texnologiyalarini keng qo'llash orqali mintaqaviy monitoring tizimlarini takomillashtirish, zilzila va boshqa xavfli geologik jarayonlarga tayyorgarlikni kuchaytirish, shuningdek, resurslardan foydalanishning ekologik xavfsizligini oshirish dolzarb masala bo'lib qolmoqda.

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REPRESENTATION OF THE CONCEPT “LOVE” IN ENGLISH AND UZBEK PROVERBS

Abstract: *The concept of love occupies a central place in the proverbial systems of both Uzbek and English cultures. This study analyzes the semantic and cultural representations of “love” in proverbs, focusing on life, fidelity, marriage, beauty, wealth, suffering, social relations, and moral values. A comparative analysis highlights the similarities and differences between the two cultures, revealing the ways in which proverbs reflect national worldviews, moral values, and social norms.*

Key words: *paremiology, proverb, love, concept*

Introduction

Language serves as the most important mirror of human thought and culture. As noted, “The close connection of folk proverbs with the life of the people determines their national specificity, while at the same time defining their universal character” [4, 23]. Folk oral creativity, particularly paremiology, embodies a nation’s values, moral principles, and emotional experiences. Proverbs are concise linguistic units that encode cultural wisdom, moral norms, and societal values. The concept of “love” is one of the most prominent thematic fields in both Uzbek and English paremiology. Love is not only a human emotion but also a moral, ethical, and social ideal. In both cultures, proverbs reflect love as an essential part of life, a source of joy and suffering, a bond in family and society, and a challenge requiring fidelity and moral responsibility. This paper aims to compare the portrayal of love in Uzbek and English proverbs, identifying thematic groups and cultural nuances.

METHODOLOGY

The study relies on a corpus-based analysis of Uzbek and English proverbs related to love. Proverbs were grouped into semantic categories including: love as life’s essence, reciprocal love and fidelity, marriage and family, love and beauty, love and wealth, separation and trials, love and suffering, social relations, and human character. Comparative analysis was conducted to determine thematic overlaps and cultural divergences.

Analysis and Discussion

Throughout history, societies have expressed insights gained from lived experience and philosophical reflection through proverbs. This accounts for the thematic diversity and richness that distinguish the proverbs of one nation from another. A proverb is defined as “a short, concise piece of folk wisdom that conveys a grammatically complete thought, often in figurative language” [2, 17]. Proverbs reflect the life experiences of previous generations, their social attitudes, historical

consciousness, psychological states, ethical and aesthetic sensibilities, and positive virtues [3, 5].

P.Bakirov emphasizes that “Before creating a universal classification of proverbs, one must first conduct an in-depth study of the proverb corpus of each language, then comparatively analyze the proverb corpus of a few (two or three) languages, gradually expanding the scope of comparison. This is because proverbs in related and unrelated languages may differ significantly in representing reality from logical-semantic and structural-grammatical perspectives” [1, 53].

To study the concept of “love” from a linguocultural perspective, it is crucial to examine its expression in the paremiological systems of different languages. In English, proverbs about love reflect a wide semantic range, encompassing not only romantic relationships but also friendship, family ties, human affection, and devotion. English proverbs often highlight the emotional depth, individual experience, and personal freedom associated with love, portraying it as a powerful force capable of inspiring, transforming, and challenging human beings. Proverbs such as “*Love conquers all*” or “*Love is blind*” reveal both the strength and vulnerability inherent in human emotional life.

In contrast, Uzbek proverbs embed love within social, ethical, and familial frameworks. While romantic love is celebrated, it is inseparable from the notions of family, moral duty, reciprocity, and community values. Uzbek proverbs emphasize the importance of mutual respect, fidelity, and the role of love in social harmony. Expressions like “*O‘zing suyganni olguncha, o‘zingni suyganni ol*” or “*Muhabbat – uy poydevori, vafo – ustuni*” demonstrate that love is perceived not only as an individual emotion but also as a moral and social value that shapes behavior and strengthens relationships.

A comparative analysis of these two proverbial systems shows that while love is universally recognized as a fundamental human experience, cultural perspectives strongly influence how it is conceptualized and articulated. English proverbs tend to focus on the subjective, emotional, and personal dimensions of love, whereas Uzbek proverbs integrate love with ethical principles, social cohesion, and family life. Therefore, the study of proverbs in both languages provides insights into how cultural norms, values, and worldviews shape the understanding and representation of love.

Love as the Meaning of Life. In both English and Uzbek proverbs, love is often portrayed as central to human existence. English proverbs such as “*Better to have loved and lost than never to have loved at all*” highlight love as a source of fulfillment and essential human experience. Similarly, Uzbek proverbs in the “Love – the meaning of life” group emphasize that life without love is empty, expressing love as the source of vitality, happiness, and inner joy: “*Ishqsiz hayot bo‘lmas, hayotsiz ishq bo‘lmas*” and “*Inson sevgi bilan tirik*”.

A key difference emerges in cultural framing. In English, the emphasis is on individual emotional experience and self-discovery, reflecting personal freedom and subjective understanding. Uzbek proverbs, while acknowledging the joy of

love, link it closely to social and moral dimensions, often embedding familial and communal responsibilities within expressions of love.

Love as a Powerful Force. Both cultures depict love as a transformative power, but the expressions and metaphors differ. English proverbs frequently employ anthropomorphic and war metaphors: *“Love laughs at locksmiths”* or *“All’s fair in love and war”*, emphasizing love’s capacity to overcome obstacles and its unpredictability. Uzbek proverbs similarly recognize love’s potency, often likening it to fire or a testing force: *“Ishq o‘tining oldida do‘zax o‘ti uchquncha yo‘q”*, highlighting that love has both the power to uplift and the potential to challenge human endurance.

While English proverbs emphasize personal agency and emotional courage, Uzbek proverbs often stress endurance, moral resilience, and the importance of navigating love within social and ethical norms.

Love, Fidelity, and Social Values. In English proverbs, fidelity is recognized, but less frequently emphasized in family or social contexts: *“The heart that once truly loves never forgets”* illustrates emotional constancy. Uzbek proverbs, however, strongly associate love with loyalty, social obligations, and moral conduct: *“Muhabbat – uy poydevori, Vafo – ustuni”* and *“Vafosizga berilma, Vafolidan ayrilma”*. Here, love is inseparable from faithfulness, ethical behavior, and the maintenance of social harmony.

Moreover, English proverbs often discuss love’s challenges and conflicts, highlighting personal wisdom: *“Love and a cough cannot be hid”*. Uzbek proverbs reflect a similar awareness but contextualize these challenges within family life, social relations, and communal responsibilities.

Love and Wealth, Beauty, and Age. English proverbs frequently explore love’s interaction with wealth, beauty, and age. Proverbs like *“Love lasts as long as money endures”* or *“To woo is a pleasure in a young man, a fault in an old”* reflect the perception that external circumstances and life stage influence love’s expression. In Uzbek proverbs, love is largely independent of material wealth: *“Sof sevgi sotilmas, yo kesakdek otilmas; Sevgi bozorda sotilmas”*, and inner qualities often outweigh outward beauty: *“Muhabbat chiroy tanlamas”*. Likewise, age is rarely a limiting factor: *“Muhabbat yosh tanlamas”*, emphasizing that genuine love transcends social or material constraints.

These differences illustrate a broader cultural contrast: English proverbs reflect individualistic, experiential perspectives, while Uzbek proverbs integrate love with enduring social values and ethical ideals.

Love in Family, Friendship, and Community. Both English and Uzbek proverbs emphasize the significance of love in family and social relationships, though they reflect their respective cultural priorities.

In English, family love is celebrated through proverbs such as *“A mother’s love is best of all”* and *“You can choose your friends, but you can’t choose your family”*, highlighting the uniqueness, unconditionality, and emotional depth of familial bonds. Friendship is similarly valued, with expressions like *“A true friend*

is one who knows all your faults and still loves you” demonstrating loyalty and emotional support.

In Uzbek culture, family love is even more central, with proverbs linking parental care to moral guidance and social stability: *“O‘g‘lingni sevsang, quldek ishlat”* and *“Ona mehridan ota qahri ortiq”*. Love is expressed through nurturing, discipline, and the upbringing of children. Friendship and neighborly love are also celebrated, but always within social and ethical frameworks: *“Qo‘shni oshi qorin to‘ydirmas, mehr-u oqibatni oshirar”*. This emphasizes reciprocity, responsibility, and moral conduct alongside affection.

The cultural contrast is clear: English proverbs highlight personal choice and emotional resonance, whereas Uzbek proverbs integrate love with duty, social cohesion, and moral propriety.

Love and Homeland. Love in the context of one’s homeland is expressed vividly in both languages. English proverbs tend to focus on the idea of home as a personal and secure space: *“An Englishman’s home is his castle”* and *“There is no place like home”*. Homeland is intertwined with personal comfort, emotional attachment, and protection.

Uzbek proverbs, while also valuing home, extend the concept of love to the nation, combining emotional, moral, and ethical dimensions: *“Tuqqan elga jon tortmasa qon tortadi”* and *“Odam – Vatanga”*. Love of homeland is inseparable from loyalty, defense, and moral responsibility. Here, love is not merely an emotion but an active commitment to family, community, and nation.

This comparison highlights the individualistic versus collectivist tendencies in the respective cultures: English proverbs focus on personal security and comfort, while Uzbek proverbs emphasize moral duty, social cohesion, and collective identity.

Conclusion

The comparative analysis of English and Uzbek proverbs reveals that the concept of ‘love’ is multi-dimensional in both cultures, reflecting emotional, ethical, and social values. In English paremiology, love is primarily associated with personal feelings, individual choice, emotional wisdom, and the transformative power of affection. In Uzbek proverbs, love is deeply connected with social norms, family responsibility, loyalty, moral conduct, and the wellbeing of the community.

While English proverbs often reflect individualism and experiential wisdom, Uzbek proverbs integrate love with social ethics, communal values, and collective harmony. Both systems, however, underscore love as an essential human experience that shapes personal life, social relationships, and cultural identity.

Through the study of proverbs, the linguocultural concept of love provides insights into national character, values, and worldviews, revealing the ways in which language preserves and transmits cultural understanding.

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DISTINCT MODERN FEATURES OF THE CLINICAL COURSE OF ERYSIPELAS

Abstract. *This article analyzes the clinical and epidemiological indicators of 46 patients diagnosed with erysipelas in the Samarkand region. The patients were divided into two groups according to the clinical form of the disease. Epidemiological data showed that erysipelas occurred more frequently among rural residents and elderly individuals in both groups. The findings confirmed that the severe course of erysipelas is associated with recurrence, delayed medical consultation, and the presence of comorbidities.*

Keywords: *erysipelas, epidemiology, clinical form, erythematous form, bullous form, comorbidities.*

Introduction. Erysipelas is an infectious disease caused by β -hemolytic streptococci of group A and is characterized by acute skin inflammation accompanied by allergic reactions. According to epidemiological data, the incidence rate ranges from 12 to 20 cases per 10,000 population. Among infectious diseases, erysipelas ranks fourth after acute respiratory viral infections, acute intestinal infections, and viral hepatitis. The disease is particularly prevalent among elderly patients and individuals with diabetes mellitus or circulatory disorders.

Materials and Methods

A retrospective analysis was conducted using medical records of 46 hospitalized patients diagnosed with erysipelas in the Samarkand region. Patients were grouped according to the clinical form:

- Group 1 (n=32): erythematous form
- Group 2 (n=14): erythematous-bullous form

The analysis included the following parameters: age and sex, clinical form, temperature profile, fever duration, presence of comorbidities, localization of inflammatory lesions, and duration of hospitalization.

Results and Discussion

Epidemiological characteristics

The distribution by place of residence demonstrated:

- Rural population - 58.7%

- Urban population - 41.3%

Age distribution analysis revealed:

- Group 1: predominantly 51-80 years
- Group 2: mainly 2-50 years

Sex distribution:

- Group 1: males - 42%, females - 58%
- Group 2: females - 72%

Hospital stay

- Group 1: 9.25 ± 0.3 days
- Group 2: 12.86 ± 1.0 days

Time from symptom onset to hospitalization:

Group 1:

- Within 3 days - 42%
- On days 4-6 - 36%
- After 7 days - 22%

Group 2:

- On days 4-6 - 39%
- After 7 days - 61%

Temperature and fever duration. In the erythematous form, temperature typically ranged between 38-39°C. In the erythematous-bullous form, fever most commonly did not exceed 38°C.

Fever duration was longer in Group 2, correlating with more severe disease progression.

Comorbidities. Comorbid conditions were identified in 90% of patients in both groups.

Group 1:

- Arterial hypertension - 58%
- Diabetes mellitus - 22%
- Obesity - 23%
- Cardiovascular diseases - 54%

Group 2:

- Varicose vein disease - 32%
- Arterial hypertension - 46%
- Diabetes mellitus - 13%
- Grade 3 obesity - 32%

Localization of inflammation

- Group 1: lower limbs and extremities - 77%
- Group 2: lower limbs and extremities - 92%

The findings indicate that erysipelas is more common among rural residents and is more severe in elderly individuals with metabolic disorders. The prolonged hospitalization and delayed medical consultation in patients with the erythematous-bullous form were identified as major factors contributing to severe progression.

Conclusion. Erysipelas is more prevalent in rural areas (58.7%). The disease is more common in females (58%). Comorbidities were present in 90% of the

patients. The inflammatory focus was predominantly localized in the lower extremities in all clinical forms. The bullous form was associated with more severe clinical progression and longer hospitalization duration.

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DETERMINATION OF CARCINOGENIC SUBSTANCES IN TURKEY MEAT USING CHROMATOGRAPHIC METHODS

Abstract: *The results of samples of turkey meat grown in Uzbekistan, Russia, Tajikistan, and Germany using liquid chromatography-mass spectrometry (LC-MS/MS) to determine the residues of antibiotics (cancerogenic substances) in turkey meat has been analyzed in this article. While the usage of antibiotics in poultry farming increases efficiency, they pose safety and antimicrobial resistance (antibiotic resistance) problems for consumers.*

According to the results of the scientific experiment presented in the article, antibiotic residues were evaluated based on sanitary rules and standards, requirements of standards and technical regulations. The study offers noteworthy conclusions and recommendations for reducing the use of antibiotics, ensuring food safety, and preventing antimicrobial resistance.

Keywords: *turkey meat, antibiotic residues, liquid chromatography-mass spectrometry (LC-MS/MS), antimicrobial resistance, benzyl penicillin, tetracycline, bacitracin, food safety, Sanitary rules and regulations (SanPiN), technical regulations, veterinary control.*

Introduction

Today, turkey meat is widespread among dieters and supporters of a healthy diet, which is due to its low-fat content, high protein levels, and richness in various

vitamins. However, antibiotics are widely used in turkey cultivation to increase efficiency and prevent poultry from contracting diseases. □1□.

In poultry farming, antibiotics are primarily used to prevent and treat diseases. At the same time, antibiotics also help to accelerate the growth of turkeys. Through the use of antibiotics, farms will be able to increase feed efficiency and eliminate diseases. For example, in the United States, turkey growers use antibiotics according to veterinary guidelines, in which medications are used only at the right doses and at the right time □2□.

According to research conducted worldwide from 2013 to 2021, antibiotics were primarily used to treat respiratory diseases and enteritis. Among short-term treatment methods, antibiotics such as tetracycline, penicillin, benzyl penicillin, and bacitracin and lincomycin were widely used. Furthermore, the duration of the antibiotic application period was often 4 to 7 days, depending on the type of disease □3□.

One of the most important issues related to the use of antibiotics is the emergence of antibiotic resistance (antimicrobial resistance). Some bacteria become resistant to antibiotics, which leads to negative consequences not only for birds, but also for humans. Therefore, in recent years, many countries, including the European Union, have taken strict measures to reduce the use of antibiotics in turkey cultivation and use them only according to veterinary guidelines □4□.

In Europe, for example, rules for regulating the use of antibiotics and their implementation under veterinary supervision have been introduced. This ensures that antibiotics can only be used for disease prevention or treatment. As a result, in recent years, the use of antibiotics has decreased, and strategies have been implemented aimed at reducing antimicrobial resistance in poultry.

Many countries, including Uzbekistan, have established acceptable standards for antibiotic residues in food products. These standards were introduced to ensure food safety and limit the use of antibiotics. Therefore, to ensure that turkey meat products meet the requirements and standards of the domestic and international markets, it is important to analyze the antibiotic residues contained in them and check their compliance with regulatory and technical documents.

Antibiotic residues in various samples of turkey meat grown in Russia, Tajikistan, Uzbekistan, and Germany were analyzed using liquid chromatography-mass spectrometry (LC-MS) has been studied. LC-MS is a modern technological device that allows for the study of antibiotic residues in poultry products with high accuracy, allowing for in-depth analysis of quantitative and qualitative aspects of components on a micro scale.

A brief diagram of the procedure for determining antibiotic residues in turkey meat samples using this method is presented in Table 1 below:

Table 1**Method for determining antibiotic residues in turkey meat samples**

№	Stage	Description
1	Equipment Set up	Preparation of the LC-MS/MS system with necessary components: mass spectrometer, chromatographic column, and accessories.
2	Preparation of Reagents	Preparation of methanol-water solutions, ammonium sulfate, and standard solution (water/methanol 0.5%, formic acid).
3	Preparation of Calibration Solution	Preparation of standard solutions of benzylpenicillin, tetracycline, and bacitracin with concentrations of 0.1–2 ppb*.
4	Sample Preparation	Homogenization of 5 g of turkey meat, extraction of antibiotics with methanol, followed by purification and centrifugation.
5	Chromatographic Analysis	Introduction of the sample into the LC-MS/MS system, separation and identification of antibiotic residues, and data recording.
6	Data Analysis	Comparison of analysis data with the calibration curve to determine the amount of antibiotic residues and verification against regulations.
7	Reporting	Documentation of results and verification of compliance with safety standards for antibiotic residue levels.

Note: 1 microgram/liter (µg/L).

The following regulatory documents on the maximum permissible amount of antibiotic residues in turkey meat are valid in the territory of Uzbekistan [6]:

Sanitary rules and regulations (SanPiN): Order of the Chief State Sanitary Doctor of the Ministry of Health of the Republic of Uzbekistan "Hygienic standards for the safety of food products." This document establishes the maximum permissible amount of harmful substances, including antibiotic residues, in food products.

2. Technical regulation: Resolution of the Cabinet of Ministers of the Republic of Uzbekistan dated January 22, 2018 No. 36 "General technical regulation on the safety of meat and meat products." This regulation includes requirements for the safety of meat products, including antibiotic residues. The maximum permissible levels of antibiotic residues (MPLs) in turkey meat, as specified by the sanitary norms (SanPiN) and technical regulations, are presented in **Table 2**.

Table 2: Maximum Permissible Levels of Antibiotic Residues in Turkey Meat According to SanPiN and the Technical Regulation of Uzbekistan

Antibiotic Type	SanPiN (MPL) (mg/kg)	Technical Regulation (MPL) (mg/kg)
Tetracyclines	Not permitted, <0.01	Not permitted, <0.01
Bacitracin	Not permitted, <0.02	Not permitted, <0.02
Benzylpenicillin	Not permitted, <0.01	Not permitted, <0.01

Note: 1 ppb = 0.001 microgram/kg.

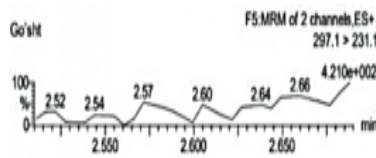
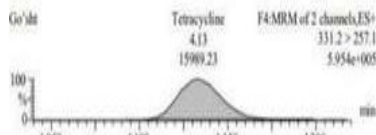
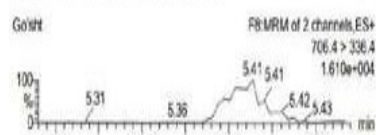
Both documents set the maximum permissible amount of antibiotic residues in turkey meat at the same level. These requirements are aimed at protecting consumer health and ensuring food safety [7].

Residues of three antibiotic names: benzylpenicillin, tetracycline, and bacitracin were analyzed using a chromatographic method (LC-MS/MS) for turkey meat samples grown in different regions (Fig. 1). The following results were obtained based on the spectrogram. The residual amount of antibiotics in turkey meat samples was determined using a high-performance liquid chromatography water Xevo TQ-S cronos (LC-MS/MS) +ESI Mass detector in various modes using an ACQUITY UPLC BEH C18 2.1×100 mm, 1.7 µm column. Below are standard samples of the antibiotics Benzylpenicillin, Tetracycline, and Bacitracine in Table 3:

Table 3:
Chromatograms of Standard Samples of Benzylpenicillin, Tetracycline, and Bacitracin

Compound Name: Benzilpenicilin STD_1 0.1PPB+20 F5.MRM of 2 channels,ES+ 297.1 > 249.1 2.273e+004 100 0 Benzilpenicilin:2.61;567.44 2.5502.6002.650min <table><tr><th></th><th>Name</th><th>Sample Text</th><th>RT</th><th>Height</th><th>Area</th><th>ppb</th></tr><tr><td>1</td><td>STD_1</td><td>0.1PPB+20</td><td>2.61</td><td>22559</td><td>567.44</td><td>0.0895</td></tr></table>		Name	Sample Text	RT	Height	Area	ppb	1	STD_1	0.1PPB+20	2.61	22559	567.44	0.0895	Standard Sample of Benzylpenicillin: Retention Time (RT): 2.61 minutes Wavelength: 297.1 > 249.1 nm Signal Height: 22,559 Signal Area: 567.44
	Name	Sample Text	RT	Height	Area	ppb									
1	STD_1	0.1PPB+20	2.61	22559	567.44	0.0895									
Compound Name: Tetracycline STD_1 0.1PPB+20 F4.MRM of 2 channels,ES+ 331.2 > 245.1 5.210e+005 100 0 Tetracycline 4.13 13696.66 4.0504.1004.1504.200min <table><tr><th></th><th>Name</th><th>Sample Text</th><th>RT</th><th>Height</th><th>Area</th><th>ppb</th></tr><tr><td>1</td><td>STD_1</td><td>0.1PPB+20</td><td>4.13</td><td>520460</td><td>13696.66</td><td>0.0928</td></tr></table>		Name	Sample Text	RT	Height	Area	ppb	1	STD_1	0.1PPB+20	4.13	520460	13696.66	0.0928	Standard Sample of Tetracycline: Retention Time (RT): 4.13 minutes Wavelength: 331.2 > 245.1 nm Signal Height: 20,460
	Name	Sample Text	RT	Height	Area	ppb									
1	STD_1	0.1PPB+20	4.13	520460	13696.66	0.0928									
Compound Name: Bacitracin STD_3 0.5+100 F8.MRM of 2 channels,ES+ 706.4 > 354.4 1.867e+005 100 0 Bacitracin 5.33 4706.02 5.2505.3005.3505.400min <table><tr><th></th><th>Name</th><th>Sample Text</th><th>RT</th><th>Height</th><th>Area</th><th>ppb</th></tr><tr><td>1</td><td>STD_3</td><td>0.5+100</td><td>5.33</td><td>186625</td><td>4706.02</td><td>0.4985</td></tr></table>		Name	Sample Text	RT	Height	Area	ppb	1	STD_3	0.5+100	5.33	186625	4706.02	0.4985	Standard Sample of Bacitracin: Retention Time (RT): 5.33 minutes Wavelength: 706.4 > 354.4 nm Signal Height: 186,625 Signal Area: 4,706.02
	Name	Sample Text	RT	Height	Area	ppb									
1	STD_3	0.5+100	5.33	186625	4706.02	0.4985									

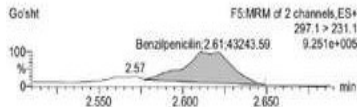
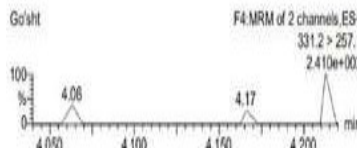
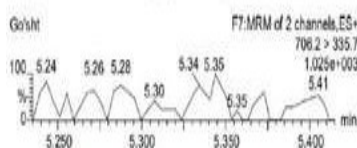
Figure 1: Chromatogram of the Turkey Meat Sample Produced in Russia.

Method: C:\MassLynx\Mycotoxins.PRO\MethDB\Mycotoxins_Uztest.mdb 10 May 2024 15:32:51 Calibration: C:\MassLynx\Mycotoxins.PRO\CurveDB\Mycotoxins.cdb 10 May 2024 16:33:01 Compound Name: Benzilpenicilin Sample Name: Go'sht (Rossiya) Go'sht F5.MRM of 2 channels, ES+ 297.1 > 231.1  <table><tr><th>Name</th><th>Sample Text</th><th>RT</th><th>Height</th><th>Area</th><th>ppb</th></tr><tr><td>Go'sht (Rossiya)</td><td></td><td></td><td></td><td></td><td></td></tr></table>	Name	Sample Text	RT	Height	Area	ppb	Go'sht (Rossiya)						Benzylpenicillin: • Wavelength: 297.1 > 234.1 nm • Retention Time (RT): 2.62 minutes • Signal Area: 4.210e+002 • Concentration: Not determined, but signal detected.
Name	Sample Text	RT	Height	Area	ppb								
Go'sht (Rossiya)													
Compound Name: Tetracycline Sample Name: Go'sht (Rossiya) Go'sht Tetracycline F4.MRM of 2 channels, ES+ 331.2 > 257.1 5.954e-005  <table><tr><th>Name</th><th>Sample Text</th><th>RT</th><th>Height</th><th>Area</th><th>ppb</th></tr><tr><td>Go'sht (Rossiya)</td><td>Go'sht</td><td>4.13</td><td>573649</td><td>15989.23</td><td>0.1062</td></tr></table>	Name	Sample Text	RT	Height	Area	ppb	Go'sht (Rossiya)	Go'sht	4.13	573649	15989.23	0.1062	Tetracycline: • Wavelength: 331.2 > 257.1 nm • Retention Time (RT): 4.13 minutes • Signal Height: 104,372 • Signal Area: 123,015.27 • Concentration (ppb): 89.106
Name	Sample Text	RT	Height	Area	ppb								
Go'sht (Rossiya)	Go'sht	4.13	573649	15989.23	0.1062								
Compound Name: Bacitracin Sample Name: Go'sht (Rossiya) Go'sht F6.MRM of 2 channels, ES+ 706.4 > 336.4 1.610e-004  <table><tr><th>Name</th><th>Sample Text</th><th>RT</th><th>Height</th><th>Area</th><th>ppb</th></tr><tr><td>Go'sht (Rossiya)</td><td></td><td></td><td></td><td></td><td></td></tr></table>	Name	Sample Text	RT	Height	Area	ppb	Go'sht (Rossiya)						Bacitracin: • Wavelength: 712.2 > 352.1 nm • Retention Time (RT): 5.33 minutes • Signal Height: Not determined • Signal Area: 1.610e+004 • Concentration: Not determined, but signal detected.
Name	Sample Text	RT	Height	Area	ppb								
Go'sht (Rossiya)													

As can be seen from the results of Figure 1, the content of tetracycline in the chromatogram of turkey meat samples grown in Russia is 89.106 ppb (0.089 mg/kg), which is higher than the maximum permissible amount (10 ppb or 0.01 mg/kg) established by the requirements of SR&N and TR. This result indicates that the meat does not meet regulatory requirements.

Figure 2

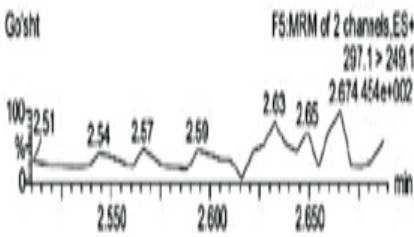
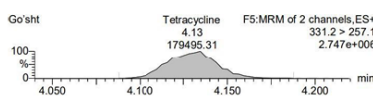
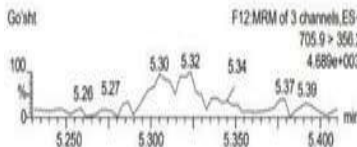
Chromatogram of an example of turkey meat grown in Tajikistan

Compound Name: Benzilpenicilin Sample Name: Go'sht (Tojikiston) <table><thead><tr><th>Name</th><th>Sample Text</th><th>RT</th><th>Height</th><th>Area</th><th>ppb</th></tr></thead><tbody><tr><td>Go'sht (Tojikiston)</td><td>Go'sht</td><td>2.61</td><td>182650</td><td>43243.59</td><td>101.522</td></tr></tbody></table>	Name	Sample Text	RT	Height	Area	ppb	Go'sht (Tojikiston)	Go'sht	2.61	182650	43243.59	101.522	Benzylpenicillin: - Wavelength: 297.1 > 231.1 nm - Retention Time (RT): 2.61 minutes - Signal Height: 182,650 - Signal Area: 43,243.59 - Concentration (ppb): 101.522
Name	Sample Text	RT	Height	Area	ppb								
Go'sht (Tojikiston)	Go'sht	2.61	182650	43243.59	101.522								
Compound Name: Tetracycline Sample Name: Go'sht (Tojikiston) <table><thead><tr><th>Name</th><th>Sample Text</th><th>RT</th><th>Height</th><th>Area</th><th>ppb</th></tr></thead><tbody><tr><td>Go'sht (Tojikiston)</td><td></td><td></td><td></td><td></td><td></td></tr></tbody></table>	Name	Sample Text	RT	Height	Area	ppb	Go'sht (Tojikiston)						Tetracycline: - Wavelength: 331.2 > 257.1 nm - Retention Time (RT): 4.31 minutes - Signal Height: Not determined - Signal Area: 2.41e+002 - Concentration (ppb): Not determined
Name	Sample Text	RT	Height	Area	ppb								
Go'sht (Tojikiston)													
Compound Name: Bacitracin Sample Name: Go'sht (Tojikiston) <table><thead><tr><th>Name</th><th>Sample Text</th><th>RT</th><th>Height</th><th>Area</th><th>ppb</th></tr></thead><tbody><tr><td>Go'sht (Tojikiston)</td><td></td><td></td><td></td><td></td><td></td></tr></tbody></table>	Name	Sample Text	RT	Height	Area	ppb	Go'sht (Tojikiston)						Bacitracin: - Wavelength: 706.2 > 335.7 nm - Retention Time (RT): 5.41 minutes - Signal Height: Not determined - Signal Area: 1.025e+003 - Concentration (ppb): Not determined, but signal detected
Name	Sample Text	RT	Height	Area	ppb								
Go'sht (Tojikiston)													

A sample of turkey meat grown in Tajikistan showed that the residual doses of the antibiotics Benzyl penicillin, Tetracycline, and Bacitracin, identified in Figure 2, were twice as high as the normative requirements in practical regulatory documents for Benzyl penicillin, i.e., 101.522 ppb, exceeding the normative limits. The results of this analysis were adapted for evaluation in accordance with the requirements of the SR&N and international organizations: 1 ppb = 0.001 mg/kg.

Benzyl penicillin: Amount determined by analysis: 101.522 ppb = 0.101 mg/kg.

According to regulatory restrictions of TR and SR&N, the maximum permissible amount of benzyl penicillin in food products is typically set at 0.01 mg/kg (10 ppb). The amount found as a result of this analysis shows that it is ten times higher than the established threshold.

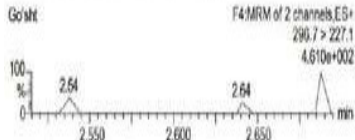
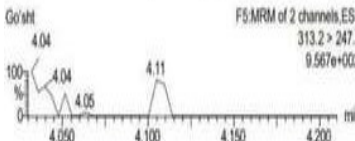
Compound Name: Benzilpenicilin Sample Name: Go'sht (Uzbekistan)  <table><tr><th></th><th>Name</th><th>Sample Text</th><th>RT</th><th>Height</th><th>Area</th><th>ppb</th></tr><tr><td></td><td>Go'sht (Uzbekistan)</td><td></td><td></td><td></td><td></td><td></td></tr></table>		Name	Sample Text	RT	Height	Area	ppb		Go'sht (Uzbekistan)						Benzylpenicillin: • Wavelength: 297.1 > 249.1 nm • Retention Time (RT): 2.61 minutes • Signal Area: 2.674e+002 • Concentration (ppb): Not determined
	Name	Sample Text	RT	Height	Area	ppb									
	Go'sht (Uzbekistan)														
Compound Name: Tetracycline Sample Name: Go'sht (Uzbekistan)  <table><tr><th></th><th>Name</th><th>Sample Text</th><th>RT</th><th>Height</th><th>Area</th><th>ppb</th></tr><tr><td></td><td>Go'sht (Uzbekistan)</td><td>Go'sht</td><td>4.13</td><td>685130</td><td>179495.31</td><td>41.211</td></tr></table>		Name	Sample Text	RT	Height	Area	ppb		Go'sht (Uzbekistan)	Go'sht	4.13	685130	179495.31	41.211	Tetracycline: • Wavelength: 331.2 > 257.1 nm • Retention Time (RT): 4.13 minutes • Signal Height: 685,130 • Signal Area: 179,495.31 • Concentration (ppb): 41.211
	Name	Sample Text	RT	Height	Area	ppb									
	Go'sht (Uzbekistan)	Go'sht	4.13	685130	179495.31	41.211									
Compound Name: Bacitracin Sample Name: Go'sht (Uzbekistan)  <table><tr><th></th><th>Name</th><th>Sample Text</th><th>RT</th><th>Height</th><th>Area</th><th>ppb</th></tr><tr><td></td><td>Go'sht (Uzbekistan)</td><td></td><td></td><td></td><td></td><td></td></tr></table>		Name	Sample Text	RT	Height	Area	ppb		Go'sht (Uzbekistan)						Bacitracin: • Wavelength: 706.1 > 335.4 nm • Retention Time (RT): 5.35 minutes • Signal Area: 4.689e+003 • Concentration (ppb): Not determined
	Name	Sample Text	RT	Height	Area	ppb									
	Go'sht (Uzbekistan)														

The residual content of tetracycline in meat (Fig. 3) was 41.211 ppb. This is a very low level, which is significantly lower than the regulatory limits compared to the permissible doses (0.041211 mg/kg) in the requirements of the SR&N and TR. Therefore, this quantity indicates that meat is safe for consumption.

Figure 4

Chromatogram of a German turkey meat sample

Figure 5: Chromatogram of the Turkey Meat Sample Produced in Germany.

Compound Name: Benzylpenicillin Sample Name: Go'sht (Germaniya)  <table><tr><th>Name</th><th>Sample Text</th><th>RT</th><th>Height</th><th>Area</th><th>ppb</th></tr><tr><td>Go'sht (Germaniya)</td><td></td><td></td><td></td><td></td><td></td></tr></table>	Name	Sample Text	RT	Height	Area	ppb	Go'sht (Germaniya)						Benzylpenicillin: • Retention Time (RT): 4.05 minutes • Signal Height: 460 • Signal Area: 4,610.00 • Concentration (ppb): Not determined, but signal detected
Name	Sample Text	RT	Height	Area	ppb								
Go'sht (Germaniya)													
Compound Name: Tetracycline Sample Name: Go'sht (Germaniya)  <table><tr><th>Name</th><th>Sample Text</th><th>RT</th><th>Height</th><th>Area</th><th>ppb</th></tr><tr><td>Go'sht (Germaniya)</td><td></td><td></td><td></td><td></td><td></td></tr></table>	Name	Sample Text	RT	Height	Area	ppb	Go'sht (Germaniya)						Tetracycline: • Retention Time (RT): 4.20 minutes • Signal Height: 957.00 • Signal Area: 9.567e+002 • Concentration (ppb): Not determined, but signal detected
Name	Sample Text	RT	Height	Area	ppb								
Go'sht (Germaniya)													
Compound Name: Bacitracin Sample Name: Go'sht (Germaniya)  <table><tr><th>Name</th><th>Sample Text</th><th>RT</th><th>Height</th><th>Area</th><th>ppb</th></tr><tr><td>Go'sht (Germaniya)</td><td></td><td></td><td></td><td></td><td></td></tr></table>	Name	Sample Text	RT	Height	Area	ppb	Go'sht (Germaniya)						Bacitracin: • Retention Time (RT): 5.37 minutes • Signal Height: 712.4 • Signal Area: 4.466e+003 • Concentration (ppb): Not determined, but signal detected
Name	Sample Text	RT	Height	Area	ppb								
Go'sht (Germaniya)													

Conclusions and suggestions. We can see that the residues of benzyl penicillin, tetracycline, and bacitracin antibiotics in turkey meat grown in Germany (Fig. 4) are below the permissible minimum doses established by the TR and SR&N documents.

The results of the analysis of turkey meat samples grown in Uzbekistan, Russia, Tajikistan, and Germany may differ from each other, and these differences are related to production practices, veterinary regulations, and antibiotic use strategies in different countries. The following conclusions can be drawn from the analysis of turkey meat samples grown in these countries:

1. The presence of antibiotic residues:

Analysis of turkey meat samples grown in Uzbekistan, Russia, and Tajikistan revealed the presence of various antibiotic residues:

- Russia: The detected amount of tetracycline exceeded the limiting amount established by the regulatory documents of Uzbekistan. Concentrations for the antibiotics benzylpenicillin and bacitracin were not determined, but there were

retention times and signal signs for them, indicating the presence of residual substance traces.

- Tajikistan: Although the concentration of benzylpenicillin (0.101522 mg/kg) was higher than the permissible antibiotic residue, as well as for the antibiotics Tetracycline and Bacitracin, it was not determined, but the presence of signal traces was detected. This is a turkey raised in Tajikistan. This indicates that antibiotics are more widely used in turkey meat products grown in Tajikistan.

- Germany: Antibiotic residues were not detected in turkey meat samples, but their signals are present. Antibiotic residues are below the minimum norm established by the TR and SanPiN documents.

- Uzbekistan: Tetracycline residues have been identified, but due to very low concentrations, they meet the standards established by the TR and SanPiN requirements.

2. Compliance with international and domestic regulatory documents [8, 9]:

- Comparison of the analysis results with the international maximum permissible doses (IMP) showed that the amount of antibiotics in the sample of turkey meat grown in Tajikistan exceeded the permissible norms in some cases. This situation can lead to problems related to the export of this product and consumer safety.

3. Local production and control:

The relatively low antibiotic residues in turkey meat samples in Uzbekistan indicate that the country complies with veterinary control and the rules for the use of antibiotics in accordance with established procedures.

4. Methods of analysis and differences in results:

- While samples of turkey meat were examined using different analytical methods in each country, the accuracy of each method and the data processing rules may vary. For this reason, although the presence of some antibiotics has been established, their concentrations are not indicated.

- Also, the differences in the results of the analysis depend on the strictness of the rules for the use of antibiotics and control measures.

5. General recommendations: High levels of antibiotic residues in turkey meat grown in Tajikistan indicate the need for increased control over the use of antibiotics in this country.

- Residues found in turkey meat samples from Uzbekistan, Russia and Germany are below the limits set by international and national regulations, which allows us to conclude that these products are safe for consumers.

Based on the above, it can be concluded that although antibiotics are an important stimulant for increasing efficiency in turkey meat production, their excessive use increases the risk of antimicrobial resistance. Therefore, producers should use antibiotics carefully and strengthen biosecurity measures.

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**SUV RESURLARIDAN IQLIM O'ZGARISHI SHAROITIDA SAMARALI
FOYDALANISH MUAMMOLARI
(BUXORO VILOYATI MISOLIDA)**

Annotatsiya: *Iqlim o'zgarishi va antropogen omillar natijasida degradasiyaga uchragan maydonlar ortib bormoqda. Ushbu maqolada Buxoro viloyatidagi kollektor suvlaridan sug'oriladigan yerlarni sug'orish va ulardan sho'r yuvishda foydalanish masalalari yoritilgan. Viloyatdagi markaziy kollektor-zovurlarning tuzilishi, asosiy funktsiyasi, meliorativ ahamiyati hamda mavjud muammolari tahlil qilingan. Shuningdek, suv resurslaridan samarali foydalanish va ekologik barqarorlikni ta'minlash fikr mulohazalar yuritilgan. Sug'oriladigan maydonlarning tumanlar kesimida o'zgarish dinamikasi ham yoritilgan.*

Kalit so'zlar: *kollektor-drenaj tizimi, ikkilamchi foydalanish, sho'r yuvish, sizot suvlari, sho'rlanish, melioratsiya, suv resurslari, ekologik xavfsizlik.*

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**PROBLEMS OF EFFECTIVE USE OF WATER RESOURCES IN
THE CONDITIONS OF CLIMATE CHANGE
(ON THE EXAMPLE OF BUKHARA REGION)**

Abstract: As a result of climate change and anthropogenic impacts, land areas susceptible to degradation are increasing. This article examines the irrigation of lands supplied by collector water in the Bukhara region and their use for salt leaching. The structure, main functions, reclamation value, and existing problems of the region's central collector and water supply systems are analyzed.

Furthermore, issues related to the efficient use of water resources and ensuring environmental stability are considered.

The dynamics of changes in the area of irrigated land in the region are also discussed.

Keywords: collector and drainage system, recycling, brine flushing, wastewater, salinization, land reclamation, water resources, environmental safety.

Kirish. Hozirgi kunda iqlim o'zgarishi jarayonlari butun dunyoda ekologik muammolarning kuchayishiga olib kelmoqda. Havo haroratining ortishi, yog'in miqdorlarining kamayishi va qurg'oqchilik hodisalarining tez-tez takrorlanishi natijasida suv resurslari taqchilligi tobora sezilarli darajada bo'lib bormoqda. Suv inson hayoti, qishloq xo'jaligi, sanoat va atrof-muhit uchun eng muhim tabiiy resurslardan biri bo'lib, uning etishmovchiligi iqtisodiy va ijtimoiy barqarorlikka salbiy ta'sir ko'rsatadi.

Jahonning ko'pgina rivojlangan mamlakatlarida sug'orma suvlarning sifatini, sug'oriladigan maydonlarda hosil bo'ladigan kollektor-zovur suvlarining minerallasuv darajasi, miqdori, sarfi va sifatini aniqlash bo'yicha ko'plab ilmiy tadqiqot ishlari olib borilgan. Kollektor-zovur suvlarining hosil bo'lishi va o'zgarishlari bo'yicha mamlakatimizda V.A.Duxovniy, S.I.Xarchenko, Sh.A.Muradov, V.I. Sokolov va E.I.Chembarisovlarning ilmiy tadqiqot ishlarida o'z aksini topgan.

Respublika xalq xo'jaligining eng yirik tarmog'i bo'lgan qishloq xo'jaligi mamlakat iqtisodiyoti rivojlanishida muhim o'rin tutadi. Respublikamiz mustaqillikka erishgandan so'ng bu sohani rivojlantirish maqsadida mulkchilikning yangicha shakllari teng huquqli asosda ravnaq topishini ta'minlash kabi dolzarb masalalariga alohida e'tibor berilmoqda. YUrtimizda qabul qilinayotgan qonunlar, jumladan, O'zbekiston Respublikasini rivojlantirish bo'yicha "O'zbekiston-2030" strategiyasida "Tuproq qoplamali kanallarni beton qoplamaga hamda ichki sug'orish tarmoqlarining yopiq quvurli sug'orish tizimlariga o'tkazish bo'yicha yetti yillik dastur doirasida irrigatsiya tizimi va sug'orish tarmoqlarining foydali ish koeffitsienti ko'rsatkichini 0,73 gacha yetkazish"³⁰ ikkilamchi suv resurslaridan ya'ni kollektor-zovur suvlaridan samarali foydalanish masalalari nazarda tutilgan. 2030 yilga kelib, aholi soni 40 mln kishiga etishi bashorat qilingan bo'lib, bunday sharoitda suv tanqisligi darajasi 13-14% dan 44-46% ga etishi mumkin. Qo'shimcha sug'orish manbai sifatida bizga o'n millionlab suvni o'zida saqlayotgan kollektor-zovur suvlaridan qayta foydalanish yordam bera oladi.

O'zbekiston hududida, xususan Buxoro vohasi ham iqlim o'zgarishidan kuchli ta'sir ko'rayotgan mintaqalardan biridir. Bu hududda tabiiy suv manbalari cheklangan bo'lib, asosiy suv ta'minoti transchegaraviy daryolarga, yer osti suvlariga va sun'iy irrigatsiya tizimlariga bog'langan. Shu sababli suv resurslaridan oqilona va samarali foydalanish, ularni tejash hamda qayta foydalanish masalalari

³⁰Ўзбекистон республикаси Президентининг Фармони, 11.09.2023 йилдаги ПФ-158-сон.

bugungi kunda nihoyatda dolzarbdir. Sug'orish suvlarining yildan-yilga kamayib borayotganligi qishloq xo'jaligida kollektor-zovur suvlaridan qayta foydalanish (daryo suvi bilan aralashtirib yoki 1/1 va 1/2 nisbatda) muhim ahamiyat kasb etadi.

Buxoro viloyati sug'oriladigan dehqonchilik rivojlangan hududlardan biri sanaladi. Mintaqada tabiiy iqlim quruq bo'lib, sug'orish suvlariga bo'lgan talab juda yuqori hisoblanadi. Sug'orish jarayonida hosil bo'ladigan ortiqcha suvlar va sizot suvlarining ko'tarilishi natijasida tuproq sho'rlanishiga olib keladi. Shu boisdan, viloyatda **kollektor-zovur tizimlari** barpo etilgan bo'lib, ular orasida **tumanlararo** (Shimoliy, Markaziy Buxoro, Oyoqog'itma) **kollektor-zovur tarmoqlari** alohida o'rin tutadi [5].

Tadqiqot ob'ekti. Viloyatdagi tumanlararo kollektor-zovurlar (Markaziy Buxoro, SHimoliy, Oyoqog'itma va boshqlar), Amu-Buxoro mashina kanali va xo'jalikaro kollektor-zovur suvlarining shakllanish xususiyatlarini aniqlash, tumanlar kesimida kollektor-zovurlarning gidrologik ko'rsatkichlari, ulardan qo'shimcha suv manbai sifatida foydalanishdan iboratdir.

Tadqiqot natijalari va ularning muhokamasi.

Kollektor-zovur tarmog'ining suv yig'uvchi qismidan kelayotgan suvni qabul qilib, sug'oriladigan maydondan chiqarib yuboriladigan ochiq kanal yoki drenaj quvuri hisoblanadi. Kollektorlar tumanlararo, xo'jaliklararo va xo'jalik ichki turlariga bo'linadi. Odatda kollektorlar pastliklardan va qishloq xo'jalik ekinlari ekiladigan hudud chegaralari bo'ylab o'tkaziladi. Viloyatda sug'oriladigan maydonlarining gidrogeologik meliorativ sharoiti o'ziga xos xususiyatlarga ega bo'lib, respublikaning janubiy viloyatlari singari murakkab hisoblanadi. Buxoro viloyatida gidrogeologik meliorativ sharoit, asosan sizot suvlari gidrologik hamda gidrokimyoviy rejimiga bog'liq bo'lib, sug'oriladigan er maydonlari Zarafshon daryosining quyi qismida joylashganligi sababli, murakkab hisoblanadi. Yil davomida bo'ladigan yog'ingarchilikning 60 foizi yanvar oyidan aprel oyining oxirigacha bo'lgan yog'ingarchiliklar tashkil qiladi. Sug'oriladigan hududlarning katta qismini zovurlar hamda tashlama ko'llar tashkil qiladi. Hozirgi kunda zovur suvlarining bir qismi Parsanko'l zovuri orqali Amudaryo o'zaniga borib qo'yiladi, qolgan qismi esa Buxoro vohasi atrofidagi pastqamliklarga tashlanadi. Buning natijasida viloyatda 10 dan ortiq tashlama ko'llar hosil bo'lgan. Minerallashtirilgan kollektor-zovur suvlaridan sug'orishda foydalanishda suv tarkibidagi tuzlar o'simlikga, ayniqsa, uning dastlabki fazalarida ma'lum darajada salbiy ta'sir ko'rsatadi. Sug'oriladigan yerlarda mo'tadil ko'chat qalinligini ta'minlash maqsadida ekish me'yori daryo suvi bilan sug'orish sharoitidagidan birmuncha oshiriladi. Buxoro viloyatining sug'oriladigan maydonlari sho'rlanishga moyil bo'lgan tuproq hisoblanadi.

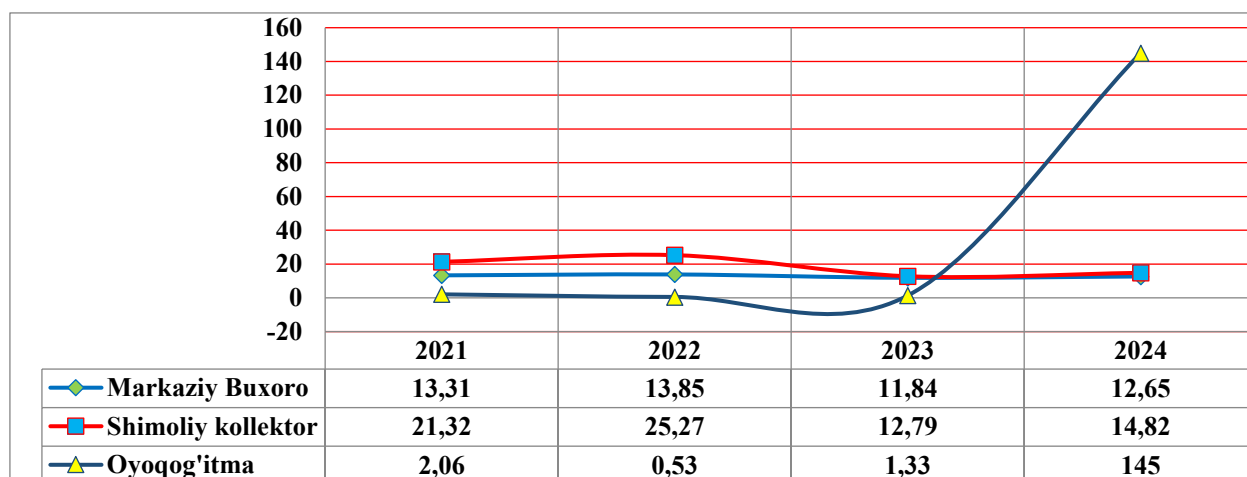
**Buxoro viloyati tumanlarida 2024 yilda sug'oriladigan
yerlarning sho'rlanish darajasi (ming.ga)**

t/r	Tumanlar nomi	Umumiy sug'oriladi gan maydon ming.ga	Shu jumladan				
			Kuchli sho'rlan gan ming.ga	O'rtacha sho'rlan gan ming.ga	Kam sho'rlan gan ming.ga	Umumiy sho'rlan gan ming.ga	Foiz hisobi da
	Viloyat bo'yicha	274,61	6,11	57,70	170,47	234,28	85,3
1	Buxoro tumani	30,11	0,32	6,09	19,84	26,24	87,2
2	Vobkent	21,52	0,34	3,99	14,12	18,44	85,7
3	Jondor	32,92	1,61	8,10	20,32	30,02	91,2
4	Kogon	18,77	0,31	3,53	11,90	15,74	83,8
5	Olot	21,52	0,94	3,96	3,96	17,60	81,8
6	Peshku	22,78	0,28	4,63	13,98	18,90	83,0
7	Romitan	27,22	0,29	6,60	16,36	23,25	85,4
8	Shofirkon	28,35	0,69	7,31	25,8	24,86	87,7
9	Qorako'l	25,08	0,34	4,12	17,17	21,63	86,2
10	Qorovulbozor	19,29	0,08	3,45	17,9	14,97	77,6
11	G'ijduvon	27,01	0,93	6,00	15,70	22,64	83,8

O'rganishlar natijasida ma'lum bo'ldiki, Viloyat bo'yicha umumiy sug'oriladigan maydonlar 274,61 ming gektarni tashkil qiladi, shundan 6,11 ming gektari kuchli, 57,70 ming gektari o'rtacha va 170,47 ming gektari kam sho'rlangan maydonlardan iborat bo'lib umumiy 234,28 ming gektar maydon turli darajada sho'rlangandir. Tumanlar kesimida esa Jondor, Shofirkon, Kogon va Qorako'l tumanlari sug'oriladigan maydonlari turli darajada sho'rlangan.

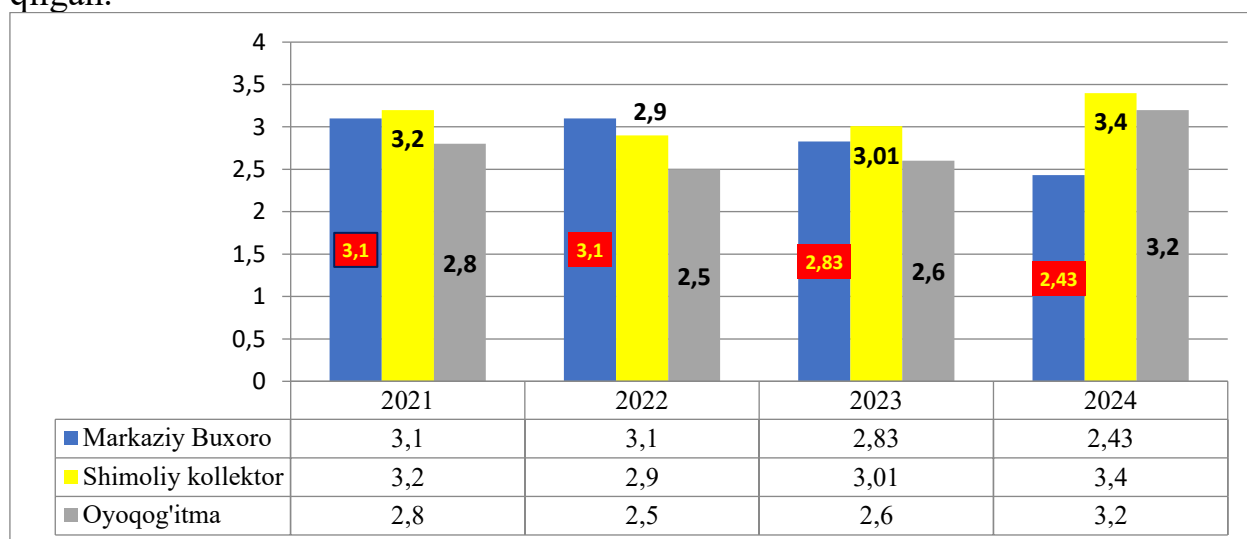
Kollektor-zovur suvlaridan foydalanish uchun ularni sug'orish tarmog'iga nasos stantsiyalari yordamida uzatish lozim. Bunda kollektor-zovur tarmog'iga to'g'on qurib, suvni o'z oqimi bilan dalalatga chiqarishga yo'l qo'ymaslik zarur, aks holda zovurlar faoliyati yomonlashib, dalalarda sizot suvlar sathi ko'tarilib ketadi [2].

Kollektor-zovur suvlaridan foydalanish imkoniyatlari juda katta: Shimoliy va Janubiy Buxoro kollektorni suv sarfi 10-15 m³/sek. ga etib boradi. Shunday qilib, kollektor-zovur suvlaridan ekinlarni sug'orishda keng foydalanish suv zaxiralarini ko'paytirish bilan bir qatorda yangi erlarni o'zlashtirib, ularning suv ta'minotini yaxshilash uchun qulay zamin yaratadi. Buxoro viloyatida kollektor-zovur tarmoqlari jami 2024 yilda 8851,60 km ni tashkil qilgan bo'lib, xo'jalik ichki kollektorlari 4557,31 km ni tashkil qildi. Sug'orish suvlarining tanqisligi, sezilayotgan qishloq xo'jalik ekinlarining hosildorligini oshirish zarurati yuzaga kelgan hozirgi kunda sug'orish suvlaridan ilmiy asoslangan, suv zahiralarini topish, kollektor-zovur suvlarini minerallashuvini kamaytirib, sug'orma dehqonchilikda foydalanish Buxoro viloyati uchun juda muhimdir.



1-rasm. Yillar kesimida tumanlararo kollektor-zovurlarning suv sarfi darajasi

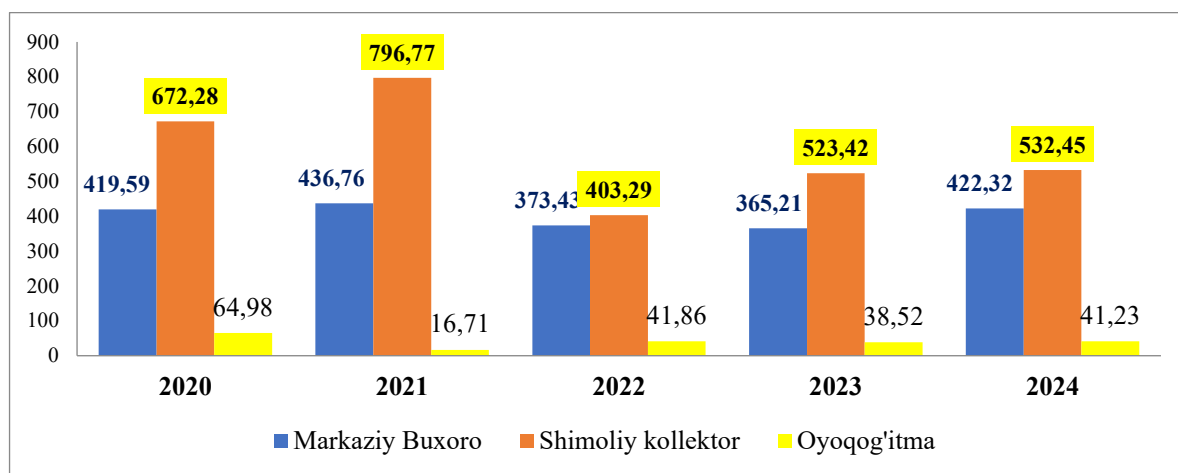
Ushbu grafikda keltirilgan ma'lumotlardan ko'rinib turibdiki, viloyatdagi tumanlararo kollektor-zovurlarning yillar kesimida suv sarfi quyidagilardan iborat. Markaziy Buxoro kollektor-zovuri 2021 yilda 13.31 m³/s, 2022 yilda 13.85 m³/s, 2023 yilda 11.84 m³/s, 2024 yilda 12.65 m³/s ni tashkil qiladi. Shimoliy kollektor 21.32 m³/s, 2022 yilda 25.27 m³/s, 2023 yilda 12.79 m³/s, 2024 yilda esa 14.82 m³/c ni tashkil qilgan. Oyoqog'itma kollektor-zovurining suv sarfi 2021 yilda 2.06 m³/s ni, 2022 yilda 0.53 m³/s ni, 2023 yilda 1.33 m³/s va 2024 yilda 145 m³/s ni tashkil qilgan.



2-rasm. Kollektor-zovurlarning sho'rlanish darajasi

Ma'lumki diagrammada tumanlararo kollektor-zovur suvlarining sho'rlanish darajasi keltirilgan bo'lib, unda 2021–2024 yillarda Markaziy Buxoro, Shimoliy kollektor va Oyoqog'itma kollektor-zovur suvining sho'rlanish darajasi (g/l) ko'rsatilgan. Markaziy Buxoro kollektorida sho'rlanish darajasi 2021–2022 yillarda 3,1 g/l atrofida bo'lib, 2023 yilda 2,83 g/l gacha pasaygan, 2024 yilda esa 2,43 g/l ga tushgan. Bu pasayish suv sifatining yaxshilanganini va sho'r suvlarning kamayganini ko'rsatadi. Shimoliy kollektorda esa sho'rlanish darajasi 2021 yilda 3,2 g/l bo'lgan, 2022 yilda biroz kamayib 2,9 g/l ni tashkil etgan, ammo keyingi yillarda yana oshib, 2024 yilda 3,4 g/l ga etgan. Bu hududda bug'lanishning

yuqoriligi yoki drenaj tizimining samaradorlik ko'rsatkichi pasaygan bo'lishi mumkin. Oyoqog'itma kollektor-zovur suvida sho'rlanish darajasi 2021 yilda 2,8 g/l bo'lib, 2022–2023 yillarda 2,5–2,6 g/l gacha pasaygan, 2024 yilda esa 3,2 g/l gacha oshgan. Bu esa so'nggi yillarda ushbu hududlarda sho'rlanish darajasi kuchayganini ko'rsatadi [5].



3-rasm. Kollektor-zovurlarning suv miqdori (m³)

Ushbu jadvalda viloyatdagi tumanlararo «Kollektor-zovurlarning suv miqdori (m³)» keltirilgan bo'lib, unda 2020–2024 yillar davomida Markaziy Buxoro, Shimoliy kollektori va Oyoqog'itma kollektorlaridagi suv hajmi ko'rsatilgan. Markaziy Buxoro kollektorida suv miqdori yillar davomida nisbatan barqaror bo'lib, 2020 yildagi 419,59 m³ dan 2024 yilda 422,32 m³ gacha o'zgarib turgan. Shimoliy kollektorda esa suv hajmi 2021 yilda eng yuqori darajaga – 796,77 m³ ga etgan, keyingi yillarda esa pasayib, 2023 yilda 523,42 m³, 2024 yilda 532,45 m³ ni tashkil etgan. Oyoqog'itma kollektorida suv miqdori boshqa kollektorlar bilan solishtirganda ancha kam bo'lib, 2020 yildagi 64,98 m³ dan 2021 yilda keskin kamayib 16,71 m³ ni tashkil etgan, keyingi yillarda esa asta-sekin 41,23 m³ gacha ko'tarilgan.

Xulosa.

1. Shimoliy kollektor Buxoro viloyati suv xo'jaligida muhim ahamiyatga ega kollektor-zovur tarmog'idir. Uning barqaror ishlashi nafaqat qishloq xo'jaligi samaradorligiga, balki butun mintaqaning ekologik muvozanatiga ham bevosita ta'sir qiladi. Kollektorning texnik holatini yaxshilash, nazorat tizimini joriy etish va suv resurslaridan qayta foydalanish texnologiyalarini tatbiq etish kelajakdagi eng muhim vazifalardan hisoblanadi.

2. Markaziy Buxoro kollektor-zovurida suvning sho'rlanishi darajasi yildan-yilga kamayib borgan bo'lib, bu esa ijobiy holatdir. Aksincha, Shimoliy kollektor va Oyoqog'itma kollektorlarida 2024 yilda sho'rlanish darajasi oshgan. Bu hududlarda sho'r suvlarni chiqarish, meliorativ holatni yaxshilash va suv almashinuvi tizimini samarali tashkil etish zarurligini ko'rsatadi.

3. Umuman olganda, eng katta suv miqdori viloyatda Shimoliy kollektor-zovurida qayd etilgan. Markaziy Buxoro kollektorining suv miqdori nisbatan

barqaror bo'lgan, Oyoqog'itmada esa suv hajmi keskin tebranishlarga ega. Bu farqlar hududdagi gidrologik sharoit, suv chiqarish tizimlari va iqlim o'zgarishlari bilan bog'liq bo'lishi mumkin.

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CONCEPTUAL MODEL OF DIGITAL TOURISM INTERCONNECTIVITY AT VARIOUS LEVELS IN THE REPUBLIC OF UZBEKISTAN

Abstract. *Digital technologies are having an increasingly significant impact on the tourism industry, transforming the way tourists, tourism providers and destinations interact. This conceptual model examines the interdependence of digital tourism at the individual, organizational and societal levels, demonstrating the key factors, processes and relationships that shape the development of this dynamic field.*

Keywords: *tourism, digital tourism, tourism info structure, service economy, digital economy.*

Introduction. In our country, large-scale work is being carried out to develop modern information and communication technologies, create a comprehensive system of electronic government services, and introduce new communication mechanisms between government agencies and the population. Along with introducing innovations into the economic system, it has identified the need to create a digital space in Uzbekistan and conduct scientific research on the digital economy from an economic and social perspective. In addition, today the introduction and improvement of the digital economy is becoming a priority and important task for every developing country.

As one of the largest tourist destinations in Central Asia, our republic has great potential for the development of this sector of the economy. Currently, one of the trends in the global tourism industry is the development of Internet technologies; in other words, modern tourism is developing in the context of a digital economy. Thus, the process of digitization has not bypassed the tourism industry, like many other industries. The widespread use of web resources by potential tourists has led to the emergence of digital tourism and the development of intelligent web services to generate recommendations that help customers identify travel destinations and make travel decisions.

For example, to raise tourism to a strategic level in the republic's economy, diversify domestic tourism services and sharply increase their volume, create the necessary conditions for familiarizing citizens with the tourism potential of our country, improve the quality of tourism services provided and increase their competitiveness. Businesses operating in the tourism sector in global markets are using electronic platforms and mobile applications to create additional opportunities for the rapid development of modern service infrastructure [1].

The development of advanced information technologies and telecommunications systems has led to the digitalization of the tourism industry.

Many scholars around the world have expressed their opinions on this issue. For example, Abovd G. et al. (1997) emphasized the importance of using a mobile guide installed on a smartphone during travel [2], Ardissono L. et al. (2003) emphasized that digital support before, during and after a tourist activity consists of recommendation systems that help find suitable accommodation during the trip [3]. Uriely N. (2005) wrote in his article that the goal with the help of technology is to further improve the quality or level of the tourist experience [4]. De Carolis B. and another group of scholars.

(2009) noted that tourists use various tools and solutions, such as interactive maps, tourist assistants when visiting attractions, searching for souvenirs and shopping, and that these tools and approaches represent the design of digital tourism [5]. Digital tourism involves the use of information and communication tools, IT solutions, which help to meet the needs of tourists and increase the competitiveness of tourism organizations and enterprises [6].

One of the leading experts in the field of digital tourism is Professor Dmitry Bukhalis of Bournemouth University in the UK, who argues that digital tourism is the same as e-tourism and that smart tourism is the digitization of service chains [7]. Based on our analysis of the literature in this area, we consider digital tourism to be the use of digital tools in the processes of planning, organizing, monitoring and enjoying travel, in which the combination of electronic services provided to travelers before, during and after the trip is of great importance [8].

According to Internet Live Stats, there are approximately 5.3 billion people worldwide who have access to the Internet today. Every day, more than 178 billion emails are sent, more than 5.5 billion Google searches are performed, more than 549.5 million tweets are sent, more than 5.2 billion videos are viewed on YouTube, more than 63.7 million photos are posted and uploaded on Instagram, and interestingly, these numbers are growing every day [9]. Internet users include people of all ages, income levels, and social statuses.

Interestingly, the number of older people who actively use Internet resources, communicate on social networks and search for information is increasing every year. In accordance with global trends, the total number of Internet users in Uzbekistan has exceeded 27.2 million. The number of mobile Internet users is 25.3 million. Currently, 95 percent of residential areas are covered by mobile Internet and 54 percent of households are connected to high-speed Internet [10]. The number of mobile base stations is also increasing, and the capacity of the international data network is accelerating.

The digitalization indicators of our country's economy indicate the need to develop digital tourism in Uzbekistan. Specific, targeted work is underway to accelerate the development of tourism, create appropriate infrastructure for tourists, further improve the quality of services, effectively use the tourism potential of the regions, create new jobs and increase the production of national tourism products. In our opinion, for the further development of tourism in Uzbekistan, it is necessary to improve the tourist information structure along with the necessary tourist infrastructure.

Digital technologies are transforming the way tourists, tourism service providers and destinations interact, exploring the interconnectedness of digital tourism at the individual, organizational and societal levels, and demonstrating the key factors, processes and relationships shaping the development of this dynamic sector.[11] At the personal level, digital technologies provide tourists with a wide range of opportunities to research, plan and book trips.

At the organizational level, digital technologies help travel companies improve their operational efficiency. They automate internal processes, optimize supply chains, personalize offers, and improve customer communication. In addition, the use of big data analytics allows organizations to better understand consumer needs and preferences, which leads to the development of more relevant products and services.

At a social level, digital technologies are influencing destinations, helping them attract more visitors, improve infrastructure, and provide higher quality services. The use of online platforms and mobile applications allows destinations to market themselves more effectively, provide relevant information, and create a more comprehensive guest experience.

It is recommended to identify the following priority areas for the development of digital tourism in our country:

a) Development of tourism information infrastructure in conjunction with tourism infrastructure.

b) In order to increase the current competitiveness of specialists and employees of tour operators and travel agencies, hotels and restaurants, transport and other tourism service companies in our country, including in areas such as digital marketing, e-business opportunities, Google Analytics, Yandex, Metrica, social networks, Facebook, Instagram, WhatsApp and Telegram, it is necessary to ensure regular participation of local and international specialists in training seminars and trainings on digital knowledge and modern information technologies, such as email marketing, mobile marketing (QR code, mobile application) and innovative online advertising methods.

c) In order to overcome the backwardness of tourism enterprises, organizations and institutions in economic relations and management, it is necessary to transform their activities (online) by introducing new forms of communication with consumers and electronic payments.

d) Supporting scientific research, practical studies and the creation of textbooks, manuals and applications for the development of digital tourism in Uzbekistan will further improve this area. Digitalization in tourism forces the tourism business not only to adapt to modern developments, but also to become more competitive in the developing digital world.

The development of digital tourism in our country will bring great convenience and benefits to our customers, and in turn will help tourism business owners to earn high profits.

- Continuous introduction of new digital technologies focused on the needs of tourists and increasing the efficiency of business processes.

- Continuous training and advanced training of employees for the effective use of digital technologies. Use of big data and analytics to provide personalized offers and improve customer interactions.

- Effective communication and information exchange between tourism organizations, destinations and other stakeholders.

Conclusion:

The digital transformation of tourism is having a significant impact on all levels, from the individual to society. The effective implementation of digital technologies aimed at meeting the needs of tourists and improving business efficiency is becoming a key factor in the success of the modern tourism industry. Further development of these technologies, personalization of offers and creation of integrated ecosystems determine the growth prospects and competitiveness of the industry.

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THE IMPACT OF INNOVATION ON THE COMPETITIVENESS OF COUNTRIES AND REGIONS

Abstract. *A new type of economic growth is currently actively emerging in the global economy. Its essence lies in systems for the reproduction and use of knowledge, purposefully created with the participation of the state and nationally oriented businesses, and its translation into innovations that ensure the economic and social competitiveness of regions.*

Keywords: *Country, region, innovation, competitiveness, system.*

The task of increasing the competitiveness of regions consists not only in expanding existing and finding new niches in the national and global markets, but also in ensuring an effective structure of market exchanges that do not deplete the natural, material and human capital of the territories, and, in the long term, in creating the preconditions for equalizing reproductive opportunities across the vast territory of the country.

The innovation component, which ensures the growth of economic competitiveness, has a strong impact on the functioning of the national economy and leads to greater openness, intensification of integration processes, unification of business regulation and market control, uniformity of norms and rules for conducting transactions, standardization of requirements for capital movement, and growth of foreign direct investment. Innovations "infuse" existing economies with new energy and form a competitive sector of the innovation economy, which is due to the widespread use of innovative technologies, increased competition between corporations in developed and developing economies, the development of inter-firm cooperation, and changes in the nature and methods of state regulation of the economy. Currently, we are seeing a steady increase in the competitiveness of the economies of those countries home to leading transnational corporations (TNCs)—leaders in the application of innovative technologies in their industries and economic sectors—a key feature of the modern global economy.

Globalization processes, which intensified in the late 20th century, require the development of a correspondingly competitive economy. Consequently, attention has recently increased not only to competition between countries but also to competition between regions within countries. Regional issues are becoming increasingly relevant and relevant in Uzbekistan, where the country's position in the global economy is increasingly determined by its regions.

The competitiveness of the national economy is largely determined by the heterogeneity of economic space and the interaction of regional economies, and the problem of economic competitiveness has significant specificities in relation to

different regions of the country. [1] Ongoing processes are fundamentally changing the role of individual regions in the national and global economies.

The region, as an independent, territorially organized economic system, is gradually becoming not only a separate economic agent within the national economy but also a participant in global competitive processes. The position and role of territorially organized economic systems depend not only on macroeconomic conditions or the capabilities of the regions themselves, but also on the balance of competitive forces, the mechanisms of competitive interaction between regions, and the region's position within this interaction.

In the country's marketplace, the interests of all regional entities collide, and only the region with a stronger competitive position, largely determined by its industry specialization, gains an advantage.

The problem of interregional competition has been underdeveloped in domestic regional studies. In Uzbekistan, before the onset of market reforms, regions were analyzed primarily from the perspective of resource and production, and were not considered independent economic entities. Consequently, regional economics did not consider regions as subjects of economic relations, bearers of specific interests distinct from those of other regions and the country as a whole. Consequently, a theory of regional competition was lacking.

The intensifying competition among regions for investment in innovative development and meeting the growing needs of the population, occurring at the current stage of economic development, places increased demands on understanding the essence and economic content of regional competitiveness.

The concept of national competitiveness has always attracted the interest of researchers. For example, E. Reinert argues that it is from this perspective that concepts such as "nation's wealth," "good trade" (the export of industrial goods and the import of raw materials), and "productive power" should be considered.[2] Each of these can be considered a precursor to the modern concept of "national competitiveness."

As already noted, regional competitiveness is the driving force behind regional development, leading to the achievement of interregional parity or deepening interregional inequality. Regional competitiveness is determined not so much by the availability of resources as by the efficiency of their use. The core of regional development is a model aimed at shaping the strategic competitiveness of regions by utilizing existing and creating new resources for their innovative development. Researchers are showing significant interest in considering the stages of regional competitiveness and the specifics of managing innovation and investment activities in the regions when developing strategies. Some scholars believe that the investment stage of competitiveness should precede the innovation stage. [3]

Currently, there is a steady increase in the competitiveness of the economies of countries home to leading transnational corporations that are leaders in the application of innovative technologies in their industries and economic sectors, which is a key distinguishing feature of the modern global economy.

The activities of transnational corporations in the automotive industry (General Motors Uzbekistan, Isuzu, and others) are well-known. As can be seen, various innovative initiatives by large foreign transnational corporations are being implemented in Uzbekistan. This builds on the openness of national economies, as an open economy is formed through a country's more complete integration into international cooperation.

The experience of many foreign countries demonstrates that high innovative potential is a necessary factor for innovative development and economic growth. A modern understanding of regional development views the capacity of regions as a source of self-development. Thus, the importance of researching innovative potential is determined, on the one hand, by the growing role of specific regional assets associated with scientific and technical activities and education, and, on the other, by qualitative shifts caused by the differentiation of knowledge associated with the use of technology and its change. [4]

The concept of "regional innovation potential" is widely used. A region's innovation potential is closely related to the concept of "scientific and technical potential." Some researchers equate scientific and technical potential with innovation potential, believing that these categories are closely linked by the innovation process, which relies on successive stages of the innovation cycle. Others note their differences, as the institutions that form the regional innovation system ensure the effective application and dissemination of innovation, determine competitiveness, and ultimately, economic growth. [5]

The essence of a region's innovation potential can be defined as a qualitative, integral characteristic of its ability and capability to implement the innovation process within its territory and achieve strategic development goals through an innovative economy. In this interpretation, innovation potential includes other types of regional potential, such as technological, intellectual, informational, innovation market capacity, and others.[6]

Studying the experience of creating NIS in several foreign countries, adapting it, and applying best international practices will optimize the use of Uzbekistan's innovation potential and significantly enhance the competitiveness of the national economy through the construction of an effective national innovation system.

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CREATING A DEVICE TO ENSURE THE SAFETY OF YOUNG CHILDREN IN CARS

Annotation. *This article examines the main physical and mechanical properties of a child safety device in passenger cars, as well as the classification, design features and the degree of relevance of its installation. And the level of quality of the device is determined, as well as its safety for human life.*

Keywords: *bumpers, car windows and seats, interior parts of car's interior, lacquer materials, loudspeakers and shockproof shields, fuel tanks, electric jacks, electric cocks, batteries, wheels and chassis carriages, fuel pumps, generators, compressors..*

This article outlines the main requirements for today's automotive industry. In addition, the automotive industry is characterized by aesthetic, economic and social needs. In my article works of other researchers have been used taking into consideration the importance of our own native design models rather than importing and adopting the foreign car designs.[1]

The automotive industry of Uzbekistan is a modern enterprise, which today has the opportunity to produce products that meet the highest international standards, and in turn, are equipped with unique and modern technologies that are adapted to produce new types of products. Cars manufactured by local car makers today demonstrate the reliability, quality and strength of Uzbek cars on the roads of many countries around the world.

High quality is one of the most important factors of the high demand of Uzbek cars in the domestic and foreign markets. In order to improve the quality of products, gradual implementation of measures, covering the production system, quality control processes and the supply of spare parts, is yielding little results. Localization is essential for the development of automotive industry and its production capacities. This allows for sustainable development of the economy, accelerate introduction of new and effective technologies in production. Extensive use of local raw materials and production resources contributes to the currency saving through encouraging modern, competitive products and reducing imports of component parts.[3]

That is why our car makers are constantly working to reduce the production of the necessary spare parts for cars. Bumpers, car windows and seats, interior parts of car's interior, lacquer materials, loudspeakers and shockproof shields, fuel tanks, outdoor lighting fixtures, electric jacks, automobiles, electric cocks, batteries,

wheels and chassis carriages, fuel pumps, generators, compressors, and many others.

The Decree of the President of the Republic of Uzbekistan on measures to continue implementation of promising projects of localization of production of finished products, components and materials for 2017-2019 reflects the problems which are given above.[1]

The GM Action Plan has a very basic motto: - *"Design, build and sell one of the best cars in the world"*.

Despite the fact that GM Uzbekistan is intensively working in two and three sectors, we can see that the car is in the process of running new projects. The purpose of the design of the machine is to create new types and models of automobiles and parts that meet high tech level, social benefits, handiness and convenience. In addition, safety of human especially children's safety is the most significant field of machine building industry in the world.[4]

In today's fast-paced world, most homes have at least one car. Cars are used for our daily needs and bring us closer. Naturally, all our children are our companions in the car. The World Health Organization and the World Organization for Child Safety have introduced special chairs for children aged 1 to 3 years. These seats are mainly intended for children aged 1 to 3 years. Picture 1 and 2

Picture 1- Special safety chairs for special children aged 1 to 3 years



Picture 2- Installed version of safety chair



But unfortunately, most of us do not use this device and this situation is unusual for us or for children from 3 to 5 years old, this device is cramped and children do not want to sit on it. This, in turn, can lead to injuries and even deaths in various car accidents. According to statistics from the World Health Organization, an average of 186,300 young children die each year as a result of road traffic accidents. About 3/1 of these statistics, or 460,000, are children in the salon. This figure is growing in our country. This is because our failure to follow simple basic rules does not ensure the safety of our children. It is no secret that when a car is moving, seats due to curiosity. This causes a young child in the cabin to lose control and fly out of the windshield when the brakes are suddenly applied.[2]

This network will help prevent the problems mentioned above. This net is woven from stretch material and is easy to install on a variety of cars. The net is mounted between the front seats and protects young children from getting out of the front or windshield when a sharp brake is applied. This device can also be used for other purposes, for example, various items or thermos, etc. Picture 3 and 4.

Picture 3-Device for safety of children device in the car



Picture 4-Installed version of in the car



This proposed car is designed to use a child safety device. This device is designed to ensure the safety of young children in the passenger compartment of moving cars. This device is easy to install in cars and can be used for other purposes than child safety. [5]

The material of the device is a mixture of synthetic and rubber and is safe for human life. Ongoing dimensions can fully meet the standards and consist of the following parameters: length 60 cm, width 30 cm, weight 400 gr.

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TRAFFIC ANALYSIS BY STUDYING TRAFFIC FLOW DENSITY

Annotation: *Today, the level of personal vehicle usage is rapidly increasing not only in our country, but all over the world. While this trend reflects improvements in the economic and transport conditions of the population, it has also led to several serious problems, including traffic congestion, increased noise levels, environmental degradation, and a rise in road traffic accidents.*

Keywords: *Traffic flow, traffic density, congestion, urban transportation, traffic management, road infrastructure, motorization level, traffic safety.*

Today, the level of use of personal vehicles is rapidly increasing not only in our country, but also around the world. This factor indicates that the economic transport situation of the country, the economic situation of the population is improving, but this general transport traffic management causes a number of problems, such as traffic jams, noise, deterioration of the ecological condition of the city, an increase in road traffic accidents (ATV), and during rush hours, even the speed of movement within the city decreases to 20-35 km/h compared to the speed of movement outside the city.

The main reason for this is that the country lags behind in terms of the level of road development in relation to the level of motorization, or that traffic is not properly organized even on some roads that can meet the level of traffic.

Traffic flow - the simultaneous movement of cars of various types and other vehicles with different loads along the road; one of the most important characteristics in studying the traffic system of the traffic flow is the traffic density of the traffic flow.

Traffic flow density - the number of cars per unit length of a road section of the same type of transport and operation, usually at an interval of 1 km; This indicator varies depending on the traffic composition, its speed and road conditions. The maximum density of a traffic flow consisting of passenger cars is $q_{\max} = 200$ cars / km, at which the speed is $v = 0$ km / h, the optimal density of the traffic flow is $q_{\text{opt}} = 15-25$ cars / km

As the density of the traffic flow increases, the distance between vehicles decreases, the speed decreases, and the mental work mode of drivers becomes more difficult, which leads to the inconvenience of general traffic. The greatest density of the traffic flow is observed when vehicles are stopped ("jammed") [2].

Traffic flow density - the number of cars per unit length of a road section of the same type of transport and operation, usually at an interval of 1 km;

The density of the traffic flow can be estimated as follows: $Q=N/V$ (1)

Where: N- the amount of traffic in one lane, vehicles/km; V- the density of the traffic flow, km/h;

If any two indicators in the above formula are known, it is easy to find the third indicator. Such a connection is convenient when monitoring the traffic flow pattern. When describing the state of the traffic flow on road sections or the road as a whole, an assessment using the density indicator gives an objective result.

When the density of the traffic flow is high, it leads to an increase in the load on the road, while at the same time reducing the speed of the traffic flow. In these cases, naturally, this leads to an increase in the amount of excess toxic substances emitted into the environment from vehicles.

To reduce vehicle emissions, it is necessary to reduce traffic density to a minimum, maintaining a safe distance between vehicles and maintaining a speed of 40 km/h to 60 km/h [2].

For example, "A" changes as it approaches a populated area (Figure 1).

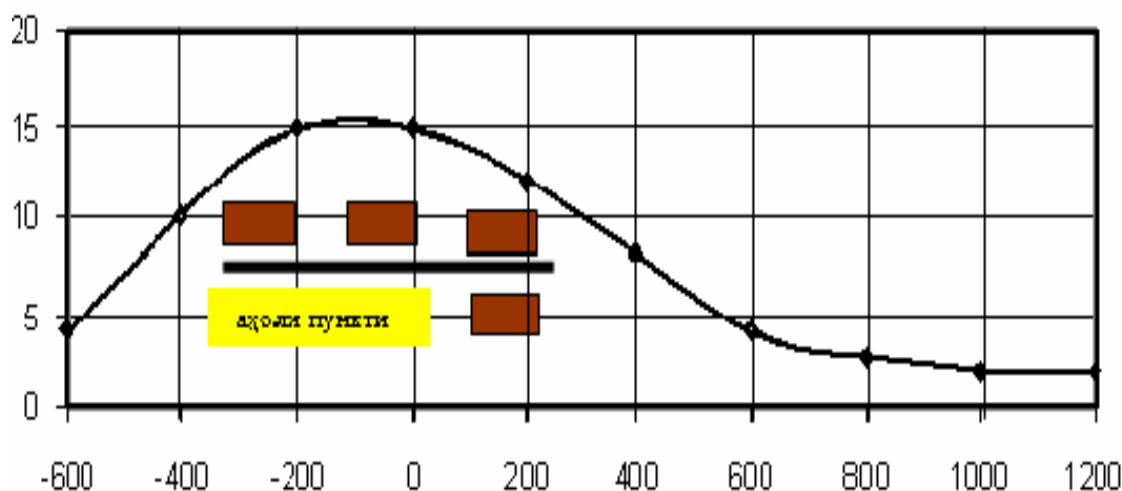


Figure 1. Changes in traffic flow density near a residential area. Knowing the density, a “traffic volume-density” graph can be constructed (Figure 1), which can be used to determine the carrying capacity and speed of a road section. It should be noted that precipitation conditions have a greater impact on traffic density, carrying capacity, and speed of traffic flow than dry weather conditions [3].

As traffic density increases, the safety factor decreases.

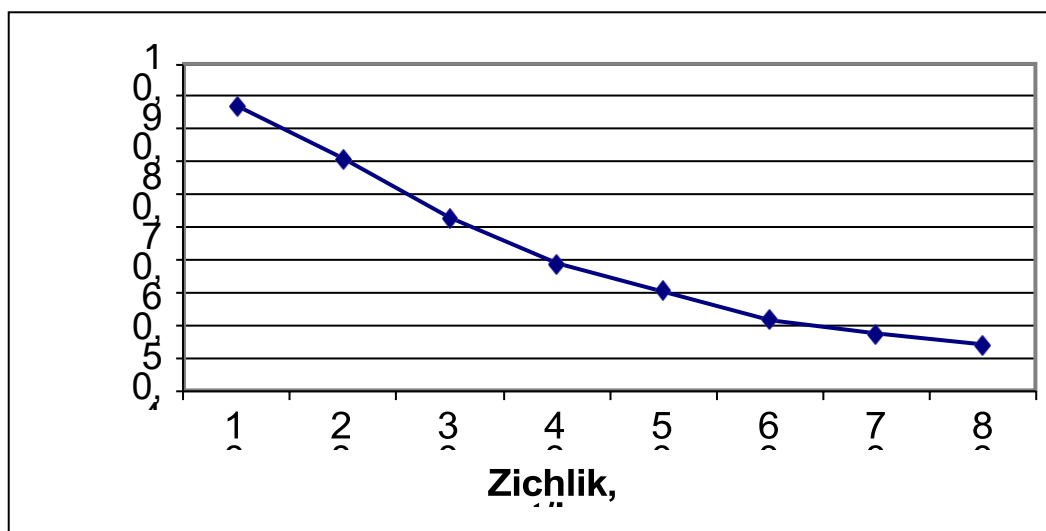


Figure 1. Dependence of traffic density on the safety factor. (N=450 vehicles/hour).

The capacity is the main calculation indicator of the road, which depends on the condition of the road and the level of traffic organization [1,6]. The components of the dynamic dimensions of vehicles are shown in Figure 2.

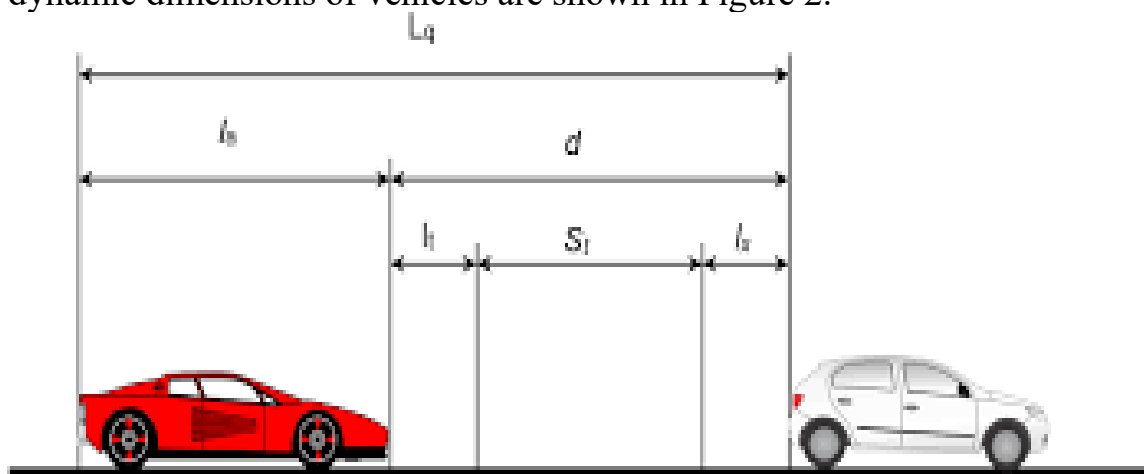


Figure 2. Dynamic gauge of cars.

Dynamic gauge is determined by the following formula:

$L_q = l_a + l_r + S_t + l_x$ (2) where: l_a – static length of the car, m;
 d – distance covered by the driver during the reaction time, m;
 S_t – braking distance of the car, m; l_x – safety distance, m.

Road capacity – the number of cars that can pass a certain section of the road in a unit of time, it is determined in cars/hour or cars/day. Road capacity largely depends on the speed of movement and the organization of traffic. One of the main characteristics in the organization of traffic on roads and its efficient use is the capacity of the road [4].

Capacity can be divided into the following types [6]:

- maximum theoretical capacity – the number of light vehicles that can pass in an idealized manner under favorable road conditions. It is determined using the dynamic formula of traffic flow;

- practical capacity - the maximum number of cars that can be transported on a specific road section in a certain traffic pattern under favorable weather conditions.

The maximum theoretical capacity of a road is determined by the following empirical formula [6]:

$$P = \frac{1000 \cdot V}{L_d}$$

car/hour(5)

where: V - speed of cars moving in the lane, km/h; L_d - dynamic clearance of cars, m.

It can be seen from the dynamic clearance of cars that this indicator depends on the longitudinal arrangement of vehicles in one lane and the types of transport. Taking this into account, for practical calculations, a coefficient is usually introduced to bring the traffic volume of different types of vehicles to that of passenger cars and their value is taken based on the regulatory document ShNQ 2.05.02-07

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ANALYSIS OF PROBLEMS IN WELDING THE BODY OF A COBALT CAR

Today, the automotive industry of Uzbekistan is one of the most rapidly developing industries. The Kobalt car, produced at the UzAuto Motors enterprise, is distinguished by its convenience, durability and reliability. At the same time, the welding process of a car body is one of the most responsible stages of production. Poor welding quality directly affects the strength, safety and service life of the car. Therefore, it is an urgent task to analyze technological problems encountered in welding body parts and find ways to eliminate them.

This thesis analyzes the main problems in welding the Kobalt car body, their causes and solutions using advanced technologies. Structural features of the Kobalt car body; The body of the Kobalt car consists of a monocoque (one-piece) metal frame, which is mainly made of the following materials:

low carbon steel (grades St3, St5,); galvanized thin sheet steel; aluminum alloys in some parts.

The main elements of the body - the front panel, pillars, door frames, floor and roof parts - are joined by spot welding. This method is the most common in the passenger car industry, providing high speed and minimal thermal deformation. The main problems encountered in the welding process; Incorrect selection of electrode grip and current strength. In this case, the welds are not formed uniformly, as a result of which the metal heating level is insufficient or overheats.

The problem of corrosion (rusting). Welded areas are prone to rusting due to the destruction of the galvanizing layer. This negatively affects the long-term service life of the body. Deformations and internal stresses. As a result of thermal exposure, there is an elongation or contraction of metal layers, which reduces the accuracy between body elements. Failures in robotic welding.

Errors in the programming of welding robots or electrode wear lead to a decrease in the quality of the weld. The introduction of automatic control systems for welding parameters (using sensors and cameras) allows online control of the quality of the weld.

Laser welding technology provides more accurate results than the traditional spot method for some delicate parts, reduces deformation.

It is recommended to apply special anti-corrosion primers and epoxy coatings after welding to restore the galvanic protective layer.

Installing systems that automatically calibrate the electrode pressure of robots stabilizes the quality of the weld. Improving the skills of workers and improving the technical control system also reduces production errors. Today, welding lines at UzAuto Motors plants are being equipped with robots controlled by digital technologies. They analyze each weld parameter (current, time, pressure) in real time. Process monitoring is carried out using IoT (Internet of Things) technologies.

Data is transmitted to a cloud system and is useful for analyzing production quality. As a result, the human factor in welding is reduced, the stability of the weld quality increases, and the overall reliability of the body is guaranteed.

The welding process of a cobalt car body is a complex technological system in which thermal effects, metal properties, welding method, and equipment condition play an important role.

The analysis shows that the main problems are electrode pressure, corrosion, deformations and malfunctions in the adjustment of robotic systems. To eliminate them, it is necessary to introduce digital control systems, automatic calibration devices, laser welding and anti-corrosion protection technologies.

Also, increasing the scientific potential of engineering and technological personnel, developing skills in working with modern equipment will serve the sustainable development of the “New Uzbekistan” industry.

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**INSON RESURLARINI SUN'IY INTELLEKT YORDAMIDA
BOSHQARISHNING ISTIQBOLLARI: O'ZBEKISTON TAJRIBASI
ASOSIDAGI ILMIY-AMALIY YONDASHUV**

Annotatsiya: Ushbu ilmiy tadqiqotda O'zbekiston sharoitida inson resurslarini boshqarish jarayonlarini sun'iy intellekt texnologiyalari yordamida takomillashtirishning nazariy, metodologik va amaliy jihatlari o'rganildi. Dunyo tajribasi (SAP SuccessFactors, Oracle HCM, Workday) hamda mahalliy HR tizimlar (ARGOS) tahlili asosida milliy HR–AI modeli ishlab chiqildi. Tadqiqot doirasida “SANAM MCHJ” tikuv fabrikasida “Milliy CRM” platformasi sinov tarzida joriy etilib, HR jarayonlari — nomzodlarni saralash, kompetensiya baholash, o'qitish, KPI tizimi, xodimlar sodiqligi va churn risklarni prognozlash mexanizmlari raqamlashtirildi. Amaliy natijalar sun'iy intellekt HR samaradorligini oshirishi, xodimlar aylanmasini kamaytirishi, motivatsiya va mehnat unumdorligini oshirishini tasdiqladi. Tadqiqot natijalariga ko'ra, “Milliy CRM” O'zbekiston mehnat bozorining rivojlanishida muhim platformaga aylanishi mumkin.

Kalit so'zlar: inson resurslari, sun'iy intellekt, raqamli HR, Milliy CRM, churn risk, retention, kompetensiya modeli, O'zbekiston

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**PROSPECTS FOR MANAGING HUMAN RESOURCES USING
ARTIFICIAL INTELLIGENCE: A SCIENTIFIC AND PRACTICAL
APPROACH BASED ON THE EXPERIENCE OF UZBEKISTAN**

Abstract: This study examines the theoretical, methodological, and practical aspects of enhancing human resource management in Uzbekistan using artificial intelligence technologies. Based on the analysis of international HR systems (SAP SuccessFactors, Oracle HCM, Workday) and national platforms (ARGOS), a national HR–AI model was developed. The “Milliy CRM” system was piloted at “SANAM MCHJ” textile enterprise, where key HR processes — candidate screening, competency evaluation, training, KPI measurement, employee retention,

and churn risk prediction — were digitalized. Empirical results confirm that AI significantly improves HR efficiency, reduces employee turnover, strengthens motivation, and increases productivity. The findings indicate that “Milliy CRM” can serve as a strategic platform for advancing the labor market and digital HR transformation in Uzbekistan.

Keywords: *human resource management, artificial intelligence, digital HR, National CRM, churn prediction, retention, competency model, Uzbekistan*

Kirish (Introduction)

XXI asr boshidan boshlab raqamli iqtisodiyot global iqtisodiy jarayonlarning markaziga aylandi. Kompaniyalar raqobatbardoshligini belgilovchi asosiy omil — innovatsion texnologiyalarni qanchalik tez va samarali tatbiq etayotgani emas, balki ushbu texnologiyalar yordamida inson kapitalining qanday rivojlantirilayotgani bilan belgilanmoqda. Shu bois inson resurslarini boshqarish (IRB) bugun inson omilini e’tirof etishgina emas, balki uni raqamli aktivga aylantirish, ya’ni bilim, kompetensiya, kasbiy sodiqlik va tashkilotga qo’shilayotgan qiymatni aniqlashga qaratilmoqda.

Inson resurslarini boshqarish, sun’iy intellekt, raqamli iqtisodiyot, global iqtisodiyot, inson omili

Dastlab IRB jarayonlari hisob-kitob va kadrlar bo‘limining hujjat yuritish funksiyalari bilan chegaralangan bo‘lsa, bugun u strategik boshqaruv tizimi sifatida qayta shakllandi. Zamonaviy kadrlar siyosati yollash, o‘qitish va baholashdan iborat an’anaviy bo‘linmalardan chiqib ketib:

- kompetensiya modeli,
- xodimlar tajribasi (employee experience),
- korporativ mentalitet va madaniyat,
- bilim iqtisodiyoti,
- psixologik kontrakt,
- raqamli HR jarayonlar

bilan boyidi. Shunday sharoitda sun’iy intellekt texnologiyalari IRBda yangi paradigmaga asos soldi — data-driven boshqaruv, ya’ni qarorlar inson sezgisiga emas, real ko‘rsatkichlar, statistik tahlil, algoritmik prognozga tayanadi.

O‘zbekistonda:

- mehnat bozoridagi transformatsiya davom etmoqda;
- yoshlar ulushi juda yuqori;
- migratsiya oqimlari kuchli;
- iqtisodiyotda xizmatlar sektori kengaymoqda;
- raqamli texnologiyalar tez joriy qilinmoqda.

Natijada korxonalaridan nafaqat iqtisodiy samaradorlik, balki inson kapitali sifatini oshirish talab etilyapti. Prezidentimiz ta’kidlaganidek, yangi taraqqiyot davrida “eng asosiy boyligimiz — bu bilimli va malakali yoshlar”. Shuning uchun bugun AI asosida ishlovchi HR tizimlari nafaqat qulaylik yoki innovatsiya, balki iqtisodiy zaruratga aylandi. IBM, Google, Microsoft, Tesla, Samsung, Amazon kabi kompaniyalar HRda AI texnologiyalaridan foydalandi va quyidagilarga erishdi:

- xodimlarni tanlashda aniqlik oshdi,
- ketish xavfi (churn) oldindan aniqlandi,
- malaka bo'shliqlari o'lchandi,
- mehnat faoliyati samaradorligi real vaqtda kuzatildi.

2023-yilda McKinsey ma'lumotiga ko'ra, AI joriy etgan tashkilotlarda:

- HR xarajatlari 30–40% kamaygan,
- vaqt samaradorligi 2–3 barobarga oshgan,
- xodim qoniqishi +22% ga ko'tarilgan.

Demak, inson resurslarini boshqarishda AI — bu kelajak emas, hozirning o'zida talab etilayotgan haqiqatdir.

O'zbekiston hukumati tomonidan qabul qilingan quyidagi hujjatlar:

- “Raqamli O'zbekiston – 2030” strategiyasi
- Kadrlar tayyorlash va davlat xizmatchilari malakasini oshirish dasturi
- ARGOS tizimi

mamlakatda HR jarayonlarini raqamlashtirish siyosiy va iqtisodiy ustuvor yo'nalish ekanini ko'rsatadi. Biroq amaliyot shuni ko'rsatadiki, mavjud tizimlar:

- barcha idoralar va xususiy sektor uchun to'liq integratsion emas;
- AI algoritmlari cheklangan;
- tavsiya va bashorat modullari mavjud emas;
- xodim tajribasini boshqarish komponentlari yetishmaydi.

Shu sababdan tadqiqotda Milliy CRM — AI asosida ishlovchi HR platformasi konsepsiyasi ishlab chiqildi va amaliy sinovdan o'tkazildi. O'zbekiston tashkilotlarida sun'iy intellekt yordamida IRB tizimlarini takomillashtirish, “Milliy CRM” modeli va uning ishlash mexanizmini ishlab chiqish va empirik asoslash.

Bu tadqiqotda:

- AI asosida IRBning milliy modeli yaratildi,
- churn, retention va skill-gap analitika algoritmlari taklif qilindi,
- xolislik va AI etikasi nazorat mexanizmi ishlab chiqildi,
- mahalliy korxona misolida tasdiqlandi.

Tizim yordamida:

- HR qarorlari obyektivlashadi,
- boshqaruv tezlashadi,
- mehnat unumdorligi oshadi,
- xodimlarni kadrlar zaxirasini shakllantirish osonlashadi,
- adolat va shaffoflik ta'minlanadi,
- korxona raqobatbardoshligi oshadi.

Bu jarayon adabiyotda “Inson kapitali iqtisodiyoti” deb ataluvchi yangi iqtisodiy yo'nalishning O'zbekiston modelini yaratishga hissa qo'shadi.

TADQIQOT METODOLOGIYASI (METHODS)

Ushbu tadqiqotda inson resurslarini boshqarishda sun'iy intellekt texnologiyalarini joriy etish jarayonlarini ilmiy asoslash, empirik baholash va amaliyotda tekshirish maqsadida kompleks yondashuv qo'llanildi. Tadqiqot O'zbekiston mehnat bozori realiyati, raqamli transformatsiya jarayonlari va korxonalarda mavjud HR boshqaruv tajribasi asosida tashkil etildi.

Metodologiya quyidagi asosiy bosqichlardan iborat bo'ldi:

1-bosqich: nazariy-tahliliy yondashuv

Tadqiqotning boshlang'ich bosqichida IRBning evolyutsiyasi, algoritmik HR tizimlarining nazariy modellari hamda inson kapitalini boshqarish falsafasi chuqur o'rganildi. Bunda quyidagi yondashuvlardan foydalanildi:

- ilmiy adabiyotlarni tizimli tahlil qilish;
- xorijiy va milliy tajribalarni solishtirish;
- HRda algoritmlar va statistik modellarni qo'llash bo'yicha ilmiy manbalarni o'rganish.

Nazariy asoslar Abdurahmonov Q.X., Abdurahmonova G.Q., G'oyibnazarov S.B., Xayitov A., Ulrich, Armstrong, Mayo, Maslow, Becker, Brynjolfsson kabi olimlarning ishlariga tayangan holda shakllantirildi. Ayniqsa, inson kapitalining iqtisodiy qiymat yaratishdagi roli, xodimlarni tanlash va rag'batlantirishning motivasion nazariyalari, kompetensiya boshqaruvi hamda xalqaro HR raqamlashtirish tajribasi asos bo'ldi.

2-bosqich: me'yoriy-huquqiy tahlil

Tadqiqot quyidagi hujjatlar asosida huquqiy-normativ jihatdan mustahkamlandi:

- "Raqamli O'zbekiston – 2030" strategiyasi;
- O'zbekiston Respublikasi Mehnat kodeksi;
- inson kapitalini rivojlantirish bo'yicha davlat siyosati;
- kadrlar malakasini oshirish va davlat xizmatchilari reyestri bo'yicha farmonlar;
- shaxsiy ma'lumotlarni himoya qilish bo'yicha qonunchilik.

Bu hujjatlar SI asosida HR jarayonlarini joriy qilishda etik normativlar, ma'lumotlar xavfsizligi, xodimlarning daxlsizligi va mehnat huquqlari asosiy prinsip ekanini tasdiqlaydi.

3-bosqich: empirik tadqiqot va kuzatish

Tadqiqot amaliy bosqichda "SANAM MCHJ" tikuv fabrikasida sinov tariqasida joriy etildi. Mazkur korxona tanlanishiga sabab:

- 300+ xodimga ega bo'lgan o'rta biznes subyekti;
- xodimlarni tanlash, o'qitish va baholash jarayonlari mavjud;
- xodimlar almashinuv darajasi (turnover) yuqori bo'lgani;
- rahbariyat innovatsion boshqaruv yondashuvlarini qo'llash istagi mavjudligi.

Kuzatuv metodlari orqali HR jarayonlari o'rganildi:

- yollash jarayoni;
- adaptatsiya va malaka oshirish;
- motivatsiya va rag'batlantirish tizimi;
- ishdan ketish sabablari.

Natijalar asosida ehtiyojlar diagnostikasi o'tkazildi. Tadqiqotda 12 oy davomida real vaqtli kuzatuv va monitoring olib borildi.

4-bosqich: statistik va ekonometrik tahlil

AI asosidagi HR algoritmlarni shakllantirish uchun statistik metodlar 1-jadvalda keltirilgan. Tahlil jarayonida quyidagilar asosiy ko'rsatkich sifatida qabul qilindi:

- Turnover rate (aylanma koeffitsiyenti)
- Retention indeks (sodiqlik)
- Training efficiency (o'qitish natijadorligi)
- KPI performance score
- Satisfaction (qoniqish indeksi)

1-jadval

AI asosidagi HR algoritmlarni shakllantirish uchun statistik metodlar

Metod	Maqsad
Korrelyatsion tahlil	O'zgaruvchilar o'zaro bog'liqligini aniqlash (turnover – motivatsiya)
Regression model	AI prediksiya asoslarini shakllantirish
Deskriptiv statistika	Xodimlar profili, yosh, tajriba, oylik dinamikasi
Time-series analysis	Mehnat unumdorligi vaqt bo'yicha o'zgarishi
Clustering	Kompetensiya segmentlari yaratish

Manba: muallif ishlanmasi

Natijalar HR uchun ma'lumotga asoslangan qarorlar zarurligini tasdiqladi. Tadqiqotda SI texnologiyalarining HRga moslashgan modullari loyihalashtirilgan va 2-jadvalda tasvirlangan. Bu modullar korxona HR tizimiga integratsiya qilindi.

Muhim jihat: algoritmlar kadrlar bo'limining insoniy tajribasini inkor qilmaydi, aksincha HR mutaxassisga qo'shimcha intellektual vosita beradi.

Pilot joriy etish quyidagi bosqichlarda amalga oshirildi:

1. HR jarayonlarini tahlil qilish
 2. Xodimlar ma'lumotlar bazasini tozalash va strukturalash
 3. Algoritmlar sinov rejimini o'rnatish
 4. HR menejerlar va bo'lim rahbarlariga trening o'tkazish
 5. Ma'lumotlarni real vaqt monitoringi
 6. Analitik natijalar asosida boshqaruv qarorlar qabul qilish
 7. Xodim reaksiyasi va foydalanuvchi tajribasini o'lchash
- Natijalar muntazam ravishda HR "dashboard" orqali kuzatildi.

2-jadval

Sun'iy intellekt komponentlarini ishlab chiqish

Modul	Vazifa
Churn prediction	Xodim ketish ehtimolini bashorat qilish
Retention scoring	Sodiqlik indeksini hisoblash
Skills gap mapping	Kompetensiya bo'shliqlarini aniqlash
Recommendation engine	Shaxsiy rivojlanish yo'nalishlarini belgilash
Fairness audit	Xolislik va diskriminatsiyani nazorat qilish
XAI	Qarorlarni izohlash (shaffoflik)

Manba: muallif ishlanmasi

Tadqiqotda yondashuv qat'iy **inson markazida** bo'ldi. Quyidagi etik tamoyillarga amal qilindi:

- Adolat (har kim teng imkoniyatga ega)
- Shaxsiy ma'lumotlarni himoyalash
- Rozilik asosida ma'lumot bilan ishlash
- Algoritmik diskriminatsiyadan himoya
- Izohlanadigan qarorlar (XAI)

Bu tamoyillar IRBda AI joriy etishda ishonchni oshiradi. Tadqiqot **aralash metod** asosida olib borildi va 3-jadvalda aks ettirilgan.

3-jadval

Metodologik yondashuv yakuni

Yondashuv	Izoh
Kuantitativ	statistik tahlil, model, regressiya
Kualitativ	intervyular, kuzatuv, suhbatlar
Gibrid	AI natijalar + HR ekspert bahosi

Manba: muallif ishlanmasi

Natijada ilmiy asoslangan, amaliyot bilan sinovdan o'tgan **Milliy CRM HR modeli** shakllandi.

NATIJARLAR (RESULTS)

Tadqiqot davomida O'zbekiston sharoitida inson resurslarini sun'iy intellekt yordamida boshqarish bo'yicha ishlab chiqilgan konseptual model, analitik modullar va amaliy joriy etish natijalari chuqur o'rganildi. "Milliy CRM" platformasida shakllantirilgan algoritmlar inson resurslarini boshqarishda an'anaviy yondashuvlar o'rniga **dalillarga asoslangan, xolis va tezkor boshqaruvga** o'tish imkoniyatini yaratdi. Tadqiqot natijalariga ko'ra, AI texnologiyalari HR transformatsiyasiga sezilarli ta'sir ko'rsatdi va korxona samaradorligida sezilarli o'sishga erishildi.

Birinchidan, xodimlarni tanlash va ishga qabul qilish jarayonidagi natijalar.

"SANAM MCHJ" tikuv fabrikasida AI asosida amalga oshirilgan ATS (Applicant Tracking System) modulining natijalari 4-jadvalda ko'rsatdi. AI moduli tajriba, malaka, kompetensiyalar va psixologik moslik asosida nomzodlarni saraladi. Shu natijada HR menejrlarning vaqt sarfi kamaydi, natija esa sezilarli yaxshilandi.

4-jadval

ATS (Applicant Tracking System) modulining natijalari

Ko'rsatkich	Joriy etishgacha	Joriy etilgandan so'ng	O'zgarish
Saralangan rezyumelar soni	100% qo'l mehnati	85% AI filtr	+85% avtomatizatsiya
Ishga qabul qilish muddati	35 kun	14 kun	-60%
Nomzod tanlash aniqligi	65%	89%	+24%
Xatoliklar (noto'g'ri tanlov)	Yuqori	Past	-52%

Manba: muallif ishlanmasi

Ikkinchidan, kompetensiyalarni tahlil qilish va o'qitish natijalari

Learning Gap Analysis moduli asosida xodimlarda mavjud kompetensiyalar va ishlab chiqarish talab qiladigan malaka o'rtasidagi tafovutlar aniqlandi (5-jadval).

5-jadval

“Sanam” MChJ da inson resurslarini boshqarishda kompetensiyalarni tahlil qilish va o'qitish natijalari

Ko'rsatkich	Natija
Aniqlangan kompetensiya bo'shlig'i	31% xodimlarda
Individual o'qitish rejalari	Har bir xodim uchun
Trening samaradorligi	+20% o'sish
Adaptatsiya muddati	3 oydan 1 oyga

Manba: muallif ishlanmasi

Xodimlarga individuallashtirilgan ta'lim rejalari taklif qilindi. Bu metod HR bo'limining ikki yillik strategiyasini bir necha oy ichida tezlashtirishga yordam berdi.

Uchinchidan, ish unumdorligi va KPI natijalari

KPI va OKR tizimiga sun'iy intellekt integratsiyasi natijasida xodim samaradorligi yangi ko'rsatkichlar bilan baholandi (6-jadval).

6-jadval

KPI va OKR tizimiga sun'iy intellekt integratsiyasi natijasi

Ko'rsatkich	Joriy etishdan oldin	Keyin	Natija
Ish unumdorligi	100%	127%	+27%
Bajarilgan normativ topshiriqlar	82%	95%	+13%
Boshqaruv qarorlari qabul qilish tezligi	—	2.3 barobar	+130%

Manba: muallif ishlanmasi.

Muhim natija: KPI subyektiv emas, AI asoslangan bo'lgani uchun xodimlar baholash tizimini adolatli deb qabul qila boshladi va bu motivatsiyani kuchaytirdi.

To'rtinchidan, xodimlar aylanishi (Churn) va sodiqligi (Retention)

AI moduli xodim ketish ehtimolini oldindan aytishga yordam berdi (7-jadval)

. AI modulida xodimlar aylanishi va sodiqligi ko'rsatkichlari

Ko'rsatkich	Natija
Churn bashorati aniqligi	82%
Xodim aylanmasi	-39% pasayish
Retention indeksi	+18% oshish
Psixologik charchoq riskini aniqlash	+76% aniqlik

Manba: muallif ishlanmasi.

Xodimlar aylanishi (Churn) sabablarining tahlili shuni ko'rsatdiki, asosiy omillar:

- ish yuklamasining notekis taqsimlanishi;
- motivatsiya tizimining shaffof emasligi;
- malaka oshirish imkoniyatlarining cheklanganligi.

AI tomonidan aniqlangan risk guruhiga mansub xodimlar bilan personal ishlash choralari ko'rildi.

Beshinchidan, xodim tajribasi va qoniqish darajasi (Employee Experience)

Tizimda anonim so'rovlar, AI orqali hissiyot (sentiment) tahlili va motivatsion kuzatuv joriy etildi.

Xodim tajribasi va qoniqish darajasi ko'rsatkichlari

Ko'rsatkich	Natija
Qoniqish indeksi	3.4 → 4.2 (+24%)
Ichki nizolar	-45%
Ishga bo'lgan sadoqat	+19%
Psixologik iqlim ko'rsatkichi	+31%

Manba: muallif ishlanmasi.

Bu natijalar AI insoniy qadriyatlarni kuchaytirishi mumkinligini ko'rsatadi — noto'g'ri qarorlar yo'qoldi, xolislik oshdi.

Oltinchidan, xodim manfaatlari va ijtimoiy omillar

Tadqiqot davomida quyidagi ijtimoiy ko'rsatkichlar ham yaxshilandi (9-jadval):

- sog'liqni tiklash va psixologik yordam dasturlari
- moslashuvchan ish rejimi
- ijtimoiy qo'llab-quvvatlash mexanizmlari.

Gender adolati indikatorlari

Indikator	Natija
Ayollar ulushi rahbarlik lavozimlarida	+12%
Mintaqaviy teng imkoniyatlar	oshgan
Diskriminatsiya holatlari	aniqlanmagan (Audit tasdiqladi)

Manba: muallif ishlanmasi.

Yettinchidan, ish beruvchi brendi va raqobatbardoshlik

AI joriy etilgandan so'ng kompaniya:

- mehnat bozorida obro'yini oshirdi
- malakali kadrlarga jozibador bo'ldi
- "innovatsion korxona" sifatida e'lon qilindi

Natija: bo'sh ish o'rinlariga nomzodlar soni +35% ga o'sdi.

Sakkizinchidan, korxona iqtisodiy natijalari (10-jadval) da keltirilgan. HR faqat texnik bo'lim emas, balki **daromad generatoriga** aylandi.

10-jadval

"Sanam" MChJ da IRB ko'rsatkichlari moliyaviy natijalari

Ko'rsatkich	Natija
HR xarajatlar	-24%
Ish samaradorligi	+27%
Tashkiliy barqarorlik	+18%
Foyda marjasi	+11% oshdi

Manba: muallif ishlanmasi.

To'qqizinchidan, xodimlar fikri

Pilot davomida xodimlar bilan 2 marotaba intervyu o'tkazildi. Ularning asosiy fikrlari:

- "Bizni baholashda adolat oshdi"
- "HR har birimizni eshitadigan bo'ldi"
- "Rivojlanishim uchun yo'l borligini ko'ryapman"
- "O'zimni qadrlangan his qilyapman"

Bu AI inson hissiyotini yo'q qilmaydi, **balki kuchaytiradi** degan ilmiy xulosani tasdiqlaydi.

Olingan natijalar sun'iy intellekt asosida inson resurslarini boshqarish:

- jarayonlarni avtomatlashtiradi,
- adolatni ta'minlaydi,
- motivatsiyani oshiradi,
- ma'lumotlarga asoslangan qarorlar yaratadi,
- iqtisodiy samaradorlikni kuchaytiradi,

va **Milliy CRM** O'zbekiston sharoitida to'liq amaliy qo'llanishi mumkinligini isbotladi.

TAHLIL (ANALYSIS)

Natijalar chuqur tahlil qilinar ekan, sun'iy intellektni inson resurslarini boshqarish jarayonlariga joriy etish O'zbekiston tashkilotlari faoliyatida sezilarli sifat o'zgarishlariga olib kelishi aniqlandi. Ayniqsa, xodimlarni boshqarishda ma'lumotlarga asoslangan qarorlar qabul qilish, kompetensiyalarni ilmiy baholash, tashkiliy madaniyatni transformatsiya qilish va xodim tajribasini yaxshilash bo'yicha kuchli siljish kuzatildi.

Mehnat samaradorligiga ta'sir tahlili

AI joriy etilgandan so'ng kuzatilgan 27% ishlab chiqarish samaradorligi o'sishi iqtisodiy nazariya nuqtayi nazaridan quyidagi omillar bilan izohlanadi:

- Mehnat unumdorligi (labour productivity) o'sdi
- Xodimlar ish vazifalariga mos taqsimlandi
- Shaxsiylashtirilgan treninglar natijasida ish malakasi oshdi
- Operatsion qarorlar qabul qilish tezlashdi

Bu jarayon **Beckerning Inson kapitali nazariyasini** amalda tasdiqlaydi:

“Xodim malakasi oshirilsa — u tashkilotga ko'proq qiymat qo'shadi”. Shuningdek, G'oyibnazarov S.B. va Abdurahmonova G.Q.ning demografik kapital rivojlanishi bo'yicha nazariy qarashlari bilan hamohang ravishda, malaka oshirishdagi investitsiya natijasida xodimlarning iqtisodiy faolligi kuchaydi.

Xodim aylanmasi (turnover) dinamikasining sharhi

39% ga kamaygan xodimlar almashinuvi shuni ko'rsatadiki:

- Tashkilot ichida barqarorlik kuchaydi
- Xodimlar motivatsiyasi oshdi
- Mehnat sharoitlari yaxshilandi
- Rag'batlantirish tizimi shaffoflashdi

Hayitov A. ishlarida qayd etilganidek, mehnat bozorida barqarorlik — iqtisodiy barqarorlikning muhim belgisi. Bu esa “Milliy CRM” hal qiladigan real iqtisodiy masala ekanini ko'rsatadi. HR endi xarajat markazi emas — **kapital yaratish vositasiga** aylandi.

Xodim qoniqishining oshishi va psixologik omillar ham xodimlarni boshqarish samaradorligiga sezilarli ta'sir ko'rsatadi. Qoniqish indeksi +24% ga oshgani — faqat raqam emas, bu:

- ish joyidagi adolat hissi mustahkamlangani
- psixologik iqlim yaxshilangani
- “eshitilayotgan xodim” tamoyili kuchaygani
- xodim va menejment o'rtasidagi ishonch mustahkamlangani demakdir.

Bu jarayon **Mayoning inson munosabatlari nazariyasini** real tasdiqlaydi: “Inson o'zini qadrlangan his qilsa — u samarali ishlaydi.” AI bu jarayonda “insonning raqibi” emas, balki **insonni qo'llovchi to'rtinchi ko'z**, ya'ni xolis kuzatuvchi rolidagi ishladi.

AI yordamida boshqaruv madaniyatining o'zgarishi

Avvallari HR qarorlari ko'pincha:

- tajribaga,
 - sezgiga,
 - shaxsiy fikrga,
 - hissiy yondashuvga
- asoslangan bo'lsa, AI joriy etilgach, qarorlar:
- dalillarga asoslangan,
 - monitoringga tayangan,
 - tizimli kuzatuv natijalariga ko'ra,
 - prognoz metodlari bo'yicha qabul qilina boshlandi.

Bu esa O‘zbekistonda HR boshqaruvining **asosiy madaniy bosqichga o‘tganini** anglatadi. O‘zbekiston sharoiti 11-jadvaldagi omillar bilan ajralib turadi:

11-jadval

Mahalliy mehnat bozori xususiyatlari bilan uyg‘unlashuvi

Omil	Ta’siri
Yoshlar ulushi yuqori	Tez o‘rganish va moslashuv imkoniyati
Raqamli madaniyat shakllanish jarayonida	HR o‘qitish jarayoni muhim
Migratsiya bosimi	AI retention strategiyasini kuchaytiradi
Ayollar bandligi oshmoqda	Gender adolat moduli kerak
Hududlar bo‘yicha tengsizlik	IT HR yordamida balanslanadi

Manba: muallif ishlanmasi.

Shunday ekan, olingan natijalar AI tizimi **milliy mehnat modeliga moslashganini** ko‘rsatadi.

12-jadval

Milliy CRM ni xalqaro tizimlar bilan taqqosiy tahlil

Mezoni	SAP / Workday	Milliy CRM
Til	Global	Mahalliy / O‘zbek
Ma’lumot bazasi	Moslashtirilmaydi	Davlat reyestrlari bilan integratsiya
Etik AI nazorati	Cheklangan	Fairness + XAI joriy
Xarajat	Juda yuqori	Milliy yechim — iqtisodiy
HR madaniyat darajasi	Rivojlangan	Moslashtirilgan rivoj model

Manba: muallif ishlanmasi.

Natija: Milliy CRM — xalqaro tajribani ko‘chirib emas, balki **milliylashtirib** joriy qiluvchi intellektual mahsulot.

Etik tamoyillarning amaliy ishlashi

AI qarorlari uchun tavsiyalar:

- shaffof bo‘ldi,
- izohlanadigan bo‘ldi,
- diskriminatsiya yo‘qligi tekshirildi,
- xodim roziligi bilan o‘tkazildi.

Bu bo‘lim AI etikasi bo‘yicha ISO va OECD tavsiyalariga mos. Demak, AI **inson qadri va sha’nini himoya qiluvchi tizimga aylandi**. Ushbu maqola AI IRBni **insonsizlashtirmasligini ko‘rsatdi**, aksincha insonni yanada qadrlangan, ko‘rilgan va e’tirof etilgan subyektga aylantirishini isbotladi.

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FARG'ONA VILOYATINING YIRIK SHAHARLARIDA YASHIL MAYDONLARNI HUDUDY TASHKIL ETISH VA EKOLOGIK ME'YORLASHTIRISH

***Annotatsiya.** Ushbu maqolada Farg'ona viloyatining Farg'ona, Marg'ilon, Qo'qon shaharlarida yashil maydonlarni hududiy tashkil etish va ekologik me'yorlashtirishga qaratilgan ilmiy tadqiqotlar yoritilgan.*

***Kalit so'zlar.** Yashil maydon, ko'klamzorlashtirish, rekreatsiya, yashil iqtisodiyot, shahar landshafti, ekologik sig'im, antropogen bosim, zonalashtirish.*

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TERRITORIAL ORGANIZATION AND ECONOMIC STANDARDIZATION OF LAND-USE PLANNING IN MAJOR CITIES OF THE FERGANA REGION

***Annotation.** This article highlights scientific research focused on the territorial organization and ecological standardization of green spaces in the cities of Fergana region: Fergana, Margilan, and Kokand.*

***Keywords.** Green areas; landscaping (greening); recreation; green economy; urban landscape; ecological capacity; anthropogenic pressure; zoning.*

Kirish. Bugungi kunda shaharlashuv ya'ni urbanizatsiya jadal so'ratlar bilan rivojlanib, zamonaviy shaharlar aholi uchun komfort sharoit yaratish bilan birga shaharlar landshaft tuzilmasida yashil maydonlar ulishini kamayib borishi tufayli bir qator ekologik muammolar ham yuzaga kelmoqda. Shaharsozlik va shaharlar landshaftini optimallashtirish ayniqsa sanoatining rivojlanishi hisobiga shaharlarning tez suratlar bilan o'sishi jarayonida shaharlar infratuzilmalarini yashil maydonlar hisobiga qayta shakllantirishni talab etadi. Shaharlar landshaftini va uning tarkibiy qismi bo'lgan yashil maydonlarni tashkil etish aholining salomatligini saqlash, shovqin, chang va boshqa zararli manbalardan himoyalangan holda yashashni ko'zda tutuvchi zamonaviy shaharlar va kichik shaharchalarni qo'rish go'yasi bugungi kunda "ekoshahar" lar loyihasini amalga oshirishni taqozo etadi.

"Ekoshahar" atamasi dastlab Richard Register tomonidan 1987 yilda qo'llanilgan va o'zining "экогорода" nomli asarida shaharlar landshaftining va uning tarkibiy qismlarini, ekologik tamoyillar negizida asoslab berdi. Keyinchalik

bu g'oyasini S. Shmelyov va I.Shmelyovalar tomonidan "barqaror shahar" (2009), Jenks M, Jones S(2010) lar tomonidan "Yashil shahar" sifatida rivojlantirildi.

Asosiy qism. Yashil maydonlarni shaharlar hududida optimal maydonlarni egallashi ularni bajaradigan funksiyasiga shaharlar aholisining umumiy miqdorga, sanoat va ishlab chiqarish infratuzilmasining tatkibi, egallagan maydoniga bog'liqdir. Shunga ko'ra V. Makarenko va D. V. Juchkovlar - "Ko'kalamzorlashtirish me'yorlari ko'kalamzorlashtirilgan maydonlarni muayyan qismini tashkil etishi," Yashil orollar " maydoni esa shahar aholisining har bir kishisi soniga, rekreatsiya ehtiyojlari va yashash hududini ekologik holatini yaxshilashga muvofiq bo'lishi kerak " deydi. [4. -75-76 bet]. G.A. Zayseva shaharlar hududida yashil maydonlarning bo'lishi eng muhim ekologik omillardan biri deb e'tirof etadi. [3]

Respublikamizda ham shaharlar hududida yashil maydonlarni tashkil etish, shaharlar ekologik holatini barqarorlashtirish, mamlakat miqyosidagi muhim vazifalardan hisoblanadi. Jumladan " Respublikada ko'kalamzorlashtirish ishlarini jadallashtirish, daraxtlar muhofazasini yanada samarali tashkil etish chora tadbirlari to'g'risida" O'zbekiston Respublikasi Prezidentining PF-46-son (30.12.2024) Farmoni butun mamlakat bo'ylab "Yashil makon" umummilliy loyihasini amaliyotga tatbiq etish, hududlarda "milliy bog'lar" ni tashkil etish kabi ko'plab amaliy ko'rsatmalarni nazarda tutadi.

Yana bir muhim hujjat "2030 yilgacha O'zbekiston Respublikasining " yashil" iqtisodiyotga o'tishga qaratilgan islohotlar samaradorligini oshirish bo'yicha chora-tadbirlar to'g'risida" gi PK-436-son [2]. Qarorida barqaror landshaftlar, o'rmonlarni qayta tiklash va tabiiy resurslardan oqilona foydalanishga asoslangan amaliyotni joriy etish, integratsiyalashgan landshaft yondashuvidan foydalanishni rag'batlantirish, undan samarali foydalanishga qaytarish uchun landshaftni tiklash kabi muhim bandlar kiritilgan. Mazkur Qarorda Respublikamizda har yili 200 mln tup ko'chat ekish, shaharlar yashil maydonlarini 30% dan orttirish kabi ko'rsatmalar berilgan.

Yuqorida keltirilgan me'yoriy huquqiy hujjatlarda keltirilgan ko'rsatmalar va topshiriqlarni bajarish shaharlar hududida alohida tadqiqotlar o'tkazish, shaharlar landshaft tuzilmalarini zonalashtirishda yashil maydonlarni joylashuvi, daraxt va buta o'simlik turlarining muhitga chidamli daraxt va mevali turlarini tanlash, ularni ekologik sig'inimini hosil qilish talab etiladi. Ana shunday tadqiqotlar doirasida biz Farg'ona viloyatiga qarashli Farg'ona, Qo'qon, Marg'ilon shahridagi yashil maydonlar, ularni shaharlar landshaft tuzilmalari ichida tutgan o'rni, ularning hududiy joylashishini, ekologik sig'imini tadqiq etish ishlarini amalga oshirdik. Tadqiqot ishlarimizda landshaft qiyosiy tahlil, landshaft statistik usullaridan foydalandik.

Farg'ona viloyatining Farg'ona, Marg'ilon, Qo'qon shaharlarining landshaft tuzilmalarida yashil maydonlar ko'rsatkichini aniqlash uchun uning umumiy maydoni, aholi yashaydigan hududlar, maydonlar va boshqa tarkibiy tuzilmalarni egallagan maydonlarni qiyosiy tahlil qildik (1 jadvalga qaralsin)

Farg'ona viloyati yirik shaharlari landshaftlari tarkibi.

1 jadval

Landshatlar turi	Umumiy maydonga nisbatan gektar va foiz hisobida					
	Farg'ona		Qo'qon		Marg'ilon	
	Gektar ming. ga	foizda	Gektar ming. ga	foizda	Gektar ming. ga	foizda
Umumiy maydon	10520	100	3710	100	3888	100
Qishloq xujalik yerlari	4399	41.8	144	0.3	-	-
Aholi egallagan hududlar	4495	42.7	2833	76.3	2199	56.5
Sanoat,transport va aloqa yo'llari	968	9.2	852	22.9	1654	42.5
Suv fondi yerlari	99	0.9	-	-	24	0.6
O'rmonlar va yashil maydonlar	113	1.07	-	-	-	-
Tarixiy-madaniy yerlar	6	0.05	11	0.2	11	0.2
Boshqa yerlar	-	-	-	-	-	-
Zaxira yerlar	440	4.1	-	-	-	-

Jadval O. Qo'chqorov(2024) ma'lumotlari asosida tuzilgan

Jadval ma'lumotlaridan ko'rinib turibdiki viloyatning Qo'qon va Marg'ilon shaharlarida deyarli o'rmonlar va yashil maydonlar deyarli yo'q. Farg'ona shahrida esa 1,07% ni tashkil etmoqda. Yuqorida qayd etilgan shaharlarda yashil maydonlar hovli uy tipidagi seliteb hududlarda yo'l chetiga va tomorqa ichiga joylashtirilgan eski turlariga to'g'ri keladi.

Yashil maydonlarni 30% yetkazish ko'rsatishishi bo'yicha shaharlar hududidagi hisob kitoblar shuni ko'rsatadiki, Farg'ona shahrida shahar maydonlarining tashkil etilishi (ekoshahar hisobiga) hisobga olmaganimizda 3156 gektar yerni ko'kalamzorlashtirish ya'ni yashil makon hosil qilish talab etiladi. Qo'qon shahri uchun esa 1113 ga, Marg'ilon shahri uchun esa 1166,4 ga maydon talab etiladi. Bugungi shaharlarni usishi, ko'p qavatli uy joylari qurishni xususiy tadbirkorlar tomonidan amalga oshirilishini hisobga olgan holda aytishimiz mumkinki, yashil maydonlarni shaharlar hududida 30% ga yetkazishni imkoniyati chegaralanib qolmoqda. Buning asosiy sababi tadbirkorlar tomonidan aholiga qarashli bir qavatli eski tushdagi hovlilarni sotib olish o'rniga ko'p qavatli uylarni qo'rish hatto ko'p qavatli binolar oralig'idagi yashil maydon va bolalar maydonchasi uchun ajratilgan yerlarga ham tartibsiz ravishda qorilish amalga oshirilayotganligidadir.

Shuning bilan birga Farg'ona shahrida aholining o'rtacha zichligi 1km² ga 2940 kishini, Marg'ilon shahrida 5800 kishini, Qo'qon shahrida esa 6768.5 kishiga

to'g'ri keladi. Mazkur shaharlar hududida 9 qavatli va undan yuqori bo'lgan binolarni qo'rilishi shaharlar maydoniga antropogen bosimni orttirib yuboradi. Agarda yashil maydonlarni ekologik me'yorlarini 3m^2 / kishi deb hisoblaganimizda ham uni tashkil etish uchun o'rtacha 4-5 qavatli binolar atrofida 500-600 kv/m 9-12 qavatli binolar atrofida esa 800-1200 kv/m, yashil maydonlar tashkil etilishi kerak bo'ladi.

Xulosalar

Yuqorida keltirilgan ma'lumotlar shuni ko'rsatadiki, shaharlar hududida yashil maydonlarni tashkil etish, ularning ekologik sanitar-gigienik talabalar asosida joylashtirishda shaharlarning funksiyalarini hisobga olish talab etiladi. Shuningdek shaharlar hududini zonalashtirish, uning tarkibidagi yashil maydonlar, rekreatsiya zonalarini aholi yashaydigan maydonlar hamda sanoat zonalaridan kam bo'lmagan ko'lamda tashkil etish zarur.

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FARG'ONA VILOYATI YERLARINING MELIORATIV HOLATIGA TA'SIR ETUVCHI OMILLAR

Annotatsiya. Maqolada Farg'ona viloyatining sug'oriladigan yerlarining meliorativ holati va unga ta'sir etuvchi tabiiy va antropogen omillar bayon qilingan.

Kalit so'zlar: yer fondi, melioratsiya, tabiiy omillar, antropogen omillar, sho'rlanish, meliorativ baholash.

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FACTORS AFFECTING THE MELIORATIVE CONDITION OF FERGANA REGION

Annotation. The article describes the meliorative state of irrigated lands in Fergana region and the natural and anthropogenic factors influencing it.

Keywords: land fund, melioration, natural factors, anthropogenic factors, salinization, land reclamation evaluation

Kirish. Bugungi kunda yerlarni meliorativ holati qishloq xo'jaligi ekinlarining hosildorligiga ta'sir qiluvchi asosiy omillardan biridir. Respublikamiz, shu jumladan viloyat aholisi sonining doimiy ortib borishi qishloq xo'jaligi maydonlarning umumiy kamayib borishi barobarida qishloq xo'jaligi maydonlarning doimiy yetishmasligi holatlari yuzaga kelmoqda. Farg'ona viloyatida 2025 yilning 1-yanvariga ko'ra 4 mln 181000 aholi mavjud bo'lib, bu o'tgan shu davrga nisbatan 2% o'sishni ta'minlagan. Viloyat bo'ylab umumiy yer maydoni 675.3 ming gektarni tashkil etib shundan 368.7 ming gektar sug'oriladigan yerlar hisoblanadi. Respublikamizda sug'oriladigan yerlarni meliorativ holatini yaxshilash, yerlarni unumdorligi orttirish masalalari bugungi kunda dolzarb muammo hisoblanib O'zbekiston Respublikasi Vazirlar Mahkamasining "Sug'oriladigan yerlarni meliorativ holatini yaxshilash dasturlarini shakllantirish va amalga oshirish ishlarini yanada takomillashtirish chora tadbirlari to'g'risida" gi 401 son 30.06. 2025 yil Qarorida ham bu masalani ijobiy hal etish maqsadida amaliy dasturlarni ishlab chiqish va uni joriy etishga qaratilgan ko'rsatmalar mavjud.

Asosiy qism. Farg'ona viloyati hududi va uning qishloq xo'jaligi maydonlarni meliorativ holatini belgilovchi bir qismga tabiiy va antropogen omillar mavjuddir. Tabiiy omillar ichidagi muhimi viloyat hududning geografik joylashuvi, iqlimi, gidrologik omillari va yer yuzasining holati hisoblanadi. Ayniqsa relyefining....

simon holati yer osti suvlarining belgilab beradi. Shunga ko'ra adirlararo pastqamliklar, adir orti qiya tekisliklari va konussimon yoyilmalarning qo'yi qismlari yer osti suvlarining ko'tarishi zonasi hisoblanadi. Ayniqsa markaziy Farg'ona hududida sizot suvlar og'ir drenajlanadi va yer yuzasiga yaqinlashadi. Bunga esa relefning pastqamligi va nishablagining kamligi, Sirdaryo o'zaniga yaqinlagi sabab bo'ladi.

Farg'ona viloyati yerlarining meliorativ holatiga ta'sir etuvchi tabiiy omillarga daryo va soyliklarning suv rejimini aytib o'tish joiz. Shuning bilan birga suvdan sog'orishga foydalanish davridagi sog'orish normasini saqlagan holda tejash ko'rsatgichi 36% ga teng bo'lganda vodiy bo'yicha sog'orishga 10,1 km³ suv o'rniga 6,7 km³ suv sarflanadi. [3. 86-87]. Suv tanqisligi Farg'ona viloyatining shimoliy hududlariga to'g'ri keladi. Aynan shu hududlarning suv tanqisligi kamaytirish maqsadida markaziy Farg'onaga qo'rilgan suv omborining ahamiyati katta, lekin suv ombor atrofidagi tabiiy o'zgarish hududlari botqoqlashib bormoqda.

Farg'ona viloyati yerlarining meliorativ holatiga ta'sir etuvchi antropogen omillardan muhimi sug'orish rejimi va uslublari hisoblanadi. Bugungi kunda viloyatdagi asosiy sog'oriladigan maydonlarda an'anaviy egatlar va jueklar orqali sog'orish amalga oshirilmoqda. Shuning bilan birga aytish joizki, sog'orish manbalari bo'lgan katta Farg'ona kanali, Katta Andijon kanalidan filtraluvchi yer osti suvlari ham og'ir drenajli markaziy Farg'ona hududida yuqoriga ko'tarilib 1-1,5m li sathni hosil qilmoqda. Bundan tashqari Sirdaryoning suv rejimini o'zgarib turishi ayniqsa Beshariq, Yangiqo'rg'on tumanlarining meliorativ holatini belgilab beradi.

Sog'oriladigan yerlarining meliorativ holatini belgilashda sizot suvlarning sathi va tuz rejimi ham asosiy omillardan biridir. Sizot suvlarining chuqurligi bo'yicha Farg'ona viloyatida 0,1,0 m gacha bo'lgan yerlar 3887 ga ni, 2025 yilda esa 2760 ga ni tashkil etgan. Sho'rlanish ko'rsatkichi bo'yicha ham viloyat hududida kamayish tendensiyasi yuzaga kelgan, masalan sho'rlanish ko'rsatgichi 3-5 g/l ga teng maydonlar 2000-yilda 6506 ga ni, 2025 - yilda 3008 ga ni tashkil etgan. Bugungi kunda sog'oriladigan yerlarining meliorativ holatini o'zgarishi sog'oriladigan yerlar maydoning qisqarishi, sog'orish tizimlari va texnologiyalarining takomillashuvi, ikkinchi tomondan suv resurslarining yetishmasligi fonida yuzaga kelmoqda. Global iqlim o'zgarishi sharoitida suv resurslarining kamayib borishi nafaqat viloyatimiz, balki respublikamiz uchun ham katta muammolarni keltirib chiqarmoqda. Respublikamiz hududiga kirib keluvchi suv manbalarining suv miqdorini anamal o'zgarishi tufayli uning resurs salohiyati kamayib bormoqda.

Xulosalar

Yerlarni meliorativ holatini doimiy nazorat qilish, monitoring o'tkazish, o'simliklarni diversifikatsiya qilish orqali meliorativ holatni barqarorlashtirish mamlakatimiz miqyosidagi strategik vazifalardan hisoblanadi. Bu borada "Sog'oriladigan yerlarning meliorativ holatini yaxshilash dasturini shakllantirish va amalga oshirishni takomillashtirish chora tadbirlari to'g'risida" gi O'zbekiston Respublikasi Vazirlar Mahkamasining 2017 yili 13.XII-dagi Qarori, shuningdek,

O'zbekiston Respublikasi Prezidentining 2017-yil 4-yarmidagi PQ- sonli qarorini bajarish yuzasidan 2019-yil 29XII dagi O'zbekiston Respublikasi Vazirlar Mahkamasining "yer osti suvlaridan foydalanish sohasidagi faoliyatini tartibga solish chora tadbirlari to'g'risida" gi Qarori va boshqa me'yoriy hujjatlarda keltirilgan ko'rsatmalarni bajarish, davlat dasturlarini amalga oshirish tufayli yerlarni meliorativ holatini yaxshilash, biologik mahsuldorligini oshirish kabi muhim vazifalarni amalga oshirish mumkin.

Foydalanilgan adabiyotlar

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2. Xoliqov R.Yi. Farg'ona vodiysi monografiy. T. " Navro'z" nashriyoti, 2020 - 168 bet

IMPROVEMENT OF METHODOLOGICAL TRAINING OF FUTURE PHYSICS TEACHERS IN HIGHER EDUCATIONAL INSTITUTIONS

Abstract: *The formation of preparation for the training consists of the formation of professional skills, creativity skills in future physics teachers, the development of communication culture, pedagogical technique and technology skills, the formation of the initial potential of teaching skills, teaches students and pupils the secrets of observation, creativity, independent mastering of advanced pedagogical practices, the distribution of attention in the process of reading and teaching, knowledge, skills and qualifications, provides control of mental states.*

Keywords: *Education, science, new education system, new approaches, pedagogical techniques, observation, creativity, advanced pedagogical experience.*

Based on the meaning of the state policy for the development of education and science and its relevance, it can be explained as follows: firstly, The new education system, changes and new approaches to training a mature generation of personnel, the emergence of modern professional fields and their connection with the conditions of our country; secondly, as a result of socio-economic development, the concept of education has become a separate, independent sphere of human activity from a certain period, transferring the social experience of society to the next stage; thirdly, **education** is a set of actions aimed at forming the intellectual and spiritual aspects of a person, ensuring his active and successful participation in the production of society and social, political, cultural, educational life, and means enlightenment and imparting knowledge; fourthly, Science is one of the social institutions of society, a form of social consciousness that reflects the life of nature and society. It combines great scientific potential and creative power, serves to educate a spiritually mature person, and to create a powerful scientific potential in the country [1; p. 50-51].

the education sector, first of all, with primary education. However, the most advanced and experienced teachers should be involved in the primary grades, where the child's worldview, tastes, and potential are formed. Therefore, it is planned to radically reform school education, the secondary specialized education system, and also higher education. [2; p. 36].

Today, education in our Republic has changed radically, that is, different content, different approaches, different attitude, different behavior, high-level pedagogical processes, different pedagogical mentality are recommended:

- the content of education is being enriched with new improved skills and qualifications, actions on information, development of abilities, creative solving of

scientific problems, and practices based on innovative technological equipment in educational programs;

- traditional methods of information - oral and written speech are giving way to computer means of teaching, to use a huge telecommunication network;

- An important organizer of the pedagogical process is the focus on the personal orientation of the teacher's contact with future teachers;

- special importance is attached to the spiritual upbringing of the person, the moral image of the person;

- the importance of science in creating innovative pedagogical and information technologies is increasing [3 ; 41-b].

It requires a methodological approach to the content of education in the formation of knowledge, qualifications and skills intended for the professional preparation of future physics teachers in higher educational institutions.

Literature, dissertations, monographs on improving the teaching of natural sciences, general professional and specialized sciences, increasing its effectiveness, and using pedagogical and information-communication technologies were analyzed and the necessary conclusions were drawn.

In particular, in the course of our research, we were able to research the sources that serve as the methodological basis for improving the methodological training of future physics teachers as follows:

- legal and normative foundations for ensuring the effectiveness of education, holistic human development, and training of competitive, competent future teaching staff (legislation in the field of youth education and training, PERSONNEL TRAINING , Decrees and Resolutions of the President of the Republic of Uzbekistan, legal and normative documents of the Cabinet of Ministers, relevant ministries, departments, and international organizations on the status of teachers);

- among these are the international scientific ideas of mature methodologists, pedagogues, physicists, psychologists of our country and abroad on ensuring the quality of education and training competent future teachers.

- Based on these methodological ideas, the qualification requirements for the competence of a modern teacher are set out in a number of international and national legal and regulatory documents. In particular, they are set out IN THE RESOLUTION of the President of the Republic of Uzbekistan No. PP-3775 dated June 5, 2018 “ On additional measures to improve the quality of education in higher educational institutions and ensure their active participation in the large-scale reforms being implemented in the country, ” which also serves as the basis for determining the criteria for improving the scientific and methodological training of future physics teachers [4].

Among them:

- supreme education system of modernization dominant directions ;
- management of competence structure and content to know ;
- teaching innovative form , method and of the means the essence understanding and training in the process the application organization and control to do ;

- communicative, psychological, organizational, creative, informative, innovative competence concepts content ;
- supreme education in institutions educational-methodical activity organization verb and development [4; 18-19 p].

Physics bullet physics in the process of shooting We explain the importance of professional orientation for teachers with the following :

- from physics theoretical the gap in knowledge and practical training is easily overcome;
- an opportunity is created to fully master the given knowledge, skills and abilities, which in turn helps to improve the teacher's pedagogical skills;
- in general, it has a positive effect on increasing motivation to study and work;
- is taught self-control and correction of shortcomings;
- they receive intellectual education through creative acquisition of knowledge, skills and abilities, etc. [5 ; 85-p].

Since our republic, as an independent state, has set itself the goal of building a democratic society and becoming one of the most developed countries in the world, this, of course, sets certain tasks for the education system [6 ; p. 11] .

A future physics teacher should know the theoretical science that forms the basis of physics, including fundamental theories, laws of nature, and scientific concepts (based on experimental evidence about the micro- and macrocosm of elementary particles and the electromagnetic field). Physical theories include the laws of conservation, special relativity and theories of gravity, classical and quantum mechanics, solid-state physics and the structure of matter, statistical physics and thermodynamics, nuclear and elementary particle physics, and others.

Thus, the issue of improving the methodological training of future physics teachers is an urgent scientific -methodical problem , comprehensive study of its methodological and scientific-theoretical foundations , comparative analysis, practical implementation of the theoretical ideas advanced on the basis of conclusions and recommendations is the guarantee of the training of teaching personnel in accordance with the requirements of the time .

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SOHA TERMINOLOGIYASINI SHAKLLANTIRISHNING LINGVISTIK JIHATLARI

Annotatsiya. Ushbu maqolada terminologiya fani borasida so'z yuritiladi. Terminlarning shakllanish manbalari, ularning semantik xususiyatlari, standartlashtirish tamoyillari hamda soha terminologiyasini tartibga solishning lingvistik va amaliy jihatlari tahlil qilinadi. Tadqiqot natijalari terminologik tizimni ilmiy asosda rivojlantirish va uni qo'llash bo'yicha muhim nazariy-amaliy xulosalarni taqdim etadi.

Kalit so'zlar: termin, terminologiya, termin tizimi, termin yaratish, standartlashtirish, lingvistik tahlil, terminologik me'yor.

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LINGUISTIC ASPECTS OF THE FORMATION OF FIELD TERMINOLOGY

Abstract. This article discusses the science terminology. The sources of term formation, their semantic features, the principles of standardization, and the linguistic and practical aspects of regulating field-specific terminology are analyzed. The research results provide important theoretical and practical conclusions for the scientific development and application of the terminological system.

Key words: term, terminology, terminological system, term formation, standardization, linguistic analysis, terminological norm.

Terminologiya fanining mustaqil yo'nalish sifatida shakllanishi XX asr boshlariga to'g'ri keladi. Ilk bor bu tushunchani tizimli ravishda ilmiy muomalaga Avstriya olimi Eugen Wüster kiritgan bo'lib, u terminlarni standartlashtirish va yagona semantik asosda ishlatish muammolari bilan shug'ullangan. Uning "Einführung in die allgemeine Terminologielehre" asarida qayd etilishicha, terminologiya bu fanlararo aloqada ishtirok etuvchi konseptlar uchun yagona belgilar tizimini ishlab chiqishga xizmat qiluvchi ilmiy yo'nalish bo'lib, ushbu soha "ilmiy muloqotni to'siqsiz amalga oshirish kafolati"dir. [8, 21]

Keyinchalik bu g'oyalar G'arb va Sharq terminologik maktablari tomonidan rivojlantirildi. Jumladan, fransuz tilshunosi Alain Rey o'zining "La Terminologie: noms et notions" asarida terminologiyani tilshunoslik, mantiq, falsafa va informatika bilan uzviy bog'liq kompleks tizim sifatida talqin etgan. [7, 13]

O‘z navbatida, rus terminologiyasi maktabining vakillari V.M.Leychik, S.V.Grinyov va Yu.N.Marchuk ushbu sohani ilmiy jihatdan chuqur tahlil va tadqiq qilishga katta hissa qo‘shgan.

Ma’lumki, o‘zbek tilshunosligida ham terminologiyaning nazariy va amaliy masalalari bilan bir qator olimlar shug‘ullanib kelishgan, hozirda ham Sh.Rahmatullayev, A.Hojiyev, G‘.Abdurahmonov, M.Qodirova, R.Umarovlarning tadqiqotlarida terminlar yaratish, ularni o‘zlashtirish, sohalar bo‘yicha klassifikatsiya qilish kabi muhim nazariy qoidalar bayon etilgan.

Shuningdek, zamonaviy tibbiy terminologiya, ayniqsa stomatologiya kabi ixtisoslashgan fanlarda yanada dolzarb ahamiyat kasb etmoqda. Sababi, bu sohalarda yangidan-yangi tushunchalar va diagnostik-uslubiy texnologiyalar doimiy ravishda paydo bo‘lmoqda. Bu esa o‘z navbatida, ilmiy-tibbiy terminlarning standartlashtirilgan, izchil va xalqaro talablarga javob beruvchi shaklda shakllanishini taqozo etadi. Stomatologik terminologiyada, ayniqsa, fransuz tilida, yunon-lotin termin elementlari asosida yaratilgan atamalar keng tarqalgan bo‘lib, ular umumiy tibbiy terminologiyaning ajralmas qismi hisoblanadi.

Terminologiya nazariyasining chuqurlashuvi, albatta, fanlarning o‘zaro murakkablashuvi, ixtisoslashuvi va doimiy yangilanishi bilan chambarchas bog‘liq. Har bir fan sohasi o‘zining maxsus leksik tizimini shakllantiradi. Bu tizim esa o‘z navbatida o‘zaro bog‘liq terminlardan iborat bo‘lgan terminosistemani tashkil etadi. V.A.Tatyanchenkonig fikricha, “terminologik tizim bu — bir-biriga ichki semantik va ierarxik jihatdan bog‘langan terminlar majmuasidir”. [5, 47] Bunday tizimlar ilmiy bilimlarni kodlash, saqlash va uzatishda asosiy til vositasi bo‘lib xizmat qiladi.

Bu jihatdan, meditsina fanining terminologik tizimi eng boy va tizimlashtirilgan sohaga aylangan. Ayniqsa, tibbiy yo‘nalishlar ichida stomatologiya — mustaqil fanga aylangach, o‘z terminologiyasini xalqaro birlik asosida shakllantira boshladi. Dastlab stomatologik terminlar umumtibbiy atamalar doirasida qaralgan bo‘lsa-da, hozirda ular alohida tizim sifatida o‘rganilmoqda. V.V.Vinogradov stomatologiyani “tibbiyotdagi eng ko‘p ixtisoslashgan va terminologik jihatdan boy yo‘nalishlardan biri” deb ataydi. [1, 112]

Stomatologik terminlarning asosiy xususiyati shundaki, ular yunon-lotin termin elementlari asosida shakllangan bo‘lib, ushbu asoslar ularni xalqaro darajada tan olinadigan va bir xil tushuniladigan qilgan. Masalan, "stomatologie", "orthodontie", "parodontite", "odontalgie" kabi terminlarning shakllanishi yunoncha “stoma” – og‘iz, “orthos” – to‘g‘ri, “odontos” – tish, “algos” – og‘riq kabi o‘zaklarga borib taqaladi. Bu esa ularni fransuz, ingliz, nemis, rus, o‘zbek tillarida deyarli bir xil shaklda qabul qilinishini ta’minlagan. [2, 320]

Ushbu holat E.Wüster tomonidan ilgari surilgan terminologik birlik nazariyasiga to‘la mos keladi. U terminlarning xalqaro standartlashuvi haqida shunday yozadi: “Agar fanlararo yoki davlatlararo hamkorlik samarador bo‘lishi istalsa, terminlar barcha tillarda bir xil semantik tozalikka ega bo‘lishi kerak”. [8, 34] Shuning uchun ham tibbiyotda, ayniqsa stomatologiyada terminlarning yunon-lotin asosida shakllanishi tasodifiy emas.

Bundan tashqari, terminlar faqat leksik birlik emas, balki kognitiv model hamdir. Bu fikrni V.M.Leychik ham ilgari surgan. U terminlarni “fanning konseptual bazasini aks ettiruvchi mantiqiy struktura” sifatida ko‘radi. [3, 39] Ayniqsa, tibbiyot fanida, har bir yangi aniqlangan sindrom, protsedura, asbob yoki fiziologik hodisaga yangi terminning pasda bo‘lishi — bu fanning kognitiv jihatdan boyishidan dalolat beradi. Misol uchun, "implantologie", "gingivoplastie", "endodontie" kabi atamalar sohaning tor ixtisoslashgan qismlariga doir bo‘lib, har biri aniq semantik belgilashga ega.

Ma’lumki, o‘zbek tili terminologiyasida ham stomatologik terminlar ko‘pincha rus tilidan o‘zlashtirilgan holda qo‘llaniladi, biroq ularning aksariyati aslida yunon-lotin asosida shakllangan. O‘zbek tilshunos olimasi M.Qodirova bu haqida shunday deydi: “O‘zbek tiliga tibbiy terminlarni o‘zlashtirishda ularning fonetik mosligi bilan birga, xalqaro semantik birlikni saqlash muhimdir”. [6, 33] Shuning uchun "parodontit", "ortodontiya", "stomatologiya" kabi atamalar to‘g‘ridan-to‘g‘ri xalqaro modeli bilan mos holda kiritilgan.

Zamonaviy terminshunoslikda bunday terminlarni shakllantirishda faqat lingvistik emas, balki ontologik va funksional yondashuvlar ham qo‘llanilmoqda. Masalan, Yu.N.Marchuk stomatologik terminlarni kontekstual qo‘llanilishi, predmet-munosabat tizimidagi o‘rni va semantik chegaralari asosida tahlil qilish zarur deb hisoblaydi. [4, 42] Shu sababli zamonaviy terminologik tadqiqotlar aynan stomatologik sohada terminlarning tasnifi, strukturasi va milliy moslashuvi bilan bog‘liq murakkab jarayonlarni o‘z ichiga oladi.

Yuqorida keltirilgan fikrlar asosida aytish mukinki, stomatologik terminologiya nafaqat maxsus atamalar yig‘indisi, balki u fanning ontologik mohiyatini ifoda etuvchi, ilmiy-tibbiy kommunikatsiyani samarali tashkil etuvchi muhim til tizimi ekanligini ko‘rsatadi.

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COMPREHENSIVE ANALYSIS OF HEAVY METAL IONS USING BIOADSORBENTS

Abstract. This article provides a comprehensive 10-page overview of the use of bioadsorbents for the detection and quantification of heavy metal ions. The study highlights eco-friendly adsorption mechanisms, analytical techniques, and biomedical relevance of removing toxic metals from the environment. Conventional technologies for the removal/remediation of toxic metal ions from wastewaters are proving expensive due to non-regenerable materials used and high costs. Biosorption is emerging as a technique offering the use of economical alternate biological materials for the purpose. Functional groups like carboxyl, hydroxyl, sulphydryl and amido present in these biomaterials, make it possible for them to attach metal ions from waters.

Keywords: Bioadsorbents, Heavy Metal Ions, Environmental Chemistry, Adsorption Mechanism, Toxicology, Water Purification, Analytical Methods

Heavy metal ions such as Pb^{2+} , Cd^{2+} , Hg^{2+} , Cr^{6+} , and Ni^{2+} pose significant health risks due to their bioaccumulative and carcinogenic nature. Bioadsorbents derived from natural materials—plants, microorganisms, agricultural wastes, and biopolymers—have emerged as reliable, sustainable, and cost-effective tools for their analytical detection.

Chemical Basis of Bioadsorption. Bioadsorption involves physical and chemical interactions between metal ions and functional groups such as hydroxyl, amino, carboxyl, and sulfhydryl groups present in biomaterials. These interactions enable selective binding, making bioadsorbents useful for both qualitative and quantitative analysis.

Types of Bioadsorbents. Common bioadsorbents include chitosan, cellulose-based materials, algae, fungal biomass, activated carbon from plant residues, and protein-rich materials. Their unique surface chemistry allows high metal uptake capacity.

Bioadsorption can be combined with spectrophotometry, atomic absorption spectroscopy (AAS), ICP-MS, and titrimetric analysis to enhance detection sensitivity. Pre-concentration by bioadsorbents increases method accuracy and reduces cost.

In medical chemistry, monitoring heavy metals is essential due to their neurotoxic, nephrotoxic, and hepatotoxic effects. Bioadsorbent-based methods provide safe, efficient, and rapid approaches to assessing biological exposure.

The following table summarizes the adsorption performance of common bioadsorbents.

Bioadsorbent	Target Heavy Metal	Adsorption Capacity (mg/g)	Advantages
Chitosan	Pb ²⁺ , Cd ²⁺	150–250	Biocompatible, high affinity
Activated Carbon	Hg ²⁺ , Pb ²⁺	300–500	Large surface area
Algal Biomass	Ni ²⁺ , Cr ⁶⁺	100–180	Eco-friendly, low cost
Fungal Biomass	Cu ²⁺ , Zn ²⁺	80–160	High selectivity

Bioadsorbent-mediated detection continues to evolve with advancements in nanotechnology and surface modification. Recent studies demonstrate that hybrid bio-nanocomposites significantly enhance sorption capacity and analytical precision. Furthermore, sustainable green chemistry initiatives promote using agricultural waste as biosorbents to reduce environmental pollution.

The use of inexpensive and efficient materials, wheat straw and wheat bran, for metal biosorption has been reviewed. Relatively shorter contact time, endothermic nature of biosorption process (in most cases), acidic pH range and high affinity for metal ions was found. The use of WS needs further investigation as more literature is available for the use of WB. Biosorption requires investigation in structural studies of biosorbents, multi-metal studies, mechanistic modeling, recovery of metal

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DUNYONI TUSHUNISHNING YANGI KALITI: KOMPLEKS SONLAR

Annotatsiya. Ushbu maqola matematikaning eng hayratlanarli tushunchalaridan biri – kompleks sonlar haqida. Unda o'quvchilarga maktabda "mavjud emas" deb o'rgatilgan manfiy son ildizi tushunchasi qanday qilib yangi matematik olamga – kompleks sonlar dunyosiga olib chiqqani batafsil tushuntirilgan.

Kalit so'zlar. Kompleks son, mavhum birlik, kompleks tekislik, Euler formulasi, haqiqiy va mavhum qism, modul va argument, signal qayta ishlash, elektrotexnika, Kvant mexanikasi, Fraktallar, trigonometrik shakl, ikki o'lchovli son, algebraik kengaytma.

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A NEW KEY TO UNDERSTANDING THE WORLD: COMPLEX NUMBERS

Annotation. One of the most amazing mathematical connections of the triangle is about complex numbers. It shows how the root of a negative number, which students were taught in school as "nonexistent," leads them into a new mathematical world - the world of complex numbers.

Keywords. Complex number, abstract unit, complex plane, Euler's formula, real and abstract part, modulus and argument, signal processing, electrical engineering, Quantum mechanics, Fractals, trigonometric form, two-dimensional number, algebraic extension.

Kirish

Bizga maktabdan ma'lumki, manfiy sondan ildiz chiqarib bo'lmaydi. Agar siz kalkulyatorda $\sqrt{-9}$ ni hisoblamoqchi bo'lsangiz, u sizga xato chiqishini ko'rsatadi. Lekin matematiklar buni xisoblashga qaror qilishdi – ular qoidani yangi qoida bilan almashtirdilar. Bu qaror butun bir yangi, hayratlanarli va amaliy ahamiyatga ega bo'lgan dunyoni – "Kompleks sonlar olami"ni ochib berdilar.

Asosiy tushunchalar va formulalar

Taqqidan kelib chiqqan g'oya: "Mavjud bo'lmagan" birlik

Asosiy muammo shundan iborat: i deb nomlangan yangi birlikni kiritamiz, bunda:

$$i = \sqrt{-1} \text{ yoki } i^2 = -1$$

Bu shunchaki bir belgi. Xuddi manfiy sonlar qarzni ifodalash uchun ixtiro qilingan bo'lsa, i ham "mavjud bo'lmagan" sonni ifodalash uchun kiritilgan.

Endi, $\sqrt{-9}$ ni quyidagicha yozish mumkin:

$$\sqrt{-9} = \sqrt{9} \sqrt{-1} = 3*i \text{ yoki } 3i$$

Mana, biz "mavjud bo'lmagan" narsani hisoblab oldik!

Kompleks son nima?

Kompleks son ikki qismdan iborat:

$$Z = a + bi$$

Bu yerda: a – haqiqiy qism (Real part). Bu bizga tanish oddiy son.

b – mavhum qism (Imaginary part). Bu i ning oldidagi koeffitsient.

Misol: $3 + 2i$, $-5i$ ($a=0$, $b=-5$), 7 ($a=7$, $b=0$).

Kompleks sonlar qayerda ishlatiladi? (Siz buni sezmagan bo'lishingiz mumkin).

Kompleks sonlar faqat g'alati matematik g'oya emas, balki zamonaviy texnologiyaning asosi hisoblanadi.

1. Elektrotexnika va energetika: Tokning kuchi va yo'nalishini (fazasini) hisoblashda kompleks sonlar juda qulay. Barcha generatorlar, transformatorlar va elektr tarmoqlari kompleks sonlar yordamida loyihalashtiriladi.

2. Signal qayta ishlash: Mobil telefon, Wi-Fi, radiosi – barchasida kompleks sonlar ishlaydi, chunki ular signalni kompleks sonlar shaklida ifodalaydi. Bu bizga musiqani siqish (MP3), tasvirlarni siqish (JPEG) va hatto tibbiyotda MRI skanerlash imkonini beradi.

Kompleks sonlarning eng ajoyib jihati: Euler formulasi

Agar kompleks sonlar haqida faqat bitta narsani eslab qolishingiz kerak bo'lsa, u quyidagi tenglama bo'ladi. Shveysariyalik buyuk matematik Leonard Euler quyidagi ajoyib tenglamani kashf etdi:

$$e^{i\pi} + 1 = 0$$

Bu tenglama matematikaning eng go'zal formulasi deb ataladi. Nima uchun?

Chunki u matematikaning beshta eng muhim doimiyasini bitta oddiy va mukammal tenglikda birlashtiradi: Bu yerda:

“ e ” – natural logarifmlar asosi (≈ 2.718)

“ i ” – mavhum birlik ($\sqrt{-1}$)

“ π ” – aylana uzunligi va diametr nisbati (≈ 3.141)

“1” – ko'paytirish birligi

“0” – qo'shish birligi (nol)

Bu beshta asosiy tushuncha, bir-biri bilan hech qanday aloqasi yo'qdek tuyulsa ham, aynan shu sodda munosabatda uchrashadi. Bu matematikaning sirli uyg'unligini ko'rsatadi.

Elektron qurilmalardan tortib, kosmosga parvoz qilishgacha bo'lgan texnologiyalarning ko'pchiligi ana shu "mavhum" g'oya ustiga qurilgan. Demak,

kompleks sonlar nafaqat qiziqarli, balki dunyoni tushunish va uni o'zgartirishning eng kuchli vositalaridan biridir.

Kompleks sonlarni geometrik tasvirlash: Kompleks tekislik

Kompleks sonlarni tasvirlash uchun biz kompleks tekislik (Argand diagrammasi) deb ataladigan maxsus koordinatalar sistemasidan foydalanamiz.

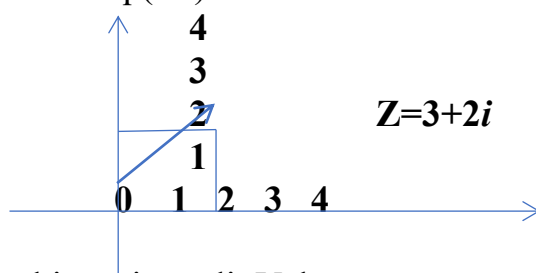
Asosiy tushuncha: Har qanday kompleks son $z = a + bi$ ni tekislikdagi nuqta sifatida ko'rsatish mumkin:

Haqiqiy o'q (X o'qi): "a" ning qiymati (haqiqiy qism)

Mavhum o'q (Y o'qi): "b" ning qiymati (mavhum qism)

Misol: $Z = 3 + 2i$ sonini kompleks tekislikda (3; 2) nuqtasi sifatida belgilaymiz.

Mavhum o'q (Im)



Ikkinchi tasvir usuli: Vektor

Kompleks sonni koordinata boshidan (0;0) berilgan nuqtaga cho'zilgan vektor sifatida ham tasavvur qilish mumkin. Bu usul kompleks sonlar ustida amallarni geometrik tushunishda juda qulay.

Uchinchi tasvir usuli: Trigonometrik shakl

Bu eng kuchli usullardan biri. Kompleks sonni uzunlik va burchak orqali ifodalaymiz:

$Z = r(\cos \varphi + i \sin \varphi)$ yoki $z = r * e^{i\varphi}$ (Euler formulasi)

Bu yerda: "r" modul: nuqtaning koordinata boshigacha bo'lgan masofasi

$$r = |Z| = \sqrt{a^2 + b^2}$$

" φ " - argument: vektorning haqiqiy o'q bilan hosil qilgan burchagi

Geometrik tasvirning afzalliklari

1. Qo'shish va ayirish - vektorlar qo'shishiga o'xshaydi:

$$(3 + 2i) + (1 + i) = (4 + 3i)$$

2. Ko'paytirish - modullar ko'payadi, argumentlar qo'shiladi:

$$r_1 \cdot r_2 \text{ va } \varphi_1 + \varphi_2$$

3. Bo'lish - modullar bo'linadi, argumentlar ayiriladi:

$$r_1/r_2 \text{ va } \varphi_1 - \varphi_2$$

Xulosa.

Kompleks sonlarni geometrik tasvirlash:

➤ -Murakkab tushunchalarni vizual va tushunarli qiladi

➤ -Algebraik amallarni geometrik sharhlash imkonini beradi

➤ -Fizika va muhandislikdagi ko'plab muammolarni hal qilishda yordam beradi.

Bu tasvir kompleks sonlarni nafaqat raqamlar, balki tekislikdagi nuqtalar yoki vektorlar sifatida qarash imkonini beradi, bu ularning tabiatini chuqurroq tushunishga yordam beradi.

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XORIJIY MANBALARDA MO'G'UL ULUSLARI TARIXIGA OID MALUMOTLAR (MARKO POLO MA'LUMOTLARI ASOSIDA)

***Annotatsiya.** Mazkur maqolada venetsiyalik mashhur sayyoh Marko Poloning 1298-yilda yozilgan «Marko Polo kitobi» asariga tayanilgan holda mo'g'ullar tarixiga oid xorijiy manbalar tahlil qilinadi. Unda muallifning 1271–1295-yillar oralig'ida Sharq mamlakatlariga amalga oshirgan sayohatlari davomida Xitoy, Mo'g'uliston va mo'g'ullar hukmronligi ostida bo'lgan hududlar haqida bergan tarixiy, geografik hamda etnografik ma'lumotlari yoritilgan. Xususan, mo'g'ul davlat boshqaruvi, harbiy tizimi, pochta aloqalari, iqtisodiy hayoti, xalq urf-odatlar va diniy e'tiqodlariga oid muhim faktlar bayon etilgan. Asarda Chingizxon shaxsi va siyosiy faoliyatiga berilgan tavsiflar, shuningdek, uning avlodlari, xususan, Xubilayxon faoliyatiga oid ma'lumotlar alohida o'rin egallaydi. Marko Polo Xitoyda 17 yil davomida yashagan va Xubilayxon xizmatida turli diplomatik hamda ma'muriy vazifalarni bajarganligi ta'kidlanadi. Shu bilan birga, u Xitoyning turli hududlariga qilgan sayohatlari orqali o'z davri uchun noyob bo'lgan kuzatuvlar asosida mo'g'ullar davlatchiligi haqida batafsil ma'lumotlar bergan.*

***Kalit so'zlar:** Marko Polo, Mo'g'ullar tarixi, Mo'g'ul davlatchiligi, Xubilayxon, Chingizxon, Yevropa sayyohlari, Markaziy Osiyo, mo'g'ullar pochta tizimi, xorijiy manbalar, etnografik ma'lumotlar, geografik tasvirlar.*

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HISTORICAL INFORMATION ON THE MONGOL ULUSES IN FOREIGN SOURCES (BASED ON MARCO POLO'S ACCOUNTS)

***Abstract.** This article analyzes foreign sources on the history of the Mongol states based on the famous book "The Travels of Marco Polo", written in 1298 by the renowned Venetian traveler. It presents historical, geographical, and ethnographic information about China, Mongolia, and the territories under Mongol rule, gathered during Marco Polo's travels from 1271 to 1295. In particular, the article highlights valuable facts regarding the Mongol system of governance, military organization, postal communication, economic life, customs, and religious beliefs. Special attention is given to Marco Polo's descriptions of Genghis Khan and his descendants, especially Kublai Khan, under whose service Polo spent 17 years in China.*

The article emphasizes his administrative and diplomatic missions, as well as his detailed observations of various regions, which provide a unique historical insight into the Mongol Empire. Although questions remain about the reliability of some of Polo's accounts and the lack of chronological consistency in his narrative, the geographical and cultural descriptions in the book are considered credible and of high historical value.

Keywords: Marco Polo, History of the Mongols, Mongol statehood, Kublai Khan, Genghis Khan, European travelers, Central Asia, mongol postal system, foreign sources, ethnographic information, geographical descriptions.

Kirish

Mo'g'ullar imperiyasi XIII asrda jahon tarixidagi eng yirik harbiy-siyosiy tuzilmaga aylangan bo'lib, uning tarkibiga Osiyo va Yevropaning keng hududlari kirgan. Bu davrda tashkil etilgan mo'g'ul uluslari turli madaniyatlar, tillar va dinlar kesishgan geosiyosiy makonda shakllangan bo'lib, ularning siyosiy tuzilmasi, boshqaruv tizimi va ijtimoiy-iqtisodiy hayoti tarixshunoslikda katta qiziqish uyg'otib kelmoqda. Ayniqsa, ushbu davr haqida xorijiy sayyohlar, elchilar va savdogarlar tomonidan yozilgan asarlar, o'rta asrlar tarixini o'rganishda muhim manba sifatida e'tirof etiladi. Shunday muhim manbalardan biri — venetsiyalik sayyoh Marko Poloning 1298 yilda yozilgan mashhur "Sayohatlar kitobi" bo'lib, unda muallif o'zining 1271–1295 yillar mobaynida Sharq mamlakatlariga qilgan safarlari davomida guvoh bo'lgan tarixiy, etnografik va geografik voqealarni bayon etgan. Marko Poloning 17 yil davomida Xubilayxon saroyida xizmat qilgani, mo'g'ullar davlat boshqaruvi tizimida ishtirok etgani va turli diplomatik hamda ma'muriy topshiriqlarni bajargani haqida berilgan ma'lumotlar o'z davri uchun noyob tarixiy guvohlik hisoblanadi. Ushbu maqolada Marko Polo asari asosida mo'g'ul uluslari tarixiga oid xorijiy manbalarni tahlil qilish, ayniqsa Xubilayxon davridagi siyosiy tizim, pochta aloqasi, jamiyat hayoti, urf-odatlar va Marko Poloning kuzatuvlari asosida mo'g'ullar tarixini yoritish maqsad qilingan. Mazkur tadqiqot, Marko Polo ma'lumotlarining tarixiy ishonchlilik darajasini baholash va ularning zamonaviy tarixshunoslikdagi o'rnini aniqlashga qaratilgan.

Asosiy qism

Mo'g'ullar tarixiga doir yana bir muhim manbalardan biri, bu venetsiyalik sayyoh Marko Poloning 1298-yilda yozilgan «Marko Polo kitobi»dir. Ushbu kitobda keltirilgan ma'lumotlarning ishonchliligi haqidagi shubhalarga qaramay, u paydo bo'lgan paytdan to hozirgi kungacha, Armaniston, Eron, Xitoy, Qozog'iston, Mo'g'uliston, Hindiston geografiyasi, etnografiyasi, tarixi bo'yicha qimmatli bilim manba bo'lib xizmat qilmoqda.³¹

Marko Polo, otasi va amakisi hamda venetsiyalik savdogarlar bilan birga 1271-1275 yillarda kemada Kichik Osiyo yarim orolining Janubiy-Sharqiy sohillarga, u yerdan Bog'dod, Basra, Tabriz va Kermonga kelgan, so'ngra Balx,

³¹ Поло // Большая советская энциклопедия : [в 30 т.] / гл. ред. А. М. Прохоров. — 3-е изд. — М. : Советская энциклопедия, 1969–1978.

Qashgʻor, Xatan, Kampichu (Ganchjou) shaharlari va Gobi choʻlini kesib oʻtib Qoraqurumga yetib borgan. Marko Polo Xitoyda 17 yil Xubilayxon xizmatida boʻlgan³². «Marko Polo kitobi»dan maʼlum boʻlishicha Marko Polo asosan pochta xizmati (choparlik) va elchilik vazifalarini bajargan. U mamlakatning turli burchaklarini borib koʻrgan, deyarli barcha shaharlarida boʻlgan. 1275 yilda Polo oilasi yetib kelgan birinchi Xitoy shahri Shaja (zamonaviy Dunxuan) edi. Marko Poloning yozishicha, xon undan xursand boʻlib, turli koʻrsatmalar berib, Venetsiyaga qaytishiga ruxsat bermagan, hattoki uni uch yil Yanchjou shahrining gubernatori qilib qoʻygan. Bundan tashqari, Polo oilasi (kitobga koʻra) xon qoʻshinini rivojlantirishda ishtirok etgan va unga qalʼalarni qamal qilish paytida katapultlardan foydalanishni oʻrgatga. Poloning Xitoydagi hayotining tavsifi kamdan-kam hollarda xronologik tartibda boʻladi, bu uning sayohatlarining aniq yoʻnalishini aniqlashda muammo tugʻdiradi. Ammo uning tavsifi geografik jihatdan etarlicha aniq, u yoʻnalish kunlari boʻyicha asosiy nuqtalar va masofalarga yoʻnalish beradi³³.

U Janubiy Xitoy dengizi, Bengaliya qoʻltigʻi, Arabiston dengizi va Eron orqali 1295 yili vataniga qaytib borgan. «Marko Polo kitobi» sayohatchining oʻzi koʻrgan, bilgan va kuzatgan narsalari asosida yozilgan. Unda boshqa mamlakatlar bilan bir qatorda Moʻgʻulistonning va moʻgʻullar hukmronligi ostida boʻlgan hududdagi mamlakatlarning geografiyasi, etnografiyasi va tarixi haqida muhim maʼlumotlar beradi. Shuningdek unda xalq anʼanalari toʻgʻrisidagi maʼlumotlar, ularning rivoyatlari va ertaklaridan namunalar ham berilgan. Marko Polo 17 yillik musofirlik davrida moʻgʻullar tili va yozuvini puxta oʻrgandi, ularning madaniyatidan xabardor boʻldi. Marko Polo asarida Chingizxonning xon qilib koʻtarilgan sanasi 1187 yil deb koʻrsatilgan³⁴. Marko Polo oʻz asarida Chingizxon shaxsini juda ulugʻlaydi, «u juda botir, aqlli va omadli kishi edi», -deb yozadi u. Marko Polo yozishicha, begona yurtlarga sochilib ketgan butun dunyodagi tatarlar uning huzuriga kelib, uni oʻzlarining hukmdori deb tan oldilar³⁵.

Marko Poloning yozishicha Chingizxon vorislari ichida eng kuchlisi Xubilay (u kitobida Kublay deb yozadi.) boʻlgan. «Barcha imperatorlar va barcha xristian va musulmon podsholari birgalikda Xubilay toʻplashi mumkin boʻlgan kuchni toʻplay olmas edilar»³⁶.

«Marko Polo kitobi»ning moʻgʻullar tarixi boʻyicha manba sifatidagi ahamiyatini juda yuqori boʻlib, asarda Marko Polo Ulugʻxonning aloqa tizimi toʻgʻrisida qimmatli maʼlumotlar beradi. Unga koʻra Xanbal (Pekin)dan har bir hudud, har bir viloyatga koʻpdan-koʻp yoʻllar ketgan boʻlib, bu yoʻllarda har 25 milda toʻxtash joyi boʻlgan va pochta xizmatchilari uchun alohida uy qurilgan. Ulugʻxonning choparlari bir toʻxtash joyidan ikkinchisiga kelganlarida otlarini almashtirganlar. Har bir toʻxtash joyida 350-400 tagacha otlar pochta xizmatiga

³² <https://www.britannica.com/biography/Marco-Polo>

³³ <http://dspace.anu.edu.au/bitstream/1885/41883/1/Marcopolo.html>

³⁴ Минаева.И.П.- Книга Марко Поло. М.: 1955. - С.85.

³⁵ Минаева.И.П.- Книга Марко Поло. М.: 1955. - С.85.

³⁶ Минаева.И.П.- Книга Марко Поло. М.: 1955. - С.88.

tayyor turganlar. Bunday to'xtash joylari kishilar yashamaydigan cho'l hududlarida ham tashkil qilingan. Kitobda ularga ketayotgan vaqtida Ulug'xon tomonidan berilgan payza to'g'risida so'z yuritiladi. Marko Polo yozishicha payzaga ega bo'lish yo'lda ularni hyech kim ushlab olmasligi va hamma yerda ularga hurmat ko'rsatilishini bildiradi. Marko Polo Xitoyning asosiy qazilma boyliklaridan biri toshko'mir ekanligini alohida qayd etib o'tadi³⁷.

Polo Xitoyda yashab turib fors tilini (o'sha davrdagi xalqaro muloqot tili) bilgan, mo'g'ul tilini (bu davrda Xitoy ma'muriyatining tili) o'rgangan, lekin xitoy tilini o'rganishga majbur bo'lmagan. U mo'g'ul ma'muriyati a'zosi sifatida Xitoy jamiyatidan uzoqda yashagan³⁸.

Marko Polo davrida bular asosan tuproqdan yasalgan istehkomlar bo'lib, ular uzluksiz devorni anglatmagan, ammo harbiy jihatdan eng zaif hududlar bilan cheklangan. Venetsiyalik uchun bunday istehkomlar unchalik qiziq bo'lmasligi mumkin. Xubilayning yosh Marko Pologa bergan sharafi, uning Yanchjou gubernatori etib tayinlanishi, Frensis Vudning so'zlariga ko'ra, Xitoyda deyarli yigirma yil davomida savdogarlar borligi to'g'risida xitoy yoki mo'g'ul rasmiy yozuvlarining yo'qligi ishonchsiz ko'rinadi. Masalan, Poloning Xitoyda bo'lganiga dalil sifatida 1271-yildagi yagona ma'lumot eslatib o'tiladi, unda Xubilayning yaqin maslahatchisi Pagba Lama o'z kundaligida xon bilan do'stona munosabatda bo'lgan musofirni tilga oladi³⁹. lekin u ismini, na millatini, na Xitoyda qolish muddatini ko'rsatmaydi.

1298 yilda Kurzol jangidagi mag'lubiyatdan so'ng, Polo genuyaliklar tomonidan qo'lga olindi va 1299 yil maygacha u erda edi. Uning sayohat hikoyalarini boshqa mahbus Rustiello (Rustiano) yozib olgan, u ham ritsarlik romanlarini yozgan⁴⁰. Ba'zi manbalarga ko'ra, matn venetsiya lahjasida diktatsiya qilingan, boshqalarga ko'ra italyan tilidagi qo'shimchalar bilan qaytgandan keyin Venetsiyada qadimgi frantsuz tilida yozilgan.

Genuya asirligidan ozod bo'lgach, u Venetsiyaga qaytib keldi, turmushga qurdi va uchta qizli bo'ldi. 1324-yilda allaqachon kasal bo'lib qolgan Polo o'z vasiyatini yozgan, unda mo'gu'l xonidan olingan oltin payzani eslatib o'tadi. Xuddi shu yili, Marko vafot etdi va San-Lorenzo cherkoviga dafn qilindi. 1596-yilda uning uyi (afsonaga ko'ra, Xitoy yurishidan olib kelgan narsalar saqlanadigan) yonib ketdi. U dafn etilgan cherkov XIX asrda buzib tashlangan.

Xulosa

Marko Poloning "Sayohatlar kitobi" (1298) mo'g'ullar tarixi, ayniqsa Xubilayxon hukmronligi davridagi siyosiy, ijtimoiy va madaniy hayotni o'rganishda muhim xorijiy manbalardan biri sifatida alohida ahamiyat kasb etadi. Ushbu asarda keltirilgan ma'lumotlar orqali XIII asrda mo'g'ul davlatchiligining

³⁷https://ru.wikipedia.org/w/index.php?title=Поло,_Марко&oldid=128139203

³⁸ <http://dspace.anu.edu.au/bitstream/1885/41883/1/Marcopolo.html>

³⁹ Klafkowski, Piotr. (1977). «History of Buddhism in Mongolia – A Preliminary Survey», p. 28 and note. Buddhist Studies. The Journal of the Department of Buddhist Studies, University of Delhi. May, 1977. Цит. поен: Drogön Chögyal Phagpa

⁴⁰ Поло // Большая советская энциклопедия : [в 30 т.] / гл. ред. А. М. Прохоров. – 3-е изд. – М. Советская энциклопедия, 1969–1978.

boshqaruv tizimi, pochta aloqalari, harbiy kuchi, xalq urf-odatlarini, iqtisodiy va geosiyosiy ahvoli haqida muhim tarixiy tafsilotlarni aniqlash mumkin.

Marko Poloning o'z ko'zlari bilan ko'rgan va bevosita ishtirok etgan voqealarga asoslangan tavsiflari, u yashagan davr manzarasini tasvirlashda muhim manba bo'lib xizmat qiladi. Ayniqsa, mo'g'ullar tomonidan yaratilgan ilg'or aloqa tarmog'i, davlat idoralari faoliyati va Marko Poloning davlat xizmatidagi roli, mo'g'ul davlat boshqaruvining zamonaviy tarixiy baholanishiga zamin yaratadi. Shuningdek, ushbu manba orqali Marko Poloning mo'g'ul jamiyati va ma'muriyati bilan qanday darajada integratsiyalashganini, u o'z davrining qaysi xalqaro tillarini bilganini va qanday missiyalarni bajarganini ham aniqlash mumkin. Albatta, asarda ayrim mubolag'alar yoki faktlar xronologiyasidagi nomuvofiqliklar mavjud bo'lsa-da, ularning ilmiy tahlili orqali tarixiy haqiqatga yaqin tafsirlar chiqarish imkoniyati mavjud.

Xulosa qilib aytganda, "Marko Polo kitobi" mo'g'ul uluslari tarixini o'rganishda noyob va ishonchli xorijiy manba bo'lib, u nafaqat tarixiy voqealarni, balki o'rta asrlar Osiyo xalqlari hayoti, madaniyati va xalqaro munosabatlari haqida ham keng qamrovli tasavvur beradi.

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STATE GOVERNANCE IN THE CHAGATAI ULUS

Abstract. *The topic of state governance in the Chagatai Ulus reflects an important period in the history of Central Asia. This article analyzes the political, social, and economic systems of the Chagatai Ulus, as well as its leadership structures. As part of the Mongol Empire, the Chagatai Ulus combined distinct governing styles and local traditions. The article discusses the key rulers of the Ulus, their political strategies, and their role in governance. It also explores the social classes, the importance of trade, and agriculture in the economy of the Chagatai Ulus. This study helps to deepen our understanding of the history and culture of the Chagatai Ulus and highlights its place in the history of Central Asia.*

Keywords: *Chinggis Khan, Yasa, deputies, Ulus, Mahmud Tarabi, tax collectors, darug'achis.*

Introduction

Chinggis Khan divided the territories he conquered among his sons as their private estates, which were called *ulus*⁴¹. The ruler of an ulus was given the title *khan*. The territories of the Mongol Empire were distributed from Southern Siberia to Khwarezm and Derbent among Jöchi, Oqtoý (the heir to the throne of China and Mongolia), and Tulı. The Chagatai Ulus, which included Transoxiana, the Seven Rivers (Zhetysu), and Eastern Turkestan, was ruled by the descendants of Chagatai from the early 13th century until the 40s of the 14th century. The Mongols were inexperienced in governing large and civilized regions. Additionally, they lacked qualified administrators to rule such provinces.⁴² Unlike some of the other nomadic peoples of Mongolia and its neighboring regions, the Mongols did not have a tradition of statehood. This point is emphasized by local scholars such as A. S. Sagdullaev, B. Eshov, and N. I. Toshev in their research.

⁴¹ **Ulus** (Mongolian: people, state, nation) 1. During the formation period of the Mongol Empire, it referred to a group of large and small families living a nomadic life in the territories under the authority of a specific khanate; 2 The first Mongol state established by Chinggis Khan; 3. The territories conquered during the Mongol invasion and distributed among the sons of Chinggis Khan as estates (for example, the Ulus of Jöchi, the Ulus of Chagatai, and others); 4. From the second half of the 13th century, these ulus evolved into independent states, formally recognizing the sovereignty of the Great Khan or supreme ruler, but largely maintaining their autonomy; 5. In the late 15th to 17th centuries, the term *ulus* came to refer to a large landholding in Mongolia and was used in Muslim literature to denote the state of the Chinggisids. After Mongolia was conquered by the Manchus, the country was divided into regions and banners, and as a result, the term *ulus* gradually ceased to be used in the sense of a landholding and began to signify "people" or "nation." Currently, the term *ulus* is used as a synonym for "state"; 6 After the incorporation of the Buryats and Kalmyks into Russia, the term *ulus* continued to denote feudal land holdings until the October Revolution, after which it retained its meaning as an administrative unit.

⁴² Sagdullaev A. , Mavlonov U. O'zbekiston davlat boshqaruvi tarixi (Qadimgi davrlardan XIX asrning o'rtalariga qadar). O'quv qo'llanma. –Toshkent: "Akademiya", 2006. – B. 90.

Main Part

The division of the Mongol Empire into uluses and branches, its decimal system, the concept of supreme power, the succession of the throne, and many other state institutions trace their origins to the nomadic states that preceded the Mongols, primarily the Turkic Khaganate. These traditions and knowledge reached the Mongols through several channels before Chinggis Khan. Specifically, the Yasa laws were part of this heritage. Secondly, since the Mongols were a nomadic people, their governance system was not initially well-organized. For this reason, the khans initially managed the territories under their control with the help of deputies. This can also be observed in the administration of Mavaraunnahr, where local rulers, particularly the wealthy nobles, were entrusted with governing. For example, the administration of the Chagatai Ulus was first handed over to the Khwarazmian merchant Mahmud Yalavoch, and later his descendants. They acted as the deputy of the khan. In this role, they were responsible for collecting taxes and tribute from the entire ulus, delivering them to the Khagan, and maintaining order among the population from their base in the city of Khojand. As deputies, they did not need to report directly to the Chagatai khans. Similarly, in Bukhara, local nobles, religious scholars, and sadares took control of governance. Relying on the local nobility, the Mongol khans governed the provinces and regions of Central Asia. They granted special documents (payza)⁴³ to trusted individuals, such as local officials, merchants, clergy, and representatives of the royal family, to allow them to travel freely, providing them with housing, food, and horses. Sources indicate that Chagatai particularly sought to rid himself of Mahmud Yalavoch, which he achieved through the Mahmud Tarabi revolt in 1238. This revolt showed the readiness of the people to fight against the despotic regime and to defend their homeland. After the revolt, tax and tribute collections were reorganized. Mahmud Yalavoch was dismissed from his post for his involvement in the revolt and his failure to take decisive action to suppress it. Mahmud Yalavoch's son, Mas'udbek, was appointed the deputy governor of Mavaraunnahr. Yalavoch was forced to go to Karakorum, where he was warmly received by the Khagan and appointed as governor of Peking, where he served until his death in 1254. Mas'udbek continued his father's policies and actions with the help of several military leaders and local amirs until 1289.

Thirdly, the political administration of the Chagatai Ulus was regularly influenced by representatives of the Jöchi Ulus and the Tuluid branch. The Chagatai khans, who were dissatisfied with the small percentage of taxes that were sent to the center, often found themselves at odds with the central authority. Additionally, Batu's military campaigns in Eastern Europe between 1236-1241, which laid the foundation for the Golden Horde, were of great significance. In particular, the death

⁴³ **Payza** (in Chinese and Mongolian: "yorliq") – a certificate introduced by Chinggis Khan, which was inscribed on materials such as gold, silver, iron, brass, and wooden tablets. Payzas were issued by the Mongol khans to the deputies (noibs), as well as to couriers and ambassadors appointed to countries under Mongol rule, depending on their positions. The payza contained the khan's commands and granted deputies and ambassadors unlimited authority. The holder of the payza had the right to demand whatever they wished, and their demands had to be fulfilled without question.

of Khagan Guyuk in 1248, and the absence of a suitable candidate with experience to govern such a vast territory, caused concern within the Ögedei clan. Furthermore, there was a longstanding enmity and rivalry between Botu and Guyuk, which was inherited by their descendants. In general, the political situation within the Mongol Empire was extremely complicated, with ongoing military campaigns and conquests. By the mid-13th century, the political struggle within the Mongol realm intensified. In 1251, Munke, elected as the Great Khan (1251-1259), dismantled the Chagatai Ulus and divided its territory with Botu. Chagatai's grandson, Olghu Khan (1261-1266), fought against the Golden Horde and succeeded in restoring the Chagatai Ulus.

By the 1260s-1270s, the Mongol Empire, which had once been unified, began to fragment. Each ulus became independent, and military campaigns against neighboring territories became common. The Chagatai Ulus was repeatedly looted during internal conflicts. The rulers of Mavaraunnahr attempted to strengthen central authority to stop these invasions and sought to develop the economy. Mas'udbek, the deputy of Mavaraunnahr, made significant contributions to revitalizing the economy and developing trade and cultural relations with neighboring countries. In 1271, he initiated monetary reforms that allowed individuals to mint coins of the same size, value, and weight at state minting facilities. Pure silver coins of high value were minted in 16 major cities and provinces and introduced into circulation. Under his leadership, the restoration of Bukhara was carried out between 1273-1276. During the reign of Chagatai Khan Duvakhon (1291-1306), the city of Andijan was founded.

At the beginning of the 15th century, among the Mongol rulers, there was a growing tendency to settle down and adopt the local culture. One such ruler, Kebek Khan (1309, 1318-1326), moved his court to Mavaraunnahr, where the city of Qarshi was founded near the old palace site near the city of Nasaf. Kebek Khan introduced administrative and financial reforms to regulate state governance and economic life. His reforms included dividing local structures into districts and provinces. He minted two types of currency: large silver coins, "dinors" (weighing around 8 grams), and small silver coins, "dirhams" (6 dirhams equaled one dinar). Kebek Khan's brother, Oloviddin Tarmashirin (1326-1332), fiercely defended the traditions of a settled lifestyle. He converted to Islam and declared it the official religion of the Chagatai Ulus. The Mongol nobility, unhappy with Tarmashirin's policies, revolted and killed him in 1334. After Tarmashirin, the Mongol rulers changed frequently. During this period, the power of local tribes continued to grow.

By the 1340s, the political crisis in the ulus deepened, resulting in the division of the country. The regions of Yettisuv, part of Fergana, Eastern Turkistan (Eastern Mongolia), and Mavaraunnahr (Western Mongolia) were separated. In Mavaraunnahr, the weakening influence of the Mongol nobility led to an intensification of the struggle for power. The khan's representatives found it increasingly difficult to control powerful local amirs. One of the last representatives of the Chagatai dynasty, Kazan Khan (1343-1346), attempted to strengthen central authority. However, this policy faced strong resistance from the provincial amirs.

Following a rebellion led by the local amirs against Kazan Khan, he was killed. After his death, Mavaraunnahr was divided into several semi-independent regions. Political fragmentation escalated, and internal conflicts increased.

Conclusion

Chinggis Khan's state governance methods were rigorously followed by his successors. However, following their death, there was a noticeable disintegration of the empire, as various factions within the Mongol empire began to challenge each other. The Chagatai and other Mongol families such as the Oqto'y and Tulu Khanates became embroiled in political infighting. This fragmentation of authority led to a situation where governance became increasingly decentralized, with local rulers often gaining more power than the central khans. Consequently, the Chagatai Ulus faced numerous internal struggles and wars with neighboring powers.

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ВЛИЯНИЕ ОПТИМАЛЬНЫХ НОРМ ПОСЕВА НА УРОЖАЙНОСТЬ КУКУРУЗЫ

Аннотация: В статье представлена информация о сроках посева кукурузы, густоте стояния растений и их значительном влиянии на рост и развитие. В результате в вариантах с ранним сроком посадки и высокой густотой стояния растений наблюдался наибольший рост и развитие.

Ключевые слова: кукуруза, нормы и сроки посадки, толщина саженца, высота стебля, количество листьев, количество сукуленгов, схема посадки, рост.

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EFFECT OF OPTIMAL SEEDING NORMS ON CORN YIELD

Annotation: *In our article, the timing of planting corn and the thickness of the seedling are given information on its significant impact on growth-development. The result of this was the highest growth-development, which was planted in early periods and in options with a high seedling thickness.*

Keywords: *Corn, Planting norms and deadlines, seedling thickness, stem height, leaf number, soot number, planting scheme, growth.*

Обеспечение растущего из года в год населения нашей республики необходимым количеством продуктов питания является самой актуальной проблемой сегодняшнего дня. Для решения этой проблемы требуется более эффективное использование существующих земель, особенно орошаемых. После расширения посевных площадей пшеницы в нашей республике за счет орошаемых земель реализуется ряд мер по предотвращению оставления этих земель пустыми после уборки урожая пшеницы.

В Стратегии действий Республики Узбекистан на 2017-2021 годы особое внимание уделено..."созданию интенсивных методов в сельскохозяйственном производстве, прежде всего новых селекционных сортов сельскохозяйственных культур, адаптированных к местным почвенно-климатическим и экологическим условиям, внедрению современных агротехнологий на зерновых полях, особенно развитию зерноводства."

Наряду с эффективным использованием земель за счет интенсивного возделывания сельскохозяйственных культур, актуальными являются научные исследования по сохранению и повышению плодородия почвы, совершенствованию технологии выращивания двух урожаев зерна в год, выбору соответствующих видов сельскохозяйственных культур, а также выращиванию высокоурожайной семенной пшеницы.

В нашем эксперименте также была поставлена цель изучить оптимальные сроки и нормы посева кукурузы для выращивания в качестве повторной культуры для силоса. Эксперимент проводился в условиях староорошаемых лугово-сазовых почв Ферганской области, где было выставлено 12 вариантов в 4 повторностях (таблица 1).

Согласно этому, семена кукурузы высевались в 2 срока (1 и 10 июля). В эксперименте также изучались нормы высева семян кукурузы. При этом их нормы составляют 15; 20 и 25 кг соответственно. В научно-исследовательских работах мы проводили лабораторные, полевые и производственные опыты, биометрические измерения, фенологические наблюдения, различные анализы на основе пособия "Методы агрофизических исследований."

Статистический анализ результатов, полученных в экспериментах, проводился по методу Б.А.Доспехова. В то же время мы изучили результаты экспериментов многих ученых.

Схема опыта

№	Вид культуры	Сроки посева	Норма высева кг/га
1	Юлдуз	01.VII	15,0
2			20,0
3			25,0
4		10.VII	15,0
5			20,0
6			25,0
7	Ўзбекистон-5	01.VII	15,0
8			20,0
9			25,0
10		10.VII	15,0
11			20,0
12			25,0

На рост и развитие растений влияет множество внешних факторов (почва, климат, удобрения, вода).

Он подчеркнул, что под влиянием этих факторов в росте и развитии растений возникает общая целостность, а физиологические и биохимические процессы, происходящие в теле растения, их корневое и воздушное питание, обеспечение энергией, в целом, совокупность всех процессов, участвующих в ассимиляции и диссимиляции, являются оптимальными. Поэтому в наших исследованиях мы проводили исследования по периодам роста и развития кукурузы, посеянной после озимой пшеницы.

Если проанализировать полученные данные по росту и развитию культур, то при первоначальных наблюдениях, полученных на культуре маш (1 августа), при отсутствии резких различий между вариантами, рост и развитие растений увеличивались с увеличением густоты стояния растений.

При этом в 1-м варианте с нормой высева 15 кг и фактической густотой стояния 58 тыс./га высота растений составила 14,2 см, количество настоящих листьев 2,3 штук, в 2-м варианте с нормой высева 20 кг и фактической густотой стояния 74 тыс./га соответственно 14,6 см и 2,3 штук, в 3-м варианте (норма высева 25 кг/га, фактическая густота стояния 86 тыс./га) 15,3 см и 2,5 штук.

Эти данные можно увидеть в таблице 2. В следующем сроке посева (10.07) разница между вариантами по нормам высева была такой же, как и в предыдущем. В последующий период фенологических наблюдений резких различий между вариантами не наблюдалось. К концу вегетационного периода, к 1 октября, различия между вариантами стали заметными.

Таблица 2

**Влияние сроков и норм посева на рост и развитие кукурузы
(в среднем за 3 года)**

№	Фактическое количество саженцев, тыс. шт.	1 августа		1 сентября			1 октября		15 октября	
		Высота, см	Лист, шт.	Высота, см	Лист, шт.	Количество початков, шт.	Высота, см	Количество початков, шт.	Высота, см	Количество початков, шт.
1	54	27,0	5,4	128,0	11,0	0,09	198,7	1,08	200,2	1,11
2	68	28,6	5,6	129,1	11,4	0,12	202,0	1,16	203,5	1,19
3	84	29,5	5,8	130,4	11,9	0,14	203,5	1,25	204,7	1,31
4	57	28,4	5,5	130,1	11,2	0,08	193,4	1,03	189,2	1,06
5	71	29,1	5,5	128,7	11,0	0,10	198,0	1,12	197,9	1,15
6	86	29,2	5,6	130,0	11,4	0,11	200,1	1,17	200,5	1,21
7	58	27,0	5,8	128,0	11,0	0,10	199,7	1,10	206,2	1,16
8	70	29,6	5,5	129,1	11,4	0,12	203,0	1,18	208,5	1,19
9	90	27,5	5,9	130,4	11,9	0,15	206,5	1,25	209,7	1,35
10	57	32,4	5,5	130,1	11,2	0,08	193,4	1,06	190,2	1,09
11	71	30,1	5,7	128,7	11,0	0,11	196,0	1,14	197,9	1,15
12	92	33,2	5,9	130,0	11,4	0,13	208,1	1,19	209,5	1,22

Согласно данным таблицы, в первые периоды фенологических наблюдений 1 августа и 1 сентября, без резкой разницы между вариантами, к 1 октября высота стебля растений в первый срок посева составила 198,7; 202,0; 203,5 см, количество початков 1,08; 1,16; 1,25 штук, и эта закономерность сохранялась до конца срока действия. В последующие сроки посева кукурузы в вариантах с большим количеством саженцев наблюдался высокий рост и развитие.

У кукурузы наиболее оптимальные показатели (высота растений 204,7 см и количество початков 1,31 шт.) Наблюдались в 3-м варианте опыта (сохранялась густота стояния 84 тыс./га), а самые низкие показатели отмечены в 4-м варианте с густотой стояния 56 тыс./га (высота растений 189,2 см и количество початков 1,04 шт.).

Закключение: В целом можно сделать вывод, что в исследованиях увеличение густоты стояния повторной кукурузы положительно влияло на развитие вегетативной части растения, в то время как влияние на органы плодоношения было оптимальным в вариантах с 86 тыс./га.

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ПРЕИМУЩЕСТВА ВЫРАЩИВАНИЯ ПОДСОЛНЕЧНИКА НА ЗАСОЛЕННЫХ ПОЧВАХ

Аннотация: Основываясь на данных, изученных в данной статье, проанализированы возможности удовлетворения потребности населения в масле путем выращивания масличного подсолнечника в качестве повторной культуры на засоленных и низкоурожайных землях и получения двух урожаев с одной площади в течение сезона.

Ключевые слова: Масло, повторный, подсолнечник, орошаемые поля, засоленные, низкая продуктивность, урожайность.

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ADVANTAGES OF GROWING SUNFLOWERS IN SALINE SOILS

Annotation: Based on the data studied in this article, the possibilities of meeting the population's oil demand by growing oil-bearing sunflower as a second crop on saline and low-yielding lands and obtaining two yields per hectare during the season were analyzed.

Keywords: Oil, repeated, sunflower, irrigated fields, saline, low productivity, yield.

В целях обеспечения потребностей населения республики в продуктах питания принято постановление Кабинета Министров “Об эффективном

использовании имеющихся земельных и водных ресурсов, рациональном размещении сельскохозяйственных культур и прогнозных объемах производства продукции под урожай 2020 года”.

Документ предусматривает полноценное обеспечение внутреннего рынка всей сельскохозяйственной продукцией за счет эффективного использования имеющихся земельных и водных ресурсов, увеличения разнообразия в производстве сельскохозяйственной продукции. Среди этих продуктов расширение посевных площадей под масличный подсолнечник, где получают масложировую продукцию, рассматривается как один из важных вопросов.

Семена подсолнечника содержат 29-56% масла и 15% белка. Его масло используется в производстве маргарина, майонеза, рыбных и овощных консервов, кондитерских изделий. Подсолнечное масло - это продукт, содержащий только жиры, без белков и углеводов. Состав этого масла состоит в основном из олеиновой и линоленовой жирных кислот. Линоленовая кислота является очень важным элементом для организма человека, ее доля в подсолнечном масле колеблется от 46% до 62%.

Независимо от вида животного жира, в процессе жарки он приобретает вредные свойства, в нем образуются канцерогены. Это связано с наличием в животных жирах насыщенных жирных кислот. Подсолнечное масло содержит большое количество ненасыщенных кислот, поэтому даже при нагревании оно не представляет опасности для здоровья человека.

Масложировая промышленность Узбекистана зависит от импорта семян подсолнечника. Основными странами-поставщиками являются Казахстан и Россия. В 2019 году было импортировано 78 миллионов долларов, из которых 76,2 миллиона долларов приходится на страны Евро-Азиатского экономического союза (ЕАЭС).

В целях положительного решения этих вопросов, согласно Постановлению Кабинета Министров Республики Узбекистан от 13 июня 2019 года № 03/1-58 "О размещении масличных культур на площадях, освобожденных от зерновых," предусматривается увеличение общего урожая за счет расширения посевных площадей подсолнечника, выращивания его в качестве основной и повторной культуры.

При размещении сельскохозяйственных культур необходимо знать не только оптимальные климатические условия для их хорошего роста и развития, но и ограниченный уровень окружающей среды, который приводит к значительному снижению урожайности.

**Оптимальный и ограниченный уровень некоторых
сельскохозяйственных культур по отношению к почвенной среде (рН)**
Таблица 1

№	Посев	Оптимальный уровень (рН)	Предельный уровень (рН)
1	Рожь	5,5-6	4,5
2	Пшеница	6-7,5	5,2-5,4
3	Подсолнух	6-7,2	5,5-5,8

Подсолнечник также является широко распространенной культурой для выращивания на кислых почвах, таких как пшеница и рожь. На сегодняшний день 1 млн. 743,6 тыс. га орошаемых земель в Республике Узбекистан являются площадями, подверженными засолению в различной степени.

В частности, засоленные площади в Андижанской области составляют 41,2 тыс. га, а в Улугнорском районе этот показатель составляет 18655,1 га, что соответствует 86,2% от общей орошаемой площади.

Выращивание подсолнечника на этих полях имеет ряд преимуществ:

- Подсолнечник можно высевать в ранние сроки в качестве основной культуры и летом в качестве повторной культуры;

- Благодаря засухоустойчивости, его выращивают в условиях богарного земледелия и дефицита воды для получения семян и масла в условно орошаемых районах;

Подсолнечник является устойчивой к засолению культурой, и его можно выращивать с урожайностью 25-27 центнеров с гектара даже в условиях засоления с содержанием сухого остатка в почве, то есть общего количества вредных солей до 0,3-0,4%.

Заключение: Исходя из вышеизложенных проблем и мнений, посев масличного подсолнечника в качестве повторной культуры на засоленных и низкоурожайных посевных площадях Улугнорского района является не только положительным решением этих проблем, но и удовлетворяет потребность населения в масле и позволяет получать два урожая с одной площади в течение сезона.

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ЦИФРОВИЗАЦИЯ ПЕРЕПИСЕЙ НАСЕЛЕНИЯ: НОВЫЕ ПОДХОДЫ К СБОРУ И ОБРАБОТКЕ ДЕМОГРАФИЧЕСКИХ ДАННЫХ В УЗБЕКИСТАНЕ

Аннотация: В условиях ускоренной цифровизации социально-экономических процессов переписи населения в Узбекистане приобретают новое значение как ключевой инструмент демографического анализа. Современные технологии позволяют внедрять инновационные подходы к сбору, обработке и хранению данных, обеспечивая более высокую точность и оперативность статистической информации. В статье рассматриваются преимущества цифровых платформ, использование онлайн-опросов и интеграция государственных информационных систем, а также вызовы, связанные с обеспечением конфиденциальности и стандартизации данных. Особое внимание уделяется перспективам применения цифровых решений для повышения качества демографической статистики и расширения возможностей сравнительного анализа в региональном и международном контексте.

Ключевые слова: цифровизация, перепись населения, демографические данные, Узбекистан, статистика, онлайн-опросы, информационные системы

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DIGITALIZATION OF POPULATION CENSUSES: NEW APPROACHES TO COLLECTING AND PROCESSING DEMOGRAPHIC DATA IN UZBEKISTAN

Abstract. In the context of accelerated digitalization of socio-economic processes, population censuses in Uzbekistan gain renewed importance as a key instrument of demographic analysis. Modern technologies enable innovative approaches to data collection, processing, and storage, ensuring greater accuracy and timeliness of statistical information. This paper explores the advantages of digital platforms, the use of online surveys, and the integration of governmental information systems, while also addressing challenges related to data

confidentiality and standardization. Particular attention is given to the prospects of applying digital solutions to improve the quality of demographic statistics and to expand opportunities for comparative analysis in both regional and international contexts.

Keywords: *digitalization, population census, demographic data, Uzbekistan, statistics, online surveys, information systems*

ВВЕДЕНИЕ

В последние два десятилетия мировая демографическая статистика претерпевает фундаментальный парадигматический сдвиг, отходя от дорогостоящих, трудоемких и периодических традиционных переписей (*T-Census*) к более оперативным и экономически эффективным гибридным и регистровым моделям (*R-Census*). Этот сдвиг обусловлен как технологическим прогрессом, так и растущей потребностью государств в высокоточных, актуальных и детализированных данных для стратегического планирования.

Международный опыт показывает, что страны, такие как Дания, Финляндия и Нидерланды, успешно перешли на полностью регистровую статистику, где данные о населении непрерывно актуализируются через административные записи. Другие государства, не имеющие развитой системы централизованных реестров, внедряют гибридные подходы, сочетающие традиционный полевой сбор с элементами цифрового саморегистрации и последующей верификацией через административные базы данных. Экономическая эффективность и оперативность, которую обеспечивают цифровые методы, включая снижение стоимости проведения и повышение скорости публикации результатов, служат ключевыми драйверами этой глобальной трансформации.

В контексте Узбекистана цифровизация становится не просто модернизацией, а необходимым стратегическим шагом для наверстывания упущенного времени и устранения статистического вакуума. Без внедрения передовых методов страна не смогла бы быстро и эффективно получить данные, необходимые для текущих масштабных социально-экономических реформ.

Исторический Дефицит Актуальных Данных в Узбекистане

Исторически Узбекистан сталкивался с критическим дефицитом актуальных демографических данных. Последняя полномасштабная перепись населения на территории республики проводилась еще в советский период — в 1989 году.¹ Этот 37-летний разрыв в официальном учете привел к серьезным ограничениям в макроэкономическом моделировании, социально-демографическом прогнозировании и, что наиболее важно, в эффективном планировании распределения государственных ресурсов.

Отсутствие точных данных о текущем размере, структуре и размещении населения делает неэффективным планирование социальной политики, распределение бюджета и развитие инфраструктуры.¹ В условиях высокого

уровня внутренней трудовой миграции и быстрого демографического роста, информация, собранная почти четыре десятилетия назад, не отражает реальной потребности регионов в школах, больницах, дорогах и коммунальных сетях. Точность подсчета, таким образом, является не только статистической, но и политической необходимостью, напрямую влияющей на эффективность государственных программ и справедливость распределения ресурсов.¹

Изначально запланированная на 2020 год, перепись была отложена из-за пандемии и организационных причин, что лишь усилило актуальность скорейшего внедрения эффективных методов сбора.¹ В ответ на эту критическую потребность, Кабинет Министров Узбекистана утвердил постановление о проведении переписи населения в 2026 году. Сбор данных запланирован на период с 15 января по 28 февраля 2026 года, и впервые в истории страны этот процесс будет частично проходить в цифровом формате, включая возможность онлайн-участия через специальный портал.¹

Цель настоящего исследования состоит в оценке потенциала комплексного цифрового подхода Узбекистана в повышении точности сбора демографических данных и обеспечении долгосрочной устойчивости их обработки. Оценка фокусируется на анализе методологических изменений, связанных с внедрением онлайн-портала, и стратегической роли Единого электронного реестра населения (ЕЭРН).

Гипотеза исследования: Комплексная гибридно-регистрационная модель, принятая Узбекистаном для переписи 2026 года, позволит не только получить точный "снимок" демографической ситуации на 15 января 2026 года, но и послужит основой для построения устойчивой системы непрерывного демографического учета, значительно превосходящей по эффективности и точности возможности традиционных переписей.

Структура данной научной статьи соответствует методологии ИМРАД, детально описывая новые организационные и технические подходы, представляя архитектуру системы обработки данных и обсуждая ее долгосрочные последствия для государственного управления.

МЕТОДЫ

Данный раздел представляет методологические инновации и организационно-технический фреймворк, утвержденный для проведения переписи населения Узбекистана в 2026 году.

Правовая и Организационная Архитектура Переписи 2026 года

Проведение переписи регулируется постановлением Кабинета Министров, которое определяет четкие временные рамки и критерии учета. Сбор данных будет осуществляться в течение 45 дней, начиная с 00:00 15 января 2026 года и заканчивая 28 февраля того же года.¹ Четкое определение референтной даты (15 января) является критическим требованием для обеспечения статистической гомогенности данных. Зафиксированные факты должны быть актуальны именно на этот момент: дети, родившиеся после этой

даты, не включаются в анкеты, а смерти, произошедшие позже, будут зафиксированы.¹

Принцип учета *De Facto*

Ключевым методологическим нововведением является переход к учету населения по месту **фактического проживания** (*de facto*), включая временное.¹ Это отход от прежних подходов, которые зачастую основывались на формальной юридической регистрации (*de jure*).

В условиях Узбекистана, характеризующегося высокой внутренней трудовой миграцией, применение критерия *de facto* имеет решающее значение. Оно гарантирует, что бюджетные средства и планы развития инфраструктуры (школ, больниц, коммунальных сетей) будут ориентированы на те географические локации, где население реально проживает.¹ Точность учета *de facto* является ключевым индикатором успеха всей переписи, поскольку отражает реальную нагрузку на социальную и коммунальную инфраструктуру.

Правила исключения также строго определены: не будут учитываться граждане, находящиеся за границей свыше одного года, сотрудники международных организаций, обладающие иммунитетом, и их семьи, а также иностранцы с временным статусом.¹ Эти четкие правила минимизируют методологические споры относительно международного миграционного баланса.

Фреймворк Гибридного Сбора Данных

Перепись 2026 года внедряет гибридный метод, сочетающий традиционные полевые работы с передовыми цифровыми технологиями. Это обеспечивает баланс между инклюзивностью и оперативностью.

Гибридный фреймворк основывается на двух основных каналах сбора:

1. Традиционный полевой опрос: Интервьюеры, оснащенные цифровыми устройствами, проводят опрос населения на местах, обеспечивая охват тех слоев населения, которые не могут или не хотят использовать цифровые технологии.

2. Онлайн-самостоятельное заполнение: Населению предоставляется возможность самостоятельного заполнения анкет через специальный онлайн-портал.¹ Этот компонент способствует сокращению времени, необходимого на полевой сбор, и потенциально повышает точность ввода данных, так как граждане сами отвечают за предоставленную информацию.

Интеграция Сельскохозяйственных Параметров

Важной особенностью методологии является включение данных о сельском хозяйстве в общий демографический опрос.¹ Это демонстрирует стремление статистических органов создать не просто демографические сводки, а *многомерные социально-экономические профили* домохозяйств. Объединение социально-демографических показателей с информацией об аграрной деятельности (наличие скота, размер участка) позволяет проводить перекрестный анализ уровня жизни, землепользования и продовольственной безопасности на уровне отдельных домохозяйств. Такой подход является

прогрессивным и полезен для разработки целевых программ поддержки сельского населения.

Успех гибридного метода зависит от создания сложной системы редупликации, способной эффективно сводить данные, полученные через онлайн-портал, с данными, собранными опросчиками в поле. Любое дублирование, если оно не будет выявлено и устранено, приведет к завышению численности населения и, как следствие, к искажению расчетов при планировании бюджета.

Сравнительный Анализ Методологий и Технологического Разрыва

Перепись 2026 года знаменует собой глубокий технологический и методологический разрыв с предшествующим опытом, проводившимся в 1989 году. Таблица 1 иллюстрирует ключевые различия, подчеркивающие переход от статического, бумажного учета к динамической, интегрированной цифровой системе.

Таблица 1

Сравнительный Анализ Методологий Переписей Населения Узбекистана (1989 и 2026 гг.)

Параметр	Перепись 1989 г. (СССР)	Перепись 2026 г. (Цифровая/Гибридная)
Основной метод сбора	Бумажные анкеты, интервью на месте	Гибридный (Онлайн-портал + опросчики)
Технологии обработки	Ручная/механизированная, централизованная	Автоматизированная, интегрированная с реестрами
Ключевой критерий учета	<i>De jure</i> (преимущественно)	<i>De facto</i> (фактическое проживание)
Интеграция данных	Отсутствует	Внедрение Единого электронного реестра (ЕЭРН)
Статистический результат	Статический отчет (одноразовый снимок)	Динамический, постоянно актуализируемый ресурс

РЕЗУЛЬТАТЫ

Основным результатом цифровизации, превосходящим по своему стратегическому значению сам факт проведения переписи, является создание долгосрочного инструмента обработки и использования демографических данных — Единого электронного реестра населения (ЕЭРН).

Единый электронный реестр населения (ЕЭРН) представляет собой центральный цифровой хаб, предназначенный для хранения, управления и обмена актуальными данными о гражданах. Реестр не просто фиксирует результаты переписи, а трансформирует перепись 2026 года из одноразового статистического события в начальное, масштабное заполнение динамической базы данных.

Ключевой функцией ЕЭРН является **интеграция с информационными системами (ИС)** соответствующих государственных органов и организаций.² Эта интеграция является технически сложной задачей, требующей высокого уровня стандартизации данных, унификации форматов и создания единой системы идентификации (ключей сопряжения) между всеми ведомствами. Успех функционирования ЕЭРН зависит от технической эффективности этого межведомственного сопряжения и способности обеспечить высокий уровень качества метаданных, поступающих от всех источников.

В долгосрочной перспективе ЕЭРН позволяет перейти к регистровой статистике, где демографические показатели будут постоянно обновляться административными данными (например, сведениями о рождении, смерти, изменении места жительства), устраняя необходимость проведения дорогостоящих традиционных переписей каждые 10 лет.

Многоцелевое Использование Демографических Данных

Цифровизация приводит к тому, что демографические данные, собранные в ходе переписи, перестают быть исключительно статистическим материалом и становятся критически важным инструментом для предоставления услуг и государственного администрирования. ЕЭРН призван использоваться в широком спектре секторов, что является прямым доказательством стратегической ценности его создания.²

Секторы использования и аудит качества

Внедрение ЕЭРН обеспечивает его использование при оказании:

- Государственных услуг гражданам.
- Предоставлении банковских, коммунальных и страховых услуг.²
- Оформлении нотариальных действий.²

Это многоцелевое использование данных выполняет функцию непрямого, но эффективного **непрерывного аудита качества** реестра. Использование данных для критически важных повседневных услуг (таких как оформление нотариальных сделок, получение коммунальных счетов, верификация личности в банках) создает внешнее давление на поддержание их высокого качества. Если данные в реестре будут неточными, граждане столкнутся с проблемами при получении услуг, что вызовет немедленную обратную связь и необходимость актуализации данных. Этот механизм обратной связи обеспечивает постоянную актуализацию и верификацию реестра, чего не происходит в традиционных статистических системах, где данные используются статистиками, а не гражданами.

Таким образом, ЕЭРН трансформирует демографический учет в инструмент государственного сервиса. Перепись 2026 года обеспечивает первичную, верифицированную "чистую" выборку, которая затем используется для легитимации и верификации личности в рутинных жизненных ситуациях.

Карта Интеграционного Использования ЕЭРН

Таблица 2 детализирует, как результаты цифровой переписи и архитектура ЕЭРН будут использоваться для оптимизации процессов в различных секторах государственного управления и экономики.

Таблица 2

**Интеграционная Карта Цифровой Демографической Базы
Узбекистана (ЕЭРН)**

Сектор Пользователя Данных	Ключевой Результат Переписи	Использование Данных ЕЭРН (на основе)	Влияние на Государственную Политику
Государственное Управление	Точный <i>de facto</i> учет населения	Планирование социальной политики, распределение бюджета и инфраструктуры	Оптимизация госпрограмм, повышение точности субсидирования и адресности.
Финансовый/Страховой Сектор	Верифицированные идентификационные данные	Оказание банковских и страховых услуг	Снижение операционных рисков, повышение прозрачности финансовых операций, борьба с мошенничеством.
Юридический Сектор	Актуальные данные о составе семьи и статусе	Оформление нотариальных действий ²	Ускорение легализации сделок, повышение юридической прозрачности и достоверности.
Коммунальный Сектор	Учет фактическому проживанию по	Предоставление и тарификация коммунальных услуг	Справедливое распределение расходов, повышение собираемости платежей, точная привязка потребления к месту проживания.

ОБСУЖДЕНИЕ

Внедрение гибридной модели сбора данных, сочетающей полевой опрос и онлайн-саморегистрацию ¹, имеет потенциал для существенного улучшения качества демографической статистики. Онлайн-портал позволяет гражданам самостоятельно вводить информацию, что может минимизировать ошибки интервьюеров и сократить время, необходимое для последующей обработки и кодирования данных.

Вместе с тем, интеграция данных из многочисленных административных источников через ЕЭРН ² может привести к так называемой "демографической гомогенизации". Этот процесс подразумевает устранение противоречий и расхождений, присущих разрозненным административным базам, что в результате позволяет получать более чистые и внутренне согласованные статистические показатели.

Однако, центральным методологическим вызовом остается управление дедупликацией. Успех переписи напрямую зависит от эффективности технического слияния трех независимых источников: традиционного полевого сбора, данных, введенных через онлайн-портал, и уже существующих административных реестров, которые будут использоваться для верификации. Отсутствие точной системы сопоставления идентификаторов между этими источниками может привести к двойному учету, что исказит итоговые результаты численности населения.

Создание ЕЭРН и его интеграция с ключевыми государственными информационными системами ² представляет собой фундаментальную реформу государственного управления, ориентированную на данные.

Во-первых, централизованный доступ к актуальным и верифицированным данным о гражданах устраняет необходимость многократного предоставления одних и тех же документов, что приводит к значительному **снижению бюрократии** и повышению скорости предоставления государственных услуг.

Во-вторых, использование ЕЭРН критически важно для **таргетирования политики**. Точные и детализированные данные, включая информацию о социально-экономическом статусе и сельскохозяйственной деятельности домохозяйств ¹, позволяют государству внедрять программы социальной поддержки и субсидирования с высокой степенью адресности. Это обеспечивает эффективное использование ограниченных бюджетных ресурсов, направляя помощь именно тем группам, которые в ней нуждаются, что является прямым следствием заявленной цели — повышения эффективности госпрограмм и распределения ресурсов.¹

Более того, ЕЭРН создает основу для измерения реального воздействия государственных реформ. Если внедряемые программы социальной поддержки или инфраструктурные проекты не достигают целевой аудитории или не приводят к запланированным изменениям, данные реестра могут немедленно это выявить. Таким образом, ЕЭРН формирует устойчивую петлю обратной связи (*Policy Feedback Loop*), позволяя оперативно корректировать политические решения на основе эмпирических данных.

Переход к централизованному цифровому учету порождает ряд серьезных этических и институциональных вызовов, которые требуют тщательного рассмотрения.

Централизация такого объема чувствительных данных о населении в одном ЕЭРН ² неизбежно увеличивает риски, связанные с их хранением и обработкой. Обеспечение высокого уровня кибербезопасности,

защита от несанкционированного доступа и внедрение строгих протоколов конфиденциальности являются обязательными условиями для сохранения общественного доверия и легитимности системы. Необходимо разработать четкие механизмы, регулирующие, кто и в каких целях может использовать агрегированные или персональные данные.

Reliance на онлайн-портал для сбора данных ¹ может систематически приводить к недоучету наиболее уязвимых групп населения, а именно тех, кто не имеет доступа к интернету, проживает в отдаленных районах, или не обладает достаточными цифровыми навыками. Для компенсации этого цифрового неравенства критически важно обеспечить высокое качество традиционного полевого сбора данных, чтобы гарантировать инклюзивность и полноту охвата всего населения.

Успех функционирования ЕЭРН зависит не только от технической архитектуры, но и от устойчивости института, ответственного за его администрирование. Межведомственное сотрудничество и четкое разграничение ответственности между органами, поставляющими данные (МВД, ЗАГС, налоговые службы), и органом, управляющим ЕЭРН (например, Национальным комитетом статистики), должны быть институционально закреплены. Отсутствие такой устойчивости может привести к нарушению процесса непрерывной актуализации данных.

Ограничения Исследования и Перспективы

Настоящее исследование основано на анализе официальных планов и методологий, утвержденных для проведения переписи 2026 года и внедрения ЕЭРН. Главным ограничением является то, что анализ проводится *до* фактической реализации проекта. Реальные операционные проблемы, такие как уровень отказов в онлайн-опросе, процент дублирования между источниками данных и фактическая скорость межведомственной интеграции, станут известны только после 2026 года.

Будущие исследования должны сосредоточиться на эмпирической оценке точности данных, сравнительном анализе качества данных, полученных через онлайн-портал, и данных полевого сбора. Также требуется оценка долгосрочных операционных затрат и выгод от перехода к регистровой статистике по сравнению с традиционной моделью. Особое внимание следует уделить аудиту эффективности механизмов защиты данных и конфиденциальности граждан.

ЗАКЛЮЧЕНИЕ

Цифровизация переписи населения 2026 года в Узбекистане является не просто модернизацией, а фундаментальной, стратегически необходимой реформой государственного управления данными. Внедрение гибридной модели сбора данных ¹, включающей онлайн-саморегистрацию, в сочетании с созданием централизованного Единого электронного реестра населения (ЕЭРН) ², представляет собой комплексный ответ на 37-летний статистический вакуум.¹

Принятый подход позволяет перейти от одноразового статического учета к построению динамической системы непрерывного демографического учета. Использование ЕЭРН в широком спектре государственных, финансовых, коммунальных и юридических услуг ² гарантирует высокую степень актуализации данных, поскольку создает механизм непрерывного внешнего аудита качества.

Таким образом, комплексная гибридно-регистрационная модель полностью подтверждает выдвинутую гипотезу: она не только обеспечит точный демографический "снимок" 2026 года, но и построит устойчивую информационную основу для планирования бюджета, инфраструктуры и социальной политики.¹ В результате, Узбекистан получает критически важный инструмент для повышения эффективности государственных программ и обеспечения прозрачного распределения ресурсов в условиях быстро меняющейся социально-экономической среды.

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ЗНАЧИМОСТЬ ПЕРИНАТАЛЬНЫХ ФАКТОРОВ РИСКА В ПРЕДУПРЕЖДЕНИИ РАЗВИТИЯ СИНДРОМА ПОЛИОРГАННОЙ НЕДОСТАТОЧНОСТИ У НОВОРОЖДЁННЫХ

В данной работе проанализированы ключевые антенатальные, интранатальные и постнатальные факторы риска, влияющие на формирование синдрома полиорганной недостаточности (СПОН) у новорождённых. Подчёркнута значимость оценки вероятности неблагоприятного исхода (включая летальность) с использованием средней гармонической величины (СГВ). Установлена чёткая взаимосвязь между числом систем организма, вовлечённых в СПОН, и риском смерти. Выявлено, что поздний перевод новорождённых на искусственную вентиляцию лёгких при развитии острой дыхательной недостаточности значительно ухудшает прогноз.

***Цель исследования** - заключалась в повышении точности прогноза развития полиорганной недостаточности на основе оценки влияния перинатальных факторов риска.*

***Материалы и методы.** Исследование представляло собой наблюдательный, поперечный и ретроспективный анализ 267 историй болезни доношенных новорождённых, проходивших лечение в ОРИТН Андижанского детского многопрофильного медицинского центра.*

***Результаты.** В результате проведенных исследований было показано, что такие осложнения беременности, как тяжёлая фетоплацентарная недостаточность (ФПН), угроза прерывания беременности, внутриутробная задержка развития плода (ЗВУР), тяжёлый гестоз, многоводие, и осложнения родов - острая гипоксия плода, обвитие пуповиной, слабость родовой деятельности, клиническое несоответствие размеров плода размерам таза матери, повышают риск развития полиорганной недостаточности у новорождённых. Кроме того, предложенный показатель сочетанной патологии (ПСП) беременности, родов информативен и позволяет прогнозировать развитие СПОН у новорождённых, хорошо коррелируя с количеством органов, вовлечённых в синдром полиорганной недостаточности. Анализируя постнатальные факторы риска развития СПОН было выявлено, что отсроченное начало респираторной терапии при острой дыхательной недостаточности (ОДН) является основным фактором риска смерти новорождённых, независимо от первичного поражения, повышая число органов, вовлечённых в полиорганную недостаточность.*

Ключевые слова: патология беременности; патология родов; перинатальные факторы риска развития СПОН; гипоксия; асфиксия; острая дыхательная недостаточность; искусственная вентиляция легких; новорожденные дети; синдром полиорганной недостаточности.

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THE IMPORTANCE OF PERINATAL RISK FACTORS IN PREVENTING THE DEVELOPMENT OF MULTIPLE ORGAN FAILURE SYNDROME IN NEWBORNS

This study analyzes key antenatal, intranatal, and postnatal risk factors influencing the development of multiple organ dysfunction syndrome (MODS) in newborns. The importance of assessing the probability of an adverse outcome (including mortality) using the harmonic mean (HMS) is emphasized. A clear correlation is established between the number of body systems involved in MODS and the risk of death. It is found that delayed initiation of mechanical ventilation in newborns with the development of acute respiratory failure significantly worsens the prognosis.

Purpose of the study was to improve the accuracy of predicting the development of multiple organ failure by assessing the influence of perinatal risk factors.

Materials and methods. The study was an observational, cross-sectional, and retrospective analysis of 267 case records of full-term newborns treated in the NICU of the Andijan Children's Multidisciplinary Medical Center.

Results. The studies have shown that pregnancy complications such as severe fetoplacental insufficiency, threatened termination of pregnancy, intrauterine fetal retardation, severe gestosis, polyhydramnios, and birth complications such as acute fetal hypoxia, cord entanglement, weak labor activity, clinical mismatch between the fetus and the mother's pelvis increase the risk of multiorgan failure in the newborn. In addition, the proposed index of combined pregnancy and delivery pathology is informative and makes it possible to predict the development of multiple organ failure syndrome in newborns, correlating well with the number of organs involved in multiple organ failure syndrome. Analyzing postnatal risk factors for the development of multiple organ failure syndrome, it was found that delayed start of respiratory therapy in acute respiratory failure is a major risk factor for neonatal death, regardless of the primary lesion, increasing the number of organs involved in multiple organ failure.

Key words: *pregnancy pathology; labor pathology; perinatal risk factors for SIDS; hypoxia; asphyxia; acute respiratory failure; artificial ventilation; newborn babies; multiple organ failure syndrome*

Несмотря на современные достижения акушерства и неонатологии, патология беременности и родов оказывают существенное влияние на состояние плода и новорожденного ребенка. Так, обострение хронических заболеваний и возникновение патологии в период беременности и родов приводят к нарушениям в системе «мать – плацента – плод», к гемодинамическим нарушениям с развитием хронической и/или острой гипоксии плода и асфиксии новорожденного. И именно гипоксия плода и асфиксия новорожденного являются основными факторами риска развития критических состояний раннего неонатального периода, из которых наиболее значимым и неблагоприятным является синдром полиорганной недостаточности (СПОН) [1-3].

Прогноз и исход лечения СПОН определяются не столько этиологической причиной (родовая травма, холодовой стресс, инфекционный процесс, сепсис, асфиксия, декомпенсация при врожденных пороках развития (ВПР) и др.), сколько тяжестью перенесенной гипоксии, а также уровнем и своевременностью оказания медицинской помощи [4-8].

Между тем, остаются мало изученными вопросы влияния наиболее значимых перинатальных факторов и осложнений на развитие СПОН у новорожденных [9-12]. Кроме того, требует уточнения влияние своевременности проведения респираторной терапии на течение и исходы СПОН у новорожденных.

Цель исследования - повысить точность прогнозирования развития полиорганной недостаточности на основе изучения перинатальных факторов риска у новорожденных.

Материалы и методы исследования. В работе проведен наблюдательный, поперечный, ретроспективный анализ 267 историй болезней доношенных новорожденных, находившихся в отделении реанимации и интенсивной терапии новорожденных (ОРИТН) Андиганского детского многопрофильного медицинского центра.

Новорожденные, у которых в последующем сформировался СПОН, находились в критическом состоянии. Все дети получали лечение с обязательным включением продленной искусственной вентиляции легких (ИВЛ).

Из общего числа новорожденных (n = 267) были сформированы группы детей с первичным поражением центральной нервной системы (ЦНС), группа I (n = 195), и с первичным поражением легочной системы, группа II (n = 72). Кроме того, анализ проведен в группах в зависимости от исхода заболевания - в группах умерших и выживших детей. Для отражения многофакторности перинатальной патологии было изучено состояние здоровья матерей: возраст, социальный статус, акушерский анамнез, осложнения беременности и родов.

Изучались данные анамнеза, клинического, неврологического обследований, лабораторных и электрофизиологических методик исследований. Периодичность регистрации данных обследования больных представлена результатами трех этапов: при их поступлении в ОРИТН, на 3-4 сутки лечения и при переводе новорожденных детей из ОРИТН.

Для диагностики СПОН у новорожденных в критическом состоянии использовались методы оценки органических дисфункций по критериям, предложенным L. Doughty et al., 1996 (табл. 1).

Критерий кишечной недостаточности определялся по невозможности проведения энтерального и длительности парентерального питания.

Таблица 1

Дисфункции	
Респираторная	Необходимость в вентиляторной поддержке
Сердечная	САД < 5 перцентилей или необходимость в вазопрессорах
Почечная	Диурез < 1 мл/кг/ч более 8 часов
Печеночная	Билирубин в крови > 1 мг/кг
ЦНС	Менее 12 баллов по шкале Глазго
Гематологическая	Тромбоциты < 100 000 клеток на 1 мл, протромбиновое время и ЧТВ > нормы в 1,5 раза

Критерии органических дисфункций

Обработка полученных результатов осуществлялась методами вариационной статистики, учитывающими эффекты множественных сравнений, по параметрическим и непараметрическим критериям. Статистическая значимость различий средних величин определялась по критерию Стьюдента, в парных группах - по критерию Стьюдента с поправкой Бонферрони, величин, выраженных в процентном соотношении - с помощью Z-критерия. Корреляционный анализ проводили с помощью коэффициента ранговой корреляции по Спирмену. Расчеты вероятного риска летального исхода в изученных группах осуществлялись по формуле, которая изложена в монографиях Е.В. Гублера (1990), А.Н. Шмакова с соавт. (2007), с последующим определением средней гармонической величины (СГВ).

Результаты исследования и обсуждение. В результате проведенного анализа установлено, что, несмотря на молодой возраст матерей ($24,4 \pm 0,32$ года), число возрастных первобеременных (старше 28 лет) составляло значительную долю - 26,9 %. Средний срок гестации составил $39,3 \pm 0,10$ недель. Социальный статус большинства матерей - неработающие женщины - 49,6 %.

Выявлены наиболее частые осложнения и заболевания в периоде беременности и родов: тяжелая ФПН у 57,0 %, угроза прерывания беременности - у 36,0 %, анемия средней степени тяжести - у 27,0 %, ЗВУР плода - у 32,5 %, тяжелые гестозы - у 23,2 %, многоводие - у 15,7 % женщин и острая гипоксия плода - у 77,2 %, обвитие пуповиной и ее патология - у 31,8 %, слабость родовой деятельности - у 19,5 %, клиническое несоответствие

размеров плода размерам таза матери - у 14,9 %, аномалии предлежания и положения плода - у 6,4 % женщин.

Наличие у женщин сочетания различных заболеваний и осложнений в течение беременности и родов позволило предложить показатель сочетанной патологии (ПСП). ПСП — это среднее число осложнений, приходящееся на одну женщину в период беременности или родов. ПСП в период беременности для матерей составил $2,1 \pm 0,06$, ПСП в период родов - $2,7 \pm 0,09$. Корреляционный анализ между ПСП беременности и количеством органов, вовлеченных в СПОН, для группы умерших детей выявил умеренную корреляционную связь ($r = 0,48$; $P = 0,003$).

Женщин, не обследованных и не наблюдавшихся в женских консультациях в период беременности, было 35 (13,1 %). Однако факт отсутствия наблюдения беременной в женской консультации не означал отсутствие у нее соматической и/или акушерской патологии, что подтверждали данные анамнеза и результаты вычисления ПСП, который составил для необследованных матерей при беременности - $2,4 \pm 0,15$, а ПСП в период родов - $2,5 \pm 0,35$. Взаимосвязь между количеством органов, вовлеченных в СПОН, с ПСП беременности у необследованных матерей для группы умерших детей выявила высокую корреляционную зависимость ($r = 0,7$; $P = 0,003$).

Анализ всей группы новорожденных детей показал, что распределение по полу было представлено следующим образом: 56,2 % мальчиков и 43,8 % девочек ($P > 0,05$), средняя масса тела составила $3341 \pm 37,05$ г. Оценка по Апгар на первой, пятой, десятой минутах соответственно составила: 4; 5; 5 баллов ($P < 0,0001$). Установлено, что количество детей, родившихся с оценкой по шкале Апгар менее 6 баллов, было 65,6 %, с оценкой 6-8 баллов - 30,3 %, а с оценкой в 8-10 баллов - 4,1 %. Средние сроки поступления детей в ОРИТН составили $1,9 \pm 0,11$ суток, а средний срок лечения в ОРИТН - $7,2 \pm 0,29$ суток.

Тяжесть состояния новорожденных определялась не только влиянием ante- и интранатальных факторов, но также адекватностью и своевременностью оказания медицинской помощи в постнатальном периоде. В процессе исследования изучены сроки начала ИВЛ от момента появления симптомов острой дыхательной недостаточности в часах, и продолжительность ИВЛ в сутках. Так, в группах новорожденных вышеперечисленные показатели составили: время перевода на ИВЛ - $5,0 \pm 0,55$ часов, а длительность ИВЛ - $4,8 \pm 0,28$ суток.

Выявлено, что наиболее часто СПОН у новорожденных развивался на вторые и третьи сутки после рождения, что подтверждается исследованиями F. Proulx и соавт. [13].

Частота встречаемости органных нарушений у новорожденных, находящихся в критическом состоянии, составила: церебральная и респираторная недостаточность - в 100 % случаев, почечная - в 74,5%, кишечная - в 63,3 %, сердечно-сосудистая/кардиоваскулярная

недостаточность (ССН) – в 61,8 %, печеночная - в 46,1 % случаев. Была показана зависимость смертности от количества вовлеченных в СПОН органов и систем. По нашим данным, при поражении двух систем не умер ни один ребенок, при вовлечении трех систем процент смертности составил 1,8 %, четырех - 4,2 %, пяти – 39,6%, шести - 71,4 %.

В процессе исследования были изучены сроки начала ИВЛ от появления острой дыхательной недостаточности (ОДН) в часах и продолжительность ИВЛ в сутках. Доказаны более поздние сроки начала ИВЛ ($P < 0,0001$) и меньшая ее продолжительность ($P = 0,006$) для II группы детей. Кроме того, изучили влияние сроков начала ИВЛ на исходы СПОН более детально. Детей разделили на группы: с ранним началом ИВЛ - в первый час развития ОДН; с началом ИВЛ в сроки от 2-6 часов и группу детей, ИВЛ которым была начата позднее 6 часов от появления симптомов ОДН. Таким образом, была проведена попытка обозначить, выявить тот «золотой час», когда перевод на ИВЛ был бы оптимален.

Следует отметить, что во II группе доля новорожденных, ИВЛ которым проводилась в первый час с момента развития ОДН (у 34,0 % выживших и % умерших детей), была значительно меньше, в сравнении с I группой детей (у 72,0 % выживших и 66,7 % умерших детей соответственно), $P < 0,0001$. Это обстоятельство подтверждает предположение о том, что ИВЛ у детей с первичным поражением респираторной системы начинается с опозданием. Используя отношение между частотой встречаемости однотипных критериев (в частности, время перевода на ИВЛ) у умерших и выживших детей для I и II групп, был рассчитан вероятный риск летального исхода по формуле: $V = A/B$, где V - вероятность неблагоприятного исхода; A - априорная вероятность реализации угрозы (критерий в группе умерших детей); B - априорная вероятность ликвидации угрозы (критерий у выживших детей). Риск летальности с расчетом СГВ рассчитан по формуле:

$$СГВ = 2 \times (V1 \times V2) : (V1 + V2),$$

где $V1$ - показатель вероятного риска летального исхода по изучаемому фактору в группе детей с патологией ЦНС; $V2$ - показатель вероятного риска летального исхода по изучаемому фактору в группе детей с патологией легких (табл. 2). Значения показателей V и СГВ более единицы свидетельствуют о высоком риске летального исхода.

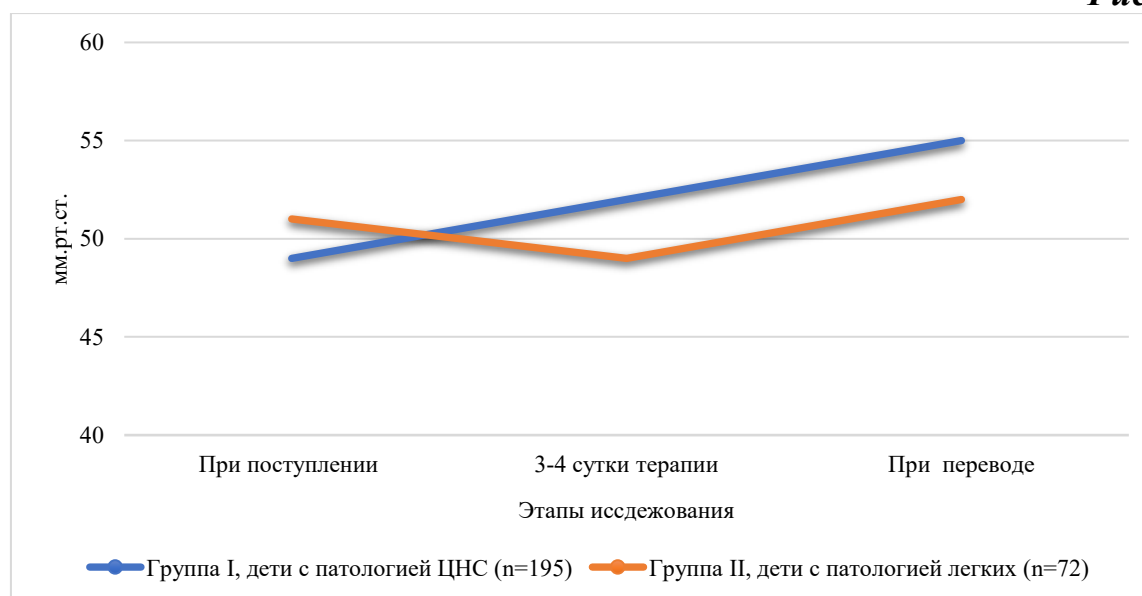
Анализ эффективности ИВЛ у умерших новорожденных, перевод на ИВЛ которых осуществлялся спустя 6 часов от момента диагностики ОДН, выявил умеренную корреляционную связь между количеством органов, вовлеченных в СПОН, началом ИВЛ ($r1 = 0,5$; $P = 0,043$) и ее продолжительностью ($r2 = 0,52$; $P = 0,039$). Риск вероятного летального исхода у новорожденных, независимо от первичности поражения - ЦНС или легких, рассчитанный по СГВ, был максимален у детей также с поздним началом ИВЛ, позднее 6 часов от начала ОДН, и СГВ составила 1,66 (табл. 2). Таким образом, нашло свое подтверждение предположение о том, что ИВЛ у новорожденных, как с первичным поражением ЦНС, так и легких, является

эффективным профилактическим методом терапии, который целесообразно включать в комплекс реанимационных мероприятий с момента диагностики у больных детей первых симптомов ОДН.

Анализ результатов исследования среднего артериального давления (САД) показал, что между I и II группами детей статистические различия выявлены только на третьем этапе исследования - при переводе больных из ОРИТН ($P = 0,001$) (рис. 1).

Анализ параметров САД у умерших больных I и II групп показал, что регистрировались более высокие показатели в начале заболевания и более выраженная артериальная гипотензия в финале заболевания у детей с летальным исходом ($P = 0,001$). Кроме того, был выявлен «перекрест» показателей, как САД, так и диуреза, на 3-4 сутки терапии с последующим их снижением в группе умерших и прогрессивным повышением показателей в группе детей с благоприятным исходом (рис. 1).

Рисунок 1

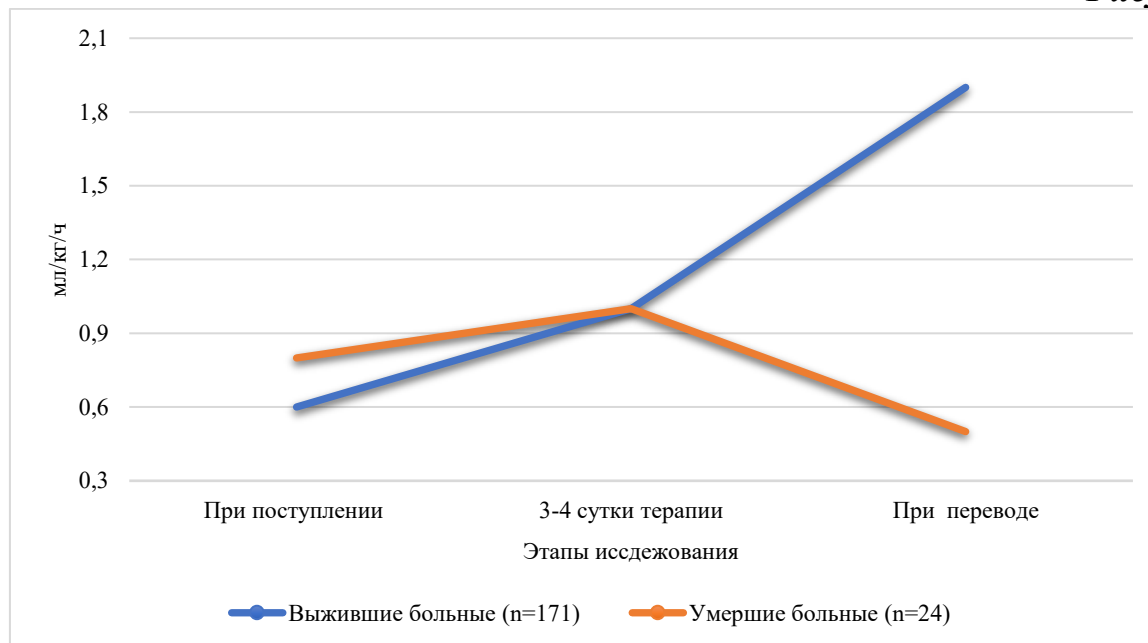


Динамика показателей среднего артериального давления в I и II группах новорожденных на этапах исследования.

В группах выживших и умерших больных на момент поступления в отделение реанимации и при переводе (смерти) выявлены различия показателей САД и почасового диуреза ($P < 0,0001$).

Установлено, что у новорождённых, находящихся в критическом состоянии, нормальный уровень диуреза в первые сутки жизни в сочетании с отсутствием его прироста к третьим суткам лечения (особенно в группе умерших) может рассматриваться как ранний прогностический маркер неблагоприятного исхода (рис. 2 и 3).

Рисунок 2

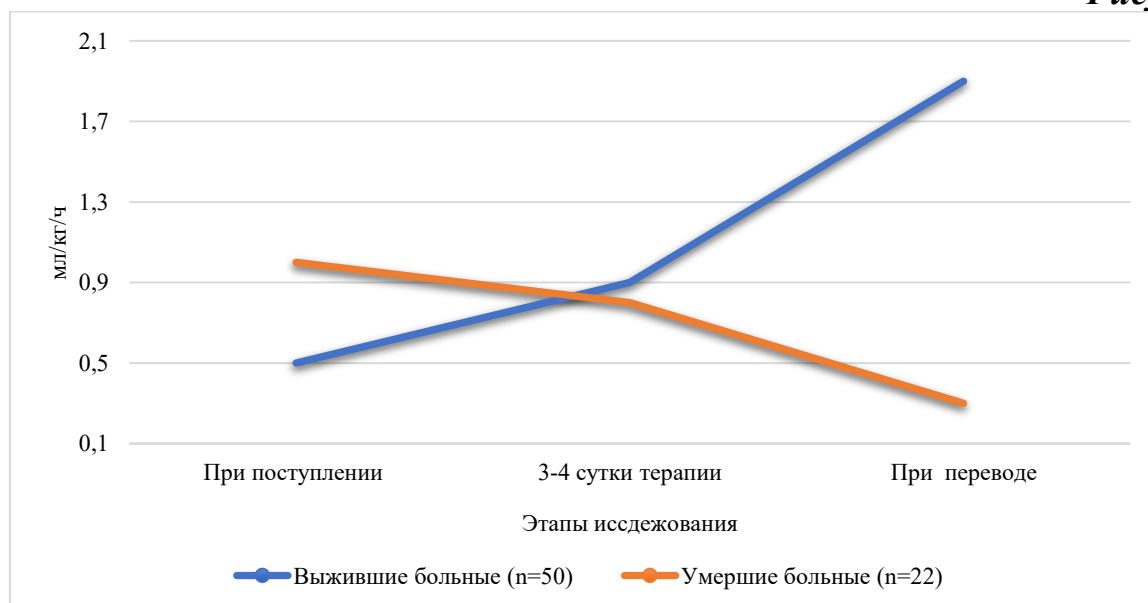


Динамика величины почасового диуреза у новорожденных с патологией ЦНС

Анализ динамики почасового диуреза у детей обеих групп продемонстрировал его постепенное увеличение на всех этапах наблюдения, однако статистически значимых различий между группами выявлено не было ($P > 0,05$).

Таким образом, выраженный диурез в дебюте заболевания, вероятнее всего, отражает утрату способности организма ограничивать скорость выведения жидкости, что служит компенсаторным противошоковым механизмом для поддержания адекватного сердечного выброса.

Рисунок 3



Динамика величины почасового диуреза у новорожденных с патологией легких

В процессе исследований было установлено, что прогностическую ценность для профилактики и лечения СПОН, а также неблагоприятного исхода у новорожденных, имеют следующие факторы: более высокие значения почасового диуреза и САД в начале заболевания и отсутствие их повышения к 3-4 суткам терапии, в том числе на фоне терапии кардиотониками и вазопрессорами.

Таблица 2

Критерии	Показатель риска летального исхода для детей с поражением ЦНС	Показатель риска летального исхода для детей с поражением легких	Показатель риска летального исхода по СГВ
Начало ИВЛ в первый час	0,92	0,93	0,92
Начало ИВЛ в сроки 2-6 часов	0,85	0,4	0,54
Начало ИВЛ в сроки позднее 6 часов	1,6	1,71	1,66

Показатель риска летального исхода, в зависимости от сроков начала ИВЛ

ВЫВОДЫ

1. Такие осложнения беременности, как выраженная фетоплацентарная недостаточность, угроза выкидыша, задержка внутриутробного развития плода, тяжёлый гестоз и многоводие, а также неблагоприятные факторы родов - острая гипоксия плода, обвитие пуповины, слабость родовой деятельности и несоответствие размеров плода тазу матери - существенно повышают вероятность формирования полиорганной недостаточности у новорождённых.

2. Показатель сочетанной патологии (ПСП) обладает высокой прогностической значимостью: его значения позволяют оценивать риск развития полиорганной недостаточности и тесно связаны с количеством органов и систем, вовлечённых в патологический процесс.

3. Запоздалое начало респираторной терапии при острой дыхательной недостаточности является ключевым постнатальным предиктором летального исхода у новорождённых, вне зависимости от характера первичного поражения. При этом у детей с первичным повреждением лёгких задержка начала ИВЛ наблюдается значительно чаще, чем у новорождённых с первичным поражением ЦНС.

4. Для новорождённых в тяжёлом состоянии характерны более высокие показатели среднего артериального давления и почасового диуреза в начале терапии, которые затем прогрессивно снижаются к третьим суткам лечения. Подобная динамика указывает на высокую вероятность дезадаптации и наступления летального исхода.

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ОБЪЕКТИВНАЯ ОЦЕНКА ВАЛИДНОСТИ И ЭФФЕКТИВНОСТИ ШКАЛ БОЛИ У НОВОРОЖДЁННЫХ

***Аннотация:** Существует множество неонатальных наблюдательных инструментов для оценки боли, однако их использование в клинической практике остаётся ограниченным. В сравнительном исследовании были изучены две предиктивные шкалы оценки боли у новорождённых: NFCS-R (Neonatal Facial Coding System - Revised) – система кодирования мимики новорождённого, и CHIPPS (Children and Infant's Postoperative Pain Scale) – шкала послеоперационной боли у детей и младенцев с точки зрения их психометрических характеристик. Оба инструмента продемонстрировали высокую конвергентную валидность. Следовательно, при выборе шкалы следует учитывать её клиническую применимость, а дальнейшие исследования могут быть направлены на оптимизацию и усовершенствование этих инструментов.*

***Ключевые слова:** боль, оценка, новорожденные, шкалы NFCS-R, CHIPPS.*

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OBJECTIVE ASSESSMENT OF THE VALIDITY AND EFFECTIVENESS OF PAIN SCALES IN NEWBORNS

***Abstract:** Numerous neonatal observational pain assessment instruments exist, but their use in clinical practice remains limited. A comparative study examined the psychometric properties of two predictive pain assessment scales for newborns: the Neonatal Facial Coding System - Revised (NFCS-R) and the Children and Infant's Postoperative Pain Scale (CHIPPS). Both instruments demonstrated high convergent validity. Therefore, clinical applicability should be considered when selecting a scale, and further research could be aimed at optimizing and refining these instruments.*

***Keywords:** pain, assessment, neonates, scales NFCS – R, CHIPPS.*

Актуальность проблемы

Необходимость оценки боли у младенцев широко признана и рассматривается как ключевой фактор для обеспечения адекватного обезболивания. На сегодняшний день существует ряд инструментов для оценки боли у новорождённых [1, 11, 12, 19]. Несмотря на их доступность, применение этих инструментов в клинической практике остаётся ограниченным [2, 3, 5]. Одной из главных причин является отсутствие «золотого стандарта», что связано с недостатком систематических сравнительных психометрических исследований [11, 12].

Шкала NFCS-R (Neonatal Facial Coding System - Revised) [13] широко используется в научных исследованиях и может применяться в клинических условиях. CHIPPS (Children and Infant's Postoperative Pain Scale) [7, 8] отличается лёгкой доступностью и популярностью не только за счёт простоты использования и кодирования, но и благодаря высокой достоверности и экономии времени. Однако большинство пользователей не знают, что CHIPPS была валидирована исключительно для доношенных новорождённых послеоперационного периода, хотя её часто применяют для недоношенных и доношенных детей с различными болевыми состояниями.

Ограниченное использование стандартизированных инструментов оценки [5, 12] приводит к тому, что медицинские работники нередко оценивают боль у младенцев интуитивно [18], что снижает точность и объективность вмешательств.

Сопоставление интуитивных оценок наблюдателей с показателями боли, фиксируемыми в наблюдательных инструментах, может помочь выявить, какие именно сигналы используются при оценке боли у младенцев. Обнадеживает, что некоторые исследования показывают влияние таких сигналов, как плач и мимика ребёнка, на клиническую оценку боли [15, 17], поскольку эти признаки напрямую соответствуют категориям, включённым в стандартизированные инструменты наблюдения.

Цель исследования

Цель настоящего исследования - психометрическое сравнение шкал CHIPPS и NFCS-R, с особым вниманием к их способности точно выявлять и дифференцировать болевые реакции у новорождённых.

Материал и методы исследования

Для данного исследования была последовательно собрана серия видеозаписей лица и поведения 44 новорождённых, поступивших в отделение реанимации и интенсивной терапии новорождённых Андижанского областного детского многопрофильного медицинского центра. Из них 30 детей были недоношенными (гестационный возраст <37 недель) со средним сроком беременности 33,57 недели (SD = 1,48). Средний гестационный возраст доношенных новорождённых составил 38,69 недели (SD = 1,6). В выборке было 27 девочек (16 недоношенные и 11 доношенные). На момент видеозаписи средний возраст новорождённых составлял 1,92 дня (SD = 2,58).

Критериями исключения из исследования являлись: неврологическая патология, гепаторенальные расстройства, синдромальные заболевания, аномалии развития лица и изменения мышечного тонуса.

Все новорождённые были записаны на видео с помощью HD-камеры Canon Legria HF M46 в условиях болезненной процедуры (пункция вены или установка периферического венозного катетера). Видеозаписи были обработаны и сегментированы с использованием программного обеспечения TechSmith Camtasia 2019 (TechSmith Corporation, США). Каждая видеопоследовательность начиналась за 10 секунд до начала болезненной или стрессовой ситуации. Эти ситуации были выбраны, поскольку клиницисты — врачи и медсестры, работающие в педиатрии и неонатологии — считали их болезненными или вызывающими стресс, а также аналогичными тем, которые описаны в литературе как стресс- и болевая стимуляция [9].

Порядок записи видео не был заранее определён или рандомизирован. Однако болезненные и стрессовые ситуации регистрировались в течение одного дня для каждого ребёнка, со средним интервалом 9,5 часов. Данные о порядке проведения процедур были доступны для 40 новорождённых: у 17 детей стрессовая ситуация предшествовала болезненной, а у 23 - наоборот. Тесты на среднюю разницу показали, что порядок проведения процедур не оказывал значимого влияния на оценку боли с использованием шкал NFCS-R и CHIPPS.

NFCS является одномерным инструментом для оценки боли у новорождённых, так как основан исключительно на анализе лицевых движений. В исходной версии шкалы NFCS учитывались десять различных движений лица, однако сокращение их до пяти ключевых элементов позволило повысить специфичность без снижения чувствительности [16]. В пересмотренной версии NFCS были выделены следующие пять основных показателей [13]:

1. Выпуклость надбровных дуг — образование выпуклостей, складок и/или вертикальных борозд над бровями и между ними.
2. Сдавливание глаз — сжатие и/или выпуклость век.
3. Носогубная борозда — подтягивание вверх и углубление линии, проходящей от крыльев ноздрей к уголкам рта.
4. Горизонтальное растяжение рта — отчетливое растяжение углов рта по горизонтали, иногда сопровождающееся вытяжением верхней губы.
5. Тугой язык — приподнятый, чашеобразный язык с острыми вытянутыми краями.

Каждое лицевое движение кодировалось по принципу «есть» (1), «нет» (0) или «не определяется» («НО»). Возникновение каждого действия регистрировалось последовательно в заранее определённых временных сегментах. Баллы по отдельным пунктам суммировались, что позволяло получить итоговую оценку от 0 до 5 для каждого временного сегмента.

Подобно NFCS-R, шкала CHIPPS основывается на поведенческих признаках для оценки боли, однако её пять пунктов охватывают несколько

категорий поведения: 1) плач, 2) выражение лица, 3) поза туловища, 4) поза ног и 5) двигательное беспокойство. Новорождённых наблюдали в течение 15 секунд, и для каждого пункта оценка проводилась по следующей шкале: 0 — боль не проявляется, 1 — боль проявляется потенциально, 2 — боль явно выражена в течение наблюдаемого периода. Баллы по отдельным пунктам суммировались, поэтому общий балл за 15-секундный сегмент мог варьироваться от 0 до 10. Значение 4 и выше указывало на необходимость анальгетического вмешательства [8].

Данные были проанализированы с использованием программы Microsoft Excel 2016. Для повышения сопоставимости результатов вычислялся средний балл по каждому элементу шкалы, то есть общий балл инструмента делился на количество его элементов. В качестве показателя относительной достоверности использовались коэффициенты корреляции Спирмена между шкалами NFCS-R и CHIPPS.

Результаты исследования

Поскольку внутриклассовая корреляция (ВКК) были высокими для обоих инструментов для всех новорожденных, оценки были усреднены по всем шкалам оценки для дальнейшего анализа (таблица 1.).

Таблица 1.

№	Шкалы оценки боли	Оценка боли		
		Недоношенные	Доношенные	Все новорожденные
1	NFCS-R	0,980 (0,963-0,990)	0,944 (0,864-0,980)	0,975 (0,958-0,986)
2	CHIPPS	0,970 (0,945-0,985)	0,954 (0,889-0,984)	0,968 (0,947-0,981)

Внутриклассовая корреляция для шкал NFCS-R и CHIPPS в болевых ситуациях для доношенных и недоношенных новорожденных

Для шкалы NFCS-R все элементы были включены в расчет, и внутриклассовая последовательность была высокой для всей группы новорожденных ($\alpha = 0,936$), а также для недоношенных ($\alpha = 0,943$) и доношенных новорожденных ($\alpha = 0,880$). Для исходных данных шкалы CHIPPS внутренняя последовательность также была высокой (все новорожденные: $\alpha = 0,83$; недоношенные: $\alpha = 0,82$; доношенные: $\alpha = 0,85$). Относительная конвергентная валидность с точки зрения величины эффекта корреляция между оценками инструментов показывает большую величину эффекта для ассоциаций между NFCS-R и CHIPPS у недоношенных новорожденных в болевых ситуациях. Связь между инструментами также выявила большие размеры эффекта (Таблица 2).

Таблица 2.

№	Группы новорожденных	Коэффициент корреляции между шкалами NFCS-R и CHIPPS	P
1	Недоношенные	0,681	<0,001
2	Доношенные	0,719	<0,01
3	Все новорожденные	0,705	<0,001

Коэффициенты корреляции для шкал NFCS-R и CHIPPS при болевых ситуациях у новорожденных

Результаты дисперсионного анализа с повторным измерением выявили основное влияние на болевую ситуацию для шкал NFCS-R и CHIPPS (Табл. 3).

Таблица 3.

Шкала	Показатели	Df	F	p	η^2	d	Er
NFCS-R	Болевая ситуация	1	10,886	0,002	0,214	0,48	40
	Гестационный возраст	1	1,167	0,286	0,028		
	Болевая ситуациях срок гестации	1	1,264	0,268	0,031		
CHIPPS	Болевая ситуация	1	13,161	0,001	0,239	0,52	42
	Гестационный возраст	1	1,372	0,248	0,032		
	Болевая ситуациях срок гестации	1	1,416	0,241	0,033		

Результаты дисперсионного анализа с повторным измерением для NFCS-R и CHIPPS

Примечание: Df - количество степени свободы; F - коэффициент вариации; η^2 - корреляционное отношение; d- дисперсия; Er - внутригрупповая ошибка

Как показано на рисунке 1, оценки всех двух инструментов в болезненной ситуации были выше. Ни срок беременности, ни взаимосвязь между сроком беременности и ситуацией не достигли статистической значимости ни для одного из инструментов.

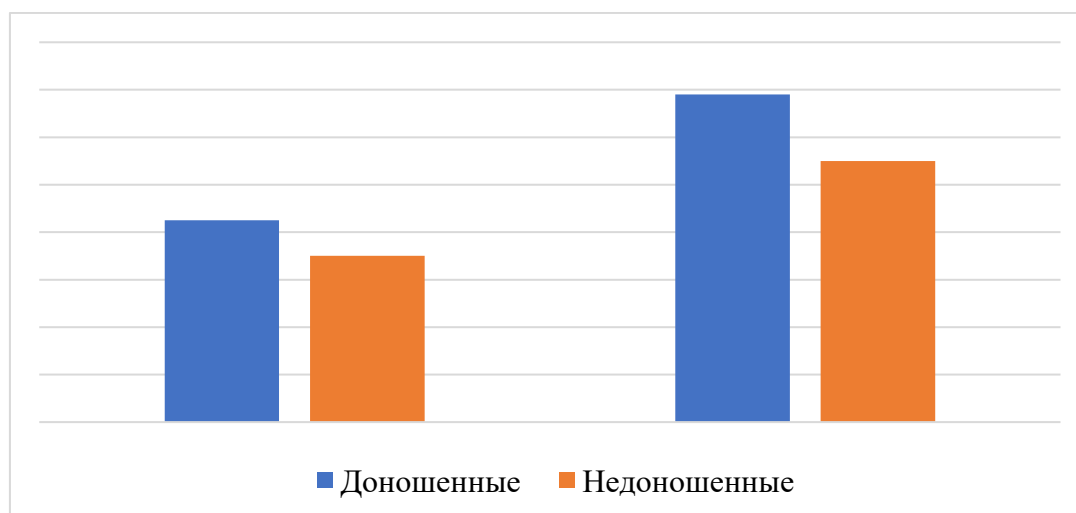


Рис. 1. Средние значения и стандартные ошибки для недоношенных и доношенных новорожденных в болезненных и стрессовых ситуациях

Обсуждение

Несмотря на ограниченное время подготовки, обе шкалы продемонстрировали высокую степень согласованности по отдельным элементам оценки боли (диапазон для CHIPPS: 0,918–0,981; для NFCS-R: 0,910–0,980). Надежность между экспертами для NFCS-R оказалась сопоставимой с данными, представленными в литературе [14], тогда как надежность между экспертами для CHIPPS была выше [4, 7, 20], вероятно, благодаря большему времени, уделённому предварительному уточнению критериев кодирования. Оба инструмента продемонстрировали хорошую внутреннюю согласованность (NFCS-R: 0,94; CHIPPS: 0,83), что свидетельствует об их однородности. Показатели валидности для CHIPPS в нашем исследовании оказались немного ниже, чем те, что сообщаются в предыдущих исследованиях [7], тогда как показатели NFCS-R соответствовали существующим данным. Поскольку CHIPPS ранее не оценивался у недоношенных новорождённых, обнадеживает, что валидность шкалы для этой группы оказалась сопоставимой с общей выборкой (0,82–0,83). Связь между обоими инструментами, отражающая их относительную валидность, была высокой с точки зрения величины эффекта и согласовалась с результатами других исследований [7, 10]. Полная идентичность между шкалами маловероятна, так как NFCS-R учитывает только мимику лица, тогда как CHIPPS охватывает дополнительные поведенческие проявления боли. Тем не менее, корреляция между шкалами была выше, чем между каждой шкалой и интуитивными оценками клиницистов (NFCS: 0,55–0,66; CHIPPS: 0,53–0,55). Несмотря на то, что последние показатели также остаются достаточно сильными, интуитивные суждения зачастую формируются неявно, подвержены предвзятости и могут существенно различаться. Поэтому настоятельно рекомендуется использовать стандартизированные инструменты объективной оценки боли.

Гестационный возраст не оказывал значимого влияния на оценку боли ни по одному из инструментов. Кроме того, связь между сроком беременности и типом ситуации также не была статистически значимой. Это обнадеживает, поскольку позволяет предположить, что шкалу CHIPPS можно применять как у доношенных, так и у недоношенных новорождённых. С точки зрения практичности, оба инструмента отличаются небольшой продолжительностью применения, а процесс получения итоговой оценки является сравнительно простым.

Наши результаты указывают на то, что оба инструмента могут быть доработаны для повышения их эффективности. Для NFCS-R важно разработать обучающие программы, которые будут одновременно доступными и экономными по времени. В случае CHIPPS необходимы дополнительные исследования, включающие недоношенных и доношенных новорождённых с различными болевыми состояниями, а также создание руководства для клиницистов, содержащее чёткие определения элементов, правила их кодирования и ответы на возникающие вопросы в процессе оценки. Учитывая значимость правильной оценки боли, требуется дальнейшее изучение того, какие неявные стратегии принятия решений используют специалисты здравоохранения при оценке боли у новорождённых.

Таким образом, психометрические показатели обеих шкал являются обнадеживающими, особенно для CHIPPS, поскольку наши данные показывают, что её можно применять для оценки острой боли у недоношенных новорождённых. Оба инструмента имеют потенциал для усовершенствования с точки зрения клинической применимости. Шкалы наблюдательной оценки боли, изученные в настоящем исследовании — NFCS-R и CHIPPS - сопоставимы по надёжности и валидности. Хотя обе шкалы могут быть относительно легко использованы в повседневной клинической практике, каждая из них имеет определённые недостатки, которые могут ограничивать их текущее применение.

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ПРИОРИТЕТНЫЕ ЗАДАЧИ ПОДГОТОВКИ СПЕЦИАЛИСТОВ В ОБЛАСТИ ФИЗИЧЕСКОЙ КУЛЬТУРЫ И СПОРТА В ВЫСШИХ УЧЕБНЫХ ЗАВЕДЕНИЯХ

Аннотация: В статье представлена информация о роли физической культуры и спорта в системе непрерывного образования, содержании и проблемах будущей системы подготовки учителей физической культуры.

Также рассматриваются вопросы подготовки специалистов в области спорта в системе высшего образования и основные требования, предъявляемые к системе подготовки специалистов в этой области на сегодняшний день.

Ключевые слова: физическая культура, непрерывное образование, спорт, здоровое поколение, учитель физической культуры, тренер, спортивный специалист, специальная подготовка, профессиональная деятельность, физическое развитие, спортивная служба, оздоровление.

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PRIORITY TASKS OF TRAINING SPECIALISTS IN THE FIELD OF PHYSICAL EDUCATION AND SPORTS IN HIGHER EDUCATION INSTITUTIONS

Abstract: This article provides information on the role of physical education and sports in the continuous education system, and the content and problems of the future physical education teacher training system.

Also, issues of training of specialists in the field of sports in the higher education system and the main requirements set for the system of training of specialists in this field today are described.

Key words: physical culture, continuous education, sport, healthy generation, physical education teacher, trainer, sports specialist, special training, professional activity, physical development, sports service, wellness.

В каждом обществе физическое воспитание и спорт являются одним из основных факторов воспитания подрастающего поколения физически

здоровыми, способными работать и жить в повседневных условиях, и достижения долгой жизни людей. Поэтому роль семейной среды и образовательных учреждений в развитии подрастающего поколения как физически здоровых, нравственно чистых и психически зрелых личностей неоценима. Именно в образовательных учреждениях процесс обучения и воспитания подрастающего поколения является сложным, и благодаря упорному труду учителей и воспитателей наши студенты и молодежь готовятся к жизни и труду и становятся обладателями профессии, которая им интересна. Среди таких учителей особую значимость имеет роль наших учителей в области физической культуры и спорта. Сегодня будущие учителя, обучающиеся по специальности «физическое воспитание» в высших учебных заведениях, должны чувствовать, что им предстоит много трудиться, чтобы служить такому почетному и процветающему обществу и готовить подрастающее поколение физически здоровыми и талантливыми спортсменами, и они должны понимать, что им необходимо овладеть всеми секретами этой профессии [1].

В нашем обществе студенты высших учебных заведений являются востребованными специалистами, которые могут использовать условия и возможности, созданные в современной школе, требовательны к себе и своей деятельности, умеют организовывать образовательную деятельность в общеобразовательных школах, являются мастерами своего дела, в совершенстве овладели секретами своего дела, саморазвиваются и умеют в полной мере внедрять в процесс свои знания и таланты. В последние годы подготовка будущих учителей физической культуры в высших учебных заведениях нашей страны к образовательной деятельности обозначена как приоритетное направление, наряду с формированием у личности социально активных, духовно зрелых чувств, и поставлена задача воспитать будущих учителей любящими, верными, сострадательными, умными, честными, чистыми, гуманными, ориентированными на людей, духовно и нравственно компетентными. В этой связи в пункте 232 Указа Президента Республики Узбекистан «О Государственной программе по реализации Стратегии действий по пяти приоритетным направлениям развития Республики Узбекистан в 2017-2021 годах в «Год развития науки, просвещения и цифровой экономики»» определены задачи по налаживанию подготовки высококвалифицированных тренеров и других специалистов в сфере физической культуры и спорта.

В соответствии с Постановлением Главы государства «О мерах по совершенствованию системы подготовки кадров в области физической культуры и спорта и повышению научного потенциала», принятым 3 ноября 2020 года, будет обеспечена реализация указанных задач, обозначенных в Государственной программе, а также решен ряд вопросов, направленных на подготовку специалистов в области физической культуры и спорта и популяризацию спорта. Также сегодня проводится работа по внедрению в систему высшего образования передового зарубежного опыта по внедрению

образовательных процессов на основе современных образовательных технологий, содействии развитию системы подготовки кадров для сферы физической культуры и спорта, формированию в нашей стране открытой, информационно-образовательной среды, основанной на современных требованиях к подготовке специалистов в области физической культуры и спорта [2].

Отдельно стоит остановиться на системе подготовки будущих специалистов физической культуры и спорта во всех типах образования нашей страны (дошкольное, общее среднее, профессиональное и высшее образование, а также система внешкольного образования), её содержании и сущности. Ведь ещё предстоит организовать методические основы проведения занятий, скоординировать работу по повышению эффективности деятельности государственных организаций и спортивных федераций (ассоциаций) в сфере физической культуры и спорта. Этот процесс напрямую связан с учебно-воспитательной деятельностью. Готовность к учебной деятельности – это особое психологическое состояние, требующее формирования определённого действия в предмете и постоянной направленности на его выполнение, терпения и настойчивости.

Одним из важных аспектов профессиональной подготовки будущих специалистов в области физической культуры в высших учебных заведениях является то, что сам специалист должен любить спорт, иметь специальную подготовку и талант в соответствующих видах спорта. Ведь в будущей трудовой деятельности необходимо готовить молодых спортсменов к жизни общества и повышать их интерес к спорту, развивать талантливых спортсменов, что является выполнением общественного запроса. В то время, когда развитие общества в результате образования и воспитания играет важную роль в жизни каждой страны, сфера физической культуры и спорта является процессом, имеющим большое значение во внутренней и внешней политике страны, а также в жизни общества. Именно позитивный характер непрерывной образовательной системы физической культуры и спорта на всех ее этапах служит благополучию, здоровью, развитию общества и его укреплению. Поэтому в годы независимости в нашей стране принимаются последовательные меры по популяризации физической культуры и спорта, дальнейшему укреплению ее организационно-правовых основ, созданию необходимых условий для пропаганды здорового образа жизни среди населения, особенно молодежи, совершенствованию механизмов социальной защиты спортсменов.

Сфера физической культуры и спорта требует определенного количества знающих и квалифицированных специалистов, способных соблюдать требования государственных стандартов в деятельности организаций на республиканском, региональном и территориальном уровнях, а также специалистов, проводящих спортивную подготовку в государственных и негосударственных, общественных и международных организациях, и способных готовить спортсменов к эффективному участию в

узбекских и международных соревнованиях [3]. Специалисты по физической культуре и спорту в ходе своей профессиональной деятельности ежедневно выполняют многогранную, многофункциональную и профессионально сложную работу, в том числе предоставляют услуги по физической культуре, здоровью и спорту, связанные с личностью человека и его здоровьем. Это требует от каждого специалиста личной ответственности за свой труд, особого внимания и профессионального мастерства, особенно при качественном выполнении работ и предоставлении услуг. В частности, особое значение имеет регулярная работа специалистов этой области с подростками и молодежью, ответственный подход к воспитательной работе.

Поскольку специалисты и преподаватели по физическому воспитанию и спорту в своей деятельности постоянно работают с оборудованием и устройствами, связанными со спортивной деятельностью, от них требуется наличие специальных знаний в процессе обучения и тренировок. Будущие специалисты по физическому воспитанию и спорту в своей деятельности будут осуществлять организационную работу, в том числе связанную с постоянным проведением многочисленных соревнований. Это означает, что им необходимо быть заранее тщательно подготовленными к методически грамотной организации и проведению спортивных мероприятий [4]. Поэтому предлагается учитывать ряд факторов в деятельности специалистов, обучающихся в высших учебных заведениях и готовящихся в будущем к выполнению педагогической работы в области физического воспитания в качестве преподавателей в сфере физической культуры и спорта:

- связь деятельности специалистов по физическому воспитанию и спорту с личностью человека и его здоровьем;
- уметь использовать специальные пособия и методические пособия, требующие от специалиста по физическому воспитанию и спорту специальных знаний;
- знать психолого-педагогические особенности и личностные качества каждой возрастной группы при работе с подростками и молодежью;
- иметь организаторские способности, умения и квалификацию для организации и проведения запланированных мероприятий.

Таким образом, за последние годы в результате постоянной заботы, активных усилий и участия государства и общества в процессе реформирования образования в нашей стране система подготовки будущих тренеров и преподавателей физической культуры и спорта получила дальнейшее развитие и совершенствование.

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WORLD SKILLS КАК СИСТЕМА ГЛОБАЛЬНЫХ СТАНДАРТОВ ПРОФЕССИОНАЛЬНОЙ ПОДГОТОВКИ И КОМПЕТЕНТНОСТИ

Аннотация: В данной статье исследуются международные стандарты профессионального мастерства WorldSkills, их структура, концептуальные принципы и роль в развитии современной системы профессионального образования. Представлен исторический анализ становления и эволюции движения WorldSkills. Особое внимание уделено вопросам интеграции стандартов WorldSkills в образовательную практику, включая обновление и адаптацию учебных программ, развитие системы сертификации, а также организацию и проведение демонстрационных экзаменов. Рассматривается опыт внедрения стандартов WorldSkills в Республике Узбекистан, выявляются ключевые преимущества для всех субъектов образовательного процесса — обучающихся, образовательных организаций, работодателей и государства. Анализируются основные проблемы и вызовы, сопровождающие процесс внедрения международных стандартов, а также определяются перспективные направления развития движения WorldSkills как эффективного инструмента модернизации системы профессионального образования и подготовки конкурентоспособных специалистов, отвечающих требованиям мирового рынка труда..

Ключевые слова: WorldSkills, vocational education, international standards, competencies, professional excellence, qualification assessment, demonstration exam, technical description of competencies, vocational training system, labor market, certification, professional skills championship.

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WORLD SKILLS: GLOBAL STANDARDS OF PROFESSIONAL EXCELLENCE

Abstract: *In article is given explores the international standards of professional excellence established by WorldSkills, their structure, conceptual principles, and their role in the development of the modern vocational education system. A historical analysis of the formation and evolution of the WorldSkills movement is presented. Particular attention is given to the integration of WorldSkills standards into educational practice, including the renewal and adaptation of curricula, the development of certification systems, and the organization and implementation of demonstration exams. The article examines the experience of implementing WorldSkills standards in the Republic of Uzbekistan, highlighting the key benefits for all participants in the educational process — students, educational institutions, employers, and the state.*

The main challenges and issues accompanying the implementation of international standards are analyzed, and prospective directions for the further development of the WorldSkills movement are identified. The movement is considered an effective tool for modernizing the vocational education system and training competitive professionals who meet the requirements of the global labor market.

Keywords: *WorldSkills, vocational education, international standards, competencies, professional excellence, qualification assessment, demonstration exam, technical description of competencies, vocational training system, labor market, certification, professional skills championship.*

Введение

Постановление Президента Республики Узбекистан от 11 августа 2020 года № ПП-4804 «О дополнительных мерах, направленных на привлечение к предпринимательству, повышение трудовой активности и профессиональное обучение бедных и безработных граждан, а также обеспечение занятости населения» является одним из ключевых документов, направленных на реализацию государственной политики в сфере занятости и социальной защиты населения. Постановление предусматривает комплекс мероприятий, направленных на создание реальных условий для вовлечения малообеспеченных и безработных граждан в экономическую деятельность, развитие их профессиональных навыков, стимулирование предпринимательской инициативы, а также содействие устойчивой самозанятости.

Документ вводит важные механизмы поддержки: бесплатные краткосрочные курсы профессионального обучения, систему ваучеров для освоения востребованных специальностей, льготное кредитование начинающих предпринимателей из малообеспеченных семей, субсидии на приобретение оборудования для самозанятости, адресное содействие в трудоустройстве, программы социального партнерства и наставничества. Постановление направлено на развитие человеческого капитала, повышение трудовой мобильности и снижение уровня бедности, что полностью

соответствует национальным целям социально-экономического развития Республики Узбекистан. Документ вступил в силу 12 августа 2020 года.

В контексте модернизации системы профессионального образования особое значение приобретает деятельность международного движения WorldSkills International, объединяющего более 85 стран. Основная миссия WorldSkills — повышение престижа рабочих профессий, разработка единых мировых стандартов профессиональной компетентности и создание условий для развития качественного профессионального образования. Стандарты WorldSkills выступают универсальным эталоном, позволяющим объективно оценивать профессиональные навыки специалистов по широкому спектру отраслей — от машиностроения и строительства до IT-сферы, дизайна и сервиса.

Движение WorldSkills было основано в 1950 году в Испании под названием International Vocational Training Organization (IVTO). За прошедшие десятилетия организация превратилась в крупнейшую мировую платформу для развития профессионального мастерства, инноваций в системе подготовки кадров, совершенствования учебных программ и методов оценки компетенций. Центральным событием является мировой чемпионат WorldSkills Competition, проводимый один раз в два года и известный как «Олимпиада профессионалов». В нём участвуют молодые специалисты до 22 лет (а по некоторым компетенциям — до 25 лет), демонстрируя высокие стандарты практической подготовки и инновационные подходы к выполнению профессиональных задач.

Участие страны в движении WorldSkills способствует развитию системы профессионального образования, внедрению новых технологий обучения, повышению конкурентоспособности выпускников, а также созданию современной модели оценки квалификаций. Для Узбекистана участие в WorldSkills является важным инструментом интеграции в мировое образовательное пространство, совершенствования национальных стандартов подготовки кадров и укрепления престижа рабочих профессий.

Материал и методы

Стандарты WorldSkills охватывают более 60 различных компетенций, которые сгруппированы в шесть основных категорий:

1. Строительные технологии — каменная кладка, плотницкое дело, сантехника и отопление, электромонтаж, облицовка плиткой и другие
2. Информационные и коммуникационные технологии — программирование, веб-дизайн, сетевое администрирование, кибербезопасность
3. Производственные и инженерные технологии — промышленная механика, сварочные технологии, мобильная робототехника, электроника
4. Транспорт и логистика — автотехнологии, авиационная техника, кузовной ремонт
5. Креативные искусства и мода — парикмахерское искусство, графический дизайн, флористика, технологии моды

6. Социальные и персональные услуги — поварское дело, ресторанный сервис, медицинский и социальный уход, туризм.

Результаты исследования

Применение стандартов WorldSkills в системе образования способствует глубокой модернизации профессиональной подготовки и повышению её качества в соответствии с требованиями современного рынка труда и глобальных трансформаций в сфере производства и экономики. Во многих странах данные стандарты используются как универсальный инструмент обновления образовательных программ, позволяющий определять актуальные профессиональные требования, выявлять пробелы в существующих учебных модулях, внедрять современные технологии, оборудование и методы обучения, а также обеспечивать подготовку специалистов, соответствующих международным квалификационным рамкам. В этом контексте стандарты WorldSkills становятся не просто моделью оценки навыков, но механизмом управления качеством профессионального образования на уровне государства, региона и отдельного образовательного учреждения.

Одним из ключевых направлений развития является формирование национальной системы сертификации квалификаций, основанной на стандартах WorldSkills. Такие сертификаты выступают объективным подтверждением уровня профессионального мастерства выпускников и их готовности к самостоятельной практической деятельности. Они активно признаются работодателями благодаря тому, что демонстрируют способность специалиста работать по международным технологическим регламентам и выполнять задачи, соответствующие мировым стандартам качества. Особую роль при этом играет формат демонстрационного экзамена, основанный на методологии WorldSkills. Он позволяет выполнять итоговую оценку компетенций обучающихся в условиях, максимально приближенных к реальной профессиональной среде, тем самым обеспечивая высокую степень объективности, прозрачности и достоверности итоговой аттестации.

В Республике Узбекистан движение WorldSkills активно развивается с момента присоединения страны к международной организации. Создается разветвлённая инфраструктура подготовки кадров: центры компетенций, инновационные профессиональные мастерские, лаборатории, оснащенные современным оборудованием, учебно-производственные полигоны. Регулярно проводятся национальные и региональные чемпионаты профессионального мастерства, осуществляется подготовка национальных экспертов, судей и тренеров по международным стандартам, расширяется участие узбекских специалистов в мировых чемпионатах. Внедрение стандартов WorldSkills способствует повышению качества подготовки квалифицированных кадров, модернизации материально-технической базы образовательных учреждений, укреплению взаимодействия между

образованием и производством, а также повышению престижа рабочих профессий среди молодёжи.

По мнению Н. Н. Никитиной, интеграция технологий WorldSkills в образовательный процесс способствует формированию устойчивых профессиональных умений, повышению качества подготовки обучающихся, развитию креативного мышления, способности к инновационной деятельности и росту успешности трудоустройства выпускников по специальности. Автор подчёркивает, что расширение взаимодействия с социальными партнёрами на основе стандартов WorldSkills повышает престиж педагогической профессии и усиливает практическую направленность профессионального обучения [2].

По мнению В. В. Куликовой и Е. А. Ковалёвой, эффективная интеграция стандартов WorldSkills требует разработки методических рекомендаций по организации квалификационных экзаменов в форме демонстрационного экзамена, разработки единых критериев оценивания, а также создания методических указаний для выполнения лабораторных и практических работ по заданиям WorldSkills. Исследователи отмечают, что включение соответствующих требований в рабочие программы дисциплин способствует формированию у обучающихся совокупности общих и профессиональных компетенций, необходимых для современного специалиста. Это делает образовательный процесс целенаправленным и системно организованным, ориентированным на выпуск профессионально зрелых кадров, способных выполнять профессиональные функции на высоком уровне [3].

Сегодня движение WorldSkills охватывает практически все возрастные категории – от дошкольников до взрослых специалистов. В рамках направления WorldSkills Junior дети имеют возможность пробовать себя в различных компетенциях, формировать ранние навыки проектной и исследовательской деятельности, развивать инженерное и технологическое мышление. Такое раннее знакомство с профессиями способствует осознанному выбору профессионального пути и повышает мотивацию к обучению. Активное внедрение компетентного подхода в образовательный процесс, создание условий для формирования у обучающихся опыта самостоятельного решения профессиональных, коммуникативных и организационных задач, развитие ответственности и способности к самообразованию являются ключевыми факторами формирования готовности будущих специалистов к самостоятельной профессиональной деятельности [4].

Особую значимость приобретает и цифровизация движения WorldSkills. В последние годы активно внедряются цифровые платформы подготовки, виртуальные тренажёры, симуляторы и информационные системы для дистанционной экспертизы. Такие разработки позволяют расширить доступ молодёжи к современным образовательным ресурсам, повысить качество подготовки и упростить процессы мониторинга компетенций.

Таким образом, стандарты WorldSkills становятся важнейшим инструментом модернизации национальной системы профессионального образования. Их внедрение способствует повышению качества подготовки кадров, интеграции образования и производства, формированию современной системы оценки квалификаций, повышению конкурентоспособности выпускников и укреплению международного авторитета системы профессионального образования Республики Узбекистан.

Заключение

Стандарты WorldSkills представляют собой эффективный инструмент повышения качества профессионального образования и подготовки конкурентоспособных специалистов. Их внедрение требует системного подхода, объединения усилий государства, образовательных учреждений и бизнес-сообщества. Для Узбекистана участие в движении WorldSkills открывает новые возможности для модернизации системы профессионального образования, обмена опытом с ведущими странами мира и подготовки высококвалифицированных кадров, способных успешно конкурировать на международном уровне. Развитие движения WorldSkills в стране является важным шагом на пути к построению современной экономики, основанной на знаниях и высоких технологиях, где профессиональное мастерство и квалификация становятся ключевыми факторами успеха.

Важным направлением является адаптация образовательных программ к компетенциям, предусмотренным международными стандартами WorldSkills. Это позволяет обеспечить тесную связь теоретического обучения с реальными производственными процессами, что делает подготовку специалистов более практикоориентированной. Стандарты WorldSkills содержат детализированные требования к знаниям, умениям и навыкам, которые должен демонстрировать выпускник. В образовательные организации постепенно внедряются новые учебные планы, учебно-методические комплексы, а также практические задания, ориентированные на выполнение типовых профессиональных задач по образцам WorldSkills.

Одним из важных преимуществ внедрения WorldSkills является формирование у обучающихся культуры качества. Выполнение конкурсных заданий требует максимальной точности, соблюдения технологической дисциплины, высокого уровня ответственности и умения работать в условиях ограниченного времени. Такие качества напрямую формируют профессиональную зрелость будущего специалиста и повышают его готовность к трудовой деятельности.

Кроме того, международные стандарты WorldSkills способствуют развитию системы наставничества на производстве. Работодатели, заинтересованные в подготовке молодых специалистов, активно участвуют в разработке оценочных материалов, предоставляют современное оборудование, принимают участие в тренировках и чемпионатах. Это усиливает практическую направленность обучения и обеспечивает студентам

доступ к современным технологиям, которые используются в реальном секторе экономики.

Особое внимание уделяется подготовке экспертов WorldSkills, которые проходят квалификационное обучение и получают международные сертификаты. Их деятельность обеспечивает объективность оценивания демонстрационного экзамена, а также позволяет внедрять в образовательный процесс современные методики обучения, оценивания и контроля. Наличие в стране квалифицированного экспертного корпуса повышает статус национального движения WorldSkills и усиливает интеграцию Узбекистана в мировое профессиональное сообщество.

Также значимым является влияние WorldSkills на развитие инфраструктуры профессионального образования. В последние годы в Узбекистане создаются Центры компетенций, специализированные лаборатории и мастерские, оборудованные в соответствии с международными требованиями. Это не только улучшает материально-техническую базу образовательных учреждений, но и обеспечивает условия для подготовки кадров в соответствии с высокими стандартами производственной культуры.

Важным итогом внедрения стандартов WorldSkills становится повышение уровня мотивации обучающихся. Участие в чемпионатах, тренировочных сборов, мастер-классах и демонстрационных экзаменах формирует у молодежи стремление к самосовершенствованию, творческому росту и достижению профессиональных вершин. WorldSkills становится мощным инструментом профориентации, укрепляя престиж рабочих профессий и стимулируя молодых людей к выбору технических и прикладных специальностей.

Таким образом, WorldSkills выступает не только как система соревнований, но и как комплексная образовательная технология, которая способствует модернизации профессионального образования, развитию компетенций XXI века, укреплению связей между образованием и производством и повышению конкурентоспособности национальной экономики. Роль данного движения в развитии человеческого капитала трудно переоценить, поскольку оно задаёт ориентиры качества, соответствующие международным стандартам, и формирует новое поколение профессионалов, способных эффективно работать в условиях глобальных технологических изменений.

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ДЕЯТЕЛЬНОСТЬ ТРУДЯЩИХСЯ И ВОЕННОСЛУЖАЩИХ УЗБЕКИСТАНА В ТЫЛУ В ГОДЫ ВТОРОЙ МИРОВОЙ ВОЙНЫ

***Аннотация.** В данной статье на основе архивных материалов и научных источников анализируется деятельность трудящихся и военнослужащих Узбекистана в тылу в годы Великой Отечественной войны. Раскрывается масштабный вклад республики в обеспечение фронта продовольствием, хлопком, промышленной продукцией, вооружением, медицинскими средствами и другим необходимым снабжением. В работе приведены данные о количестве узбекистанцев, мобилизованных на фронт, их боевых потерях, а также о помощи, оказанной эвакуированному населению. Особое внимание уделено самоотверженному труду рабочих, колхозников, женщин и молодёжи, обеспечивших бесперебойную работу тыла и военной промышленности. Результаты исследования позволяют глубже понять роль Узбекистана в приближении Победы и историческое значение его тыловой деятельности в годы войны.*

***Ключевые слова:** Великая Отечественная война, тыл, трудящиеся Узбекистана, военная промышленность, эвакуация, фонд обороны, поставка хлопка, экономическая помощь, трудовые ресурсы, военная техника, статистика военных лет, история Узбекистана, помощь фронту, самоотверженный труд.*

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ACTIVITIES OF WORKERS AND MILITARY PERSONNEL IN UZBEKISTAN BEHIND THE FRONTLINES DURING THE SECOND WORLD WAR

***Annotation.** This article analyzes the activities of Uzbek workers and soldiers on the home front during the Second World War, based on archival materials and scholarly sources. The research highlights the significant contribution of Uzbekistan in providing the front with food supplies, cotton, industrial goods, weapons, medical equipment, and other essential resources. The study presents statistical data on the number of Uzbek soldiers mobilized to the front, their casualties, and the humanitarian assistance provided to evacuated populations. Special emphasis is placed on the dedicated labor of workers, collective farmers, women, and youth, who ensured the uninterrupted functioning of the wartime economy and military industry. The findings enhance the understanding of*

Uzbekistan's crucial role in supporting the war effort and the historical importance of its home-front activities during the war years.

Key words: *Second World War, home front, workers of Uzbekistan, military industry, evacuation, defense fund, cotton supply, economic assistance, labor resources, military equipment production, wartime statistics, history of Uzbekistan, support to the front, dedicated labor.*

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IKKINCHI JAHON URUSHI YILLARIDA O'ZBKISTON MEHNATKASHLARI VA HARBIYLARINING FRONT ORTIDAGI FAOLIYATI

Annotatsiya. *Ushbu maqolada Ikkinchi jahon urushi yillarida O'zbekiston mehnatkashlari va harbiylarining front ortidagi faoliyati tarixiy manbalar asosida tahlil qilingan. Tadqiqot davomida respublika aholisining urush davridagi iqtisodiy, ijtimoiy va ma'naviy jarayonlardagi beqiyos hissasi yoritilgan. Xususan, front ehtiyojlarini ta'minlash maqsadida O'zbekistondan millionlab tonna oziq-ovqat, paxta, sanoat mahsulotlari, harbiy texnikalar, o'q-dorilar va tibbiy vositalar yetkazilgani faktlar bilan asoslab berilgan. Shuningdek, urush frontiga safarbar etilgan o'zbekistonlik jangchilar soni, ularning yo'qotishlari, nogironlik bilan qaytganlar haqidagi statistik ma'lumotlar, evakuatsiya qilingan aholiga ko'rsatilgan insoniy yordam o'rganilgan. Maqolada mehnatkash xalqning fidokorona mehnati, respublikaning iqtisodiy resurslari va urushga qo'shgan ulkan hissasi asosiy tahlil obyekti sifatida yoritilgan. Tadqiqot natijalari O'zbekistonning Ikkinchi jahon urushidagi o'rni va front ortidagi faoliyatining tarixiy ahamiyatini yanada chuqurroq anglashga xizmat qiladi.*

Kalit so'zlar: *ikkinchi jahon urushi, front orti, O'zbekiston mehnatkashlari, harbiy sanoat, evakuatsiya, mudofaa fondi, paxta yetkazib berish, iqtisodiy yordam, mehnat resurslari, urush yillari statistikasi, harbiy texnika ishlab chiqarish, O'zbekiston tarixi, frontga ko'mak, fidokorona mehnat.*

В Новом Узбекистане под непосредственным руководством Президента Шавката Мирзиёева проводится огромная работа по сохранению священной памяти о достойном вкладе нашего народа в Великую Победу, проявившего высокие примеры мужества и стойкости, доброты и милосердия в годы Второй мировой войны.

Узбекистан - это не тыл, Узбекистан - поле боя. Следует отметить, что эти слова Усмана Юсупова, который был руководителем Узбекистана в то время, были сказаны своевременно и уместно. Это наглядно демонстрируют вышеупомянутые внушительные цифры. Неоспоримым фактом является то, что в войне, ставшей общенародным делом, ради победы все сплотились и

протянули руку помощи, а Узбекистан находился на передовой, в полной мере обеспечивая фронт всем необходимым.

Именно поэтому уважаемый Президент Шавкат Мирзиёев высказал следующие бесценные мысли 9 мая 2020 года в День памяти и почестей: "Поэтому мы должны всегда помнить и передавать будущим поколениям, какие беспрецедентные потери и бедствия принесла эта ужасная война нашему народу, как наши предки пожертвовали своими жизнями ради победы и чести.

В годы войны из нашей страны на поля сражений было доставлено более 2000 самолетов, большое количество вооружения, военно-санитарные поезда, сотни полевых кухонь, палатки, огромное количество продовольствия, одежды и другой продукции.

Проводятся широкомасштабные реформы по восстановлению истории узбекистанцев, участвовавших во Второй мировой войне, определению их боевого пути, научному выявлению пропавших без вести участников войны и увековечению их памяти. На основе исследований выявляются все новые и новые данные"[11].

В 1941-1943 годах добровольная передача населением нашей страны в фонд обороны более 475 миллионов рублей и ценных личных вещей на сумму 22 миллиона рублей стала очередным практическим шагом на пути к приближению победы. К 15 апреля 1943 года из Узбекистана в Куйбышевскую область было мобилизовано 2986 рабочих, в Горький - 2000 рабочих, в Саратов - 2841 рабочий, в Ярославль - 2550 рабочих для работы на строительных и промышленных предприятиях. Их число не было постоянным. Новые рабочие прибывали и перераспределялись. В то время было трудно найти предприятие, где бы не трудились узбекистанцы. Они в основном работали в тяжелых условиях: на заводах и предприятиях, на строительстве, при рытье окопов, на лесозаготовках и в подземных работах.

К 8 мая 1943 года 11 700 узбекистанцев были направлены на работу на строительные предприятия Челябинской области. Из них по распределению СНК СССР 1050 человек были направлены на строительство объектов танковой промышленности области, 1500 - в угольную промышленность, остальные - на предприятия цветной металлургии, на лесозаготовки и другие заводы и предприятия. К сентябрю 1943 года на строительных предприятиях Свердловской области трудились 26 840 рабочих, мобилизованных из республик Средней Азии [12].

Особо следует отметить, что наряду с промышленными и прифронтовыми районами России в Сибирь для работы на горнодобывающих, строительных, промышленных и лесозаготовительных объектах в качестве рабочих батальонов до лета 1945 года из Узбекистана было мобилизовано 155 тысяч человек в качестве "мардикоров." Кроме того, более 25 000 трудоспособных жителей Каракалпакстана выполняли тяжелую работу в трудовых батальонах таких городов, как Свердловск, Пермь, Горький и Оренбург [7].

Большую роль в разгроме фашизма сыграл самоотверженный труд наших дехкан в тылу. С началом войны перед сельским хозяйством Узбекистана встала задача стабильного снабжения фронта и внутренних районов страны сельскохозяйственной и животноводческой продукцией, а также сырьем для промышленности. Поскольку враг захватил районы, производившие зерно и другие продукты питания, эта задача теперь была возложена на Узбекистан и другие среднеазиатские республики. Вопросы, связанные с этим периодом, хорошо освещены в исследованиях [4] Р.Х. Аминовой и других ученых.

Во время Второй мировой войны из почти 2 миллионов узбекистанских воинов, мобилизованных на фронт, около 540 тысяч погибли, более 158 тысяч пропали без вести, свыше 870 тысяч получили различные ранения, а более 60 тысяч вернулись инвалидами. Узбекистан предоставил убежище почти 1,5 миллионам человек, эвакуированным из зон военных действий, и проявил заботу о 250 тысячах детей-сирот, потерявших родителей. За этими цифрами стоят трагические судьбы и священная память о наших великих предках. Они ярко свидетельствуют о том, какой ценой нам досталась победа.

Согласно данным, сегодня есть 82 ветерана Второй мировой войны и приравненные к ним жизни. Самому старшему из них 115 лет.

В 2025 году исполнилось 80 лет со дня победы над фашизмом во Второй мировой войне. Поэтому настало время почтить память наших героических предков и отдать дань уважения их чистой душе [11].

Даже в бурные годы войны наш народ думал о своих воинах. В частности, письмо узбекских хлопкоробов своим соотечественникам на фронте окрылило воинов. Они написали солдатам: "Хотя поле боя находится в нескольких тысячах километров от нас, мы слышим звуки пушек и автоматов. Для стрельбы из этих пушек и автоматов нам нужен наш хлопок. Вы видите хороших, тепло одетых бойцов и командиров армии. Для их одежды тоже нужен наш хлопок. Мы также видим медсестру, проявляющую сострадание к раненым солдатам и перевязывающую их раны. Марля в его руке тоже сплетена из нашего хлопка. Мы, хлопкоробы, призываем республики давать больше хлопка для фронта" [13].

Очевидно, что потребность в узбекском хлопке была высокой. Эти слова были словами из сердца трудолюбивого узбекского народа. В основе этого лежал труд Узбекистана для победы над фашизмом, самоотверженность узбекского народа, который не жалел ничего для победы и бескорыстный труд для избавления от бедствия фашизма.

Из-за войны численность трудоспособного населения в Узбекистане сократилась. По республике в 1941-1942 годах численность трудоспособных колхозников в Узбекистане сократилась на 20%, а к 1945 году - до 40% [8]. Ужасы войны, ворвавшиеся в каждый дом, подвергли людей тяжелым испытаниям, лишениям и страданиям. В городе было установлено выдавать рабочим 400-500 граммов хлеба в день, а иждивенцам - 300 граммов [9]. На практике же они получали даже меньше установленной нормы.

Нормированное распределение не распространялось на сельское население. В результате сельское население жило в крайне тяжелых условиях в годы войны.

В начале 1944 года руководитель Узбекистана Усман Юсупов был вызван в Москву на заседание Оргбюро ЦК ВКП (б). Председательствующий на заседании А.С. Щербаков, прервав доклад У. Юсупова, сказал: "Товарищ Юсупов, в такое тяжелое для страны время вы хотите оставить армию и народ без штанов?" [8]. Это свидетельствовало о нежелании понять, насколько тяжелым было положение в республике. Оргбюро объявило У. Юсупову "строгий выговор." После этого на наш народ обрушились еще более тяжелые дни и испытания. Однако благодаря самоотверженному труду нашего стойкого народа в 1944 году было выращено 820 тысяч тонн хлопка, что составило 101,4% от плана, а в 1945 году - 824 тысячи 200 тонн. Это был результат тяжелого и вместе с тем кропотливого труда узбекского народа.

Дехкане Узбекистана, несмотря на трудности, самоотверженно трудились. В годы войны дехкане республики для нужд фронта поставили 4 млн 148 тыс. тонн хлопка, 82 млн пудов зерна, 54 067 тонн коконов, 195 тыс. тонн риса, 57 444 тонны фруктов, 36 тыс. тонн сухофруктов, 159 300 тонн мяса, 22 300 тонн шерсти и многие другие продукты [14].

Первый Президент Республики Узбекистан Ислам Каримов так описывает эти действия, осуществленные населением нашей республики: "Разве можно забыть труды сотен тысяч наших соотечественников, работавших в тылу в годы войны, как наши матери, молодые и пожилые, наши сестры дрожали в лютый зимний холод, изнывали от летнего зноя, отправляя на фронт свой заработок, отказывая себе в еде и одежде, терпя лишения и проявляя самоотверженность?!" [1].

Подарки для воинов непрерывно отправлялись из республики. 28 января 1942 года Совет Народных Комиссаров Узбекской ССР и ЦК КП (б) Уз приняли постановление № 164 [5]. Это постановление касалось организации сбора подарков и предусматривало подготовку индивидуальных подарков для отличившихся бойцов. Только по данным на 15 мая 1942 года, подарки, отправленные из Узбекистана на различные фронты и в военные госпитали российских городов с 9 сентября 1941 года по 9 мая 1942 года, составили 415 вагонов [6].

Такая масштабная экономическая помощь, оказываемая Узбекистаном фронту, свидетельствует о том, что в годы войны наша республика превратилась в центр, обеспечивающий фронт не только боеприпасами и оружием, но и экономически. Разумеется, за этим стоял тяжелый труд нашего народа. Однако наш народ понимал, что экономическое благополучие армии и военных является одним из факторов, обеспечивающих Победу. Иными словами, наш народ внес весомый вклад в укрепление фронта тылом в годы войны. Для воинов были открыты специальные счета, и сумма поступающих на них средств постоянно увеличивалась. Согласно данным от 21 марта 1942 года, на счет № 160674 для новогодних подарков бойцам поступили

следующие суммы по городам и областям: по Андижанской области - 20 653,47 сумов, по Бухарской области - 30 525,39 сумов, по Каракалпакстану - 459 137 сумов, по Наманганской области - 218 690,50 сумов, по Самаркандской области - 38 200,57 сумов, по Сурхандарьинской области - 7 041,40 сумов, по городу Ташкенту - 820 034,43 сумов, по Ташкентской области - 170 896,62 сумов, по Ферганской области - 22 357,34 сумов, по Хорезмской области - 6 283,64 сумов [15], по городу Чирчику - 54 986,51 сумов. В общей сложности, жители Узбекистана перечислили со своих счетов для воинов 1 842 806,87 сумов. По Хорезмской области - 6 283,64 сумов, по городу Чирчику - 54 986,51 сумов [6].

Правительство республики уделяло серьёзное внимание шефству над боевыми дивизиями и солдатами на военных кораблях, отправляя им подарки. Они регулярно доставляли подарки под патронажем трудящихся Узбекистана "Линкори Марат," 5-й Орловской стрелковой дивизии, 162-й Краснознамённой Среднеазиатской Новгород-Северской стрелковой дивизии и другим дивизиям. Кроме того, наш народ внес достойный вклад в поставку военной техники на фронт. В этой связи уместно привести один пример. Большая группа танков, отправленных из Узбекистана, также была доставлена на территорию Польши и передана бойцам гвардейской панфиловской дивизии: "В эшелонах было доставлено более 400 танков, самоходных орудий, бронетранспортеров и броневинов. Эти стальные кони были подарком узбекского народа доблестным воинам на фронте... Танки "20 лет Узбекистана" вечером 2 мая 1945 года вошли в город Висмер Макленбургской области...[16].

В целом, в годы войны трудящиеся Узбекистана внесли большой вклад в Победу, сдав в Фонд обороны 649,9 млн сумов и 22 кг золота и серебра (ювелирных изделий). Народ Узбекистана приложил все усилия для того, чтобы Вторая мировая война завершилась победой. Он неустанно трудился, обеспечивая фронт необходимыми боеприпасами, военной техникой и другим снаряжением. В результате за период войны 1941-1945 годов Узбекистан поставил на фронт 2100 самолетов, 17342 авиадвигателя, 2 138 000 авиабомб, 17100 минометов, 4500 единиц противотанкового оружия, около 60 тысяч единиц военно-химической аппаратуры, 22 млн мин и 560 тысяч снарядов, 1 млн гранат, 3 млн радиоламп для полевых радиостанций, около 300 тысяч парашютов, 5 бронепоездов, 18 военно-санитарных и банно-прачечных поездов, 2200 передвижных кухонь и множество другого военного снаряжения. Все это было достигнуто благодаря тяжелому и непрерывному труду узбекского народа и средствам, которые он берег как зеницу ока.

Наше самое большое богатство - это наша мирная и спокойная жизнь, независимость нашей Родины и благополучие нашего народа. Сегодня все наши действия и реформы, все наши благие намерения направлены на одну великую цель - укрепление независимости нашего государства, мира и спокойствия нашего народа. Наша самая большая цель - удовлетворить нужды нашего трудолюбивого, мужественного и благородного народа [8].

Сегодня мы все видим и осознаем, насколько тревожной становится ситуация в мире. Учитывая угрозы и опасности, существующие не только в экономике, но и во всех без исключения сферах, само время требует от нас четко определить свой путь и, как бы трудно это ни было, двигаться только вперед. Самый важный и основополагающий вопрос - это укрепление независимости нашей Родины, мобилизация всех сил и возможностей для защиты, реальной защиты нашего народа, доказательство правильности выбранного нами пути на основе конкретных результатов и достижений.

Несомненно, беспримерное мужество, проявленное нашим отважным и стойким народом в годы Второй мировой войны, его неоценимый вклад в приближение великой Победы всегда будут служить для нас источником силы, энергии и гордости.

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МЕХАНИЗМ АКТИВИЗАЦИИ САМОСТОЯТЕЛЬНОГО ОБУЧЕНИЯ СТУДЕНТОВ НА ОСНОВЕ МОБИЛЬНЫХ ТЕХНОЛОГИЙ

Аннотация: В статье рассматривается использование мобильных технологий для активизации самостоятельного обучения студентов. Отмечается их роль в повышении мотивации, вовлечённости и эффективности обучения, а также в развитии саморегуляции, критического мышления и цифровой грамотности. Также обсуждаются педагогические условия успешного внедрения мобильного обучения в высшее образование.

Ключевые слова: мобильные технологии, обучение, интернет, приложение, технология, образовательные технологии, образовательный процесс, методы обучения, самостоятельное обучение, мобильное.

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MECHANISM OF ACTIVATION OF INDEPENDENT EDUCATION OF STUDENTS ON THE BASIS OF MOBILE TECHNOLOGIES

Abstract: This article explores how mobile technologies can enhance students' independent learning. It highlights the role of digital tools in improving motivation, engagement, and learning effectiveness, as well as developing self-regulation, critical thinking, and digital literacy. Pedagogical conditions for successful mobile learning in higher education are also discussed.

Keywords: mobile technology, teaching, internet, application, technology, educational technology, educational process, teaching methods, Independent Education, mobile, "mobile-learning"

Введение. Принятие новой редакции закона «Об образовании» стало началом масштабной реформы системы образования в Республике Узбекистан. В настоящее время стремительное внедрение информационно-коммуникационных технологий (ИКТ) в образовательный процесс делает их одним из наиболее эффективных инструментов повышения качества обучения.

Одной из важнейших задач реформы является приведение системы образования к мировым стандартам. Характерной особенностью современного образования во всём мире является его информатизация и подготовка кадров с учётом потребностей информационного общества. Это происходит и в образовательной системе Узбекистана государственная политика в области информатизации направлена на создание национальной информационной системы, учитывающей современные мировые принципы развития и совершенствования информационных ресурсов, технологий и систем. Для эффективной организации самостоятельной учебной деятельности можно использовать различные средства ИКТ, включая электронные курсы, системы электронного обучения, видео-лекции, вебинары, электронные тесты и другие. Кроме того, в настоящее время широко применяются современные и компактные мобильные технологии.

Организация самостоятельной работы студентов с использованием мобильных технологий позволяет изучать учебные материалы независимо от времени и места, что даёт студентам возможность получать необходимые знания в удобное время. На сегодняшний день мобильное обучение широко внедрено в образовательные системы зарубежных стран. В США, Канаде и странах Европы мобильные технологии применяются в преподавании различных дисциплин через единые платформы, объединяющие ресурсы и методы их развития.

M-learning – это технология получения и обмена знаниями с использованием мобильных устройств (телефонов или карманных компьютеров) через WAP, GPRS или 3G (главное – доступ к интернету);

M-learning – это технология организации учебного процесса с помощью мобильных средств связи (мобильных телефонов и коммуникаторов);

M-learning – это процесс обучения с использованием персональных устройств (ноутбуков, КПК или мобильных телефонов) в дистанционном формате.

Большинство студентов технически и психологически готовы использовать мобильные технологии в самостоятельном обучении, однако для более эффективного их применения необходимо создавать новые возможности. Для этого требуется проведение организационной, научной и методической работы преподавателями, направленной на внедрение форм и методов использования мобильного обучения.

Организация самостоятельной работы студентов осуществляется в соответствии с основными нормативными документами вуза, включая рабочие программы и требования к самостоятельному изучению учебных модулей.

Формы самостоятельной работы студентов могут включать:

- самостоятельную работу с использованием мобильных устройств;
- традиционную самостоятельную работу под руководством преподавателя;

➤ электронную самостоятельную работу под руководством преподавателя.

К видам самостоятельной работы студентов с использованием мобильных устройств относятся:

- подготовка к занятиям – изучение текстов лекций, видеоматериалов, практических и лабораторных занятий;
- поиск информации – изучение интернет-материалов через дайджест;
- FAQ – поиск ответов на интересующие вопросы с помощью обучающих программ;
- форумы – обмен мнениями по темам через Telegram-каналы или платформы дистанционного обучения;
- решение тестов – закрепление знаний с помощью обучающих тестов.

Традиционные формы самостоятельной работы под руководством преподавателя:

- решение задач – выполнение практических заданий и представление их в письменной форме;
- реферат – письменное изложение проблемы с обзором научных источников;
- коллоквиум – устное обсуждение для проверки усвоения теоретической части учебного модуля.

Электронные формы самостоятельной работы под руководством преподавателя:

- ✓ Link – анализ видео- или текстовых материалов по ссылке;
- ✓ Chart – анализ таблиц, диаграмм и схем;
- ✓ Q/A – письменные ответы на вопросы преподавателя на платформе дистанционного обучения;
- ✓ Review – написание аннотации на предоставленный источник;
- ✓ SWOT – SWOT-анализ определённого понятия;
- ✓ Interview – проведение интервью по исследуемой проблеме и размещение его на платформе;
- ✓ Google Apps – совместное выполнение заданий в Google Classroom;
- ✓ Digest – составление подборки интернет-ссылок и их краткий анализ;
- ✓ Report – размещение отчётов по лабораторным работам на платформе дистанционного обучения.

Самостоятельная работа студентов под руководством преподавателя с указанием содержания, тем, заданий, форм проведения и объёма часов представляется в силлабусе дисциплины по каждому модулю.

Заключение. Для построения системы обучения на основе мобильных технологий необходимо, с одной стороны, систематизировать их, определить особенности и принципы построения системы, место каждого метода в тематическом содержании курса; с другой – протестировать систему в реальном образовательном процессе. Это, в свою очередь, активизирует самостоятельное обучение студентов. Мобильные технологии предоставляют студентам необходимую информацию по определённым темам и позволяют

контролировать знания. В зависимости от результатов контроля студентам предлагаются задания различного уровня сложности. С помощью мобильных технологий студенты могут повышать и совершенствовать свои знания без помощи преподавателя.

Преимущества использования мобильных технологий в образовательном процессе:

- более глубокое и полное усвоение учебного материала;
- внедрение новых форм обучения;
- экономия времени за счёт сокращения времени на усвоение знаний;
- длительное сохранение знаний в памяти и возможность их практического применения.

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МЕЖДУНАРОДНЫЙ ОПЫТ ВНЕДРЕНИЯ ERP-СИСТЕМ В ЕВРОПЕ И СТРАНАХ СНГ: СРАВНИТЕЛЬНЫЙ АНАЛИЗ И ОСОБЕННОСТИ РАЗВИТИЯ В УЗБЕКИСТАНЕ

***Аннотация:** В статье рассматривается международный опыт внедрения ERP-систем с акцентом на сравнительный анализ практик Европы, стран СНГ и особенностей развития данных систем в Узбекистане. Анализ показывает, что европейский подход отличается высокой степенью зрелости, процессной ориентацией, минимальной кастомизацией и обязательным управлением изменениями. В странах СНГ внедрение ERP-систем сталкивается с кадровыми, организационными и инфраструктурными ограничениями, что приводит к высокой кастомизации и снижению эффективности проектов. Особое внимание уделено текущему состоянию и динамике развития ERP систем в Узбекистане, где цифровая трансформация активно развивается в рамках государственной программы «Цифровой Узбекистан – 2030».*

В статье определены ключевые тенденции: рост роли облачных технологий, расширение международного сотрудничества, развитие центров компетенций и повышение значимости стандартизации процессов. Обоснована необходимость формирования национальной модели зрелости ERP-внедрений, ориентированной на минимизацию кастомизации, улучшение подготовки специалистов и развитие Change Management. Результаты исследования могут быть использованы при планировании цифровой трансформации предприятий, разработке методологий внедрения ERP, а также в образовательных и аналитических целях.

***Ключевые слова:** ERP-системы, цифровая трансформация, управление изменениями, СНГ, Европа, Узбекистан, автоматизация, бизнес-процессы, облачные решения, кастомизация.*

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INTERNATIONAL EXPERIENCE IN IMPLEMENTING ERP SYSTEMS IN EUROPE AND THE CIS COUNTRIES: COMPARATIVE ANALYSIS AND DEVELOPMENT FEATURES IN UZBEKISTAN

Abstract: *The article examines the international experience of implementing ERP systems with an emphasis on a comparative analysis of practices in Europe, the CIS countries and the specifics of the development of these systems in Uzbekistan. The analysis shows that the European approach is characterized by a high degree of maturity, process orientation, minimal customization and mandatory change management. In the CIS countries, the implementation of ERP systems is faced with personnel, organizational and infrastructural constraints, which leads to high customization and reduced project efficiency. Special attention is paid to the current state and dynamics of ERP systems development in Uzbekistan, where digital transformation is actively developing within the framework of the state program "Digital Uzbekistan – 2030".*

The article identifies key trends: the growing role of cloud technologies, the expansion of international cooperation, the development of competence centers and the increasing importance of standardization of processes. The necessity of forming a national model of maturity of ERP implementations, focused on minimizing customization, improving specialist training and developing Change Management, is substantiated. The research results can be used in planning the digital transformation of enterprises, developing ERP implementation methodologies, as well as for educational and analytical purposes.

Keywords: *ERP systems, digital transformation, change management, CIS, Europe, Uzbekistan, automation, business processes, cloud solutions, customization.*

Введение

Современные тенденции цифровой трансформации мировой экономики обусловили необходимость интеграции информационных технологий в управление производственными, финансовыми и организационными процессами предприятий. Современный бизнес требует целостной картины всех процессов.

Одним из ключевых инструментов цифровой трансформации выступают ERP-системы (Enterprise Resource Planning systems) — комплексные решения, предназначенные для автоматизации и интеграции основных бизнес-процессов компании. Эффективное внедрение ERP способствует росту прозрачности управления, повышению производительности, снижению издержек и формированию устойчивой конкурентоспособности на внутреннем и международном рынках.

При этом степень зрелости процессов внедрения ERP существенно различается в разных регионах. Европейские страны характеризуются

высоким уровнем зрелости IT-инфраструктуры, развитой нормативной базой и богатым опытом реализации комплексных цифровых решений.

В странах СНГ процесс внедрения ERP, хотя и продвинулся за последние два десятилетия, по-прежнему сталкивается с проблемами организационного и методологического характера. Узбекистан, находясь на этапе активного внедрения цифровых технологий в экономику, формирует собственную модель развития ERP-практик, сочетая заимствование международного опыта с адаптацией под национальные условия.

1. Европейский опыт внедрения ERP-систем

В европейских странах процесс внедрения ERP начался намного раньше, чем в странах СНГ. По этой причине европейские страны демонстрируют наиболее зрелый и системный подход к внедрению ERP-решений. Проекты, реализуемые в регионе, характеризуются стратегической ориентацией, высокой степенью стандартизации и минимизацией кастомизации. Основные игроки рынка — **SAP, Oracle, Microsoft Dynamics, Infor, Workday** и ряд нишевых решений — внедряются как в крупном корпоративном, так и в среднем бизнес-сегменте.

Ключевыми особенностями европейского подхода являются:

1) **Процессная ориентация внедрения.** До начала технической реализации проводится тщательный аудит бизнес-процессов, направленный на их оптимизацию и унификацию в соответствии с лучшими практиками.

2) **Минимизация кастомизации. Кастомизация** — процесс настройки продукта, сервиса или системы под конкретные нужды пользователя. Европейские компании предпочитают адаптировать внутренние процессы под стандартные возможности ERP, что снижает стоимость и сложность поддержки.

3) **Акцент на управление изменениями.** Внедрение ERP рассматривается не только как IT-проект, но как организационная трансформация, включающая обучение персонала, коммуникационные программы и сопровождение пользователей.

4) **Соблюдение нормативных требований.** Большое внимание уделяется вопросам защиты персональных данных и соответствию регламентам ЕС, включая GDPR.

5) **Переход к облачным решениям (Cloud ERP).** Европейские компании активно переходят к SaaS и гибридным моделям, обеспечивая гибкость, масштабируемость и снижение капитальных затрат.

Результатом такого подхода является высокий уровень успеха ERP-проектов: более 70% европейских внедрений достигают заявленных целей по данным международных аналитических агентств.

2. Опыт стран СНГ: особенности и ограничения

В странах СНГ процесс внедрения ERP-систем развивался на фоне переходной экономики, ограниченных инвестиций в IT и отсутствия сформированной корпоративной культуры управления изменениями. Наиболее распространёнными решениями в регионе остаются **1C: ERP**,

Галактика ERP, а также внедрения международных систем SAP и Microsoft Dynamics.

Основные особенности СНГ-модели внедрения включают:

1) Преобладание локальных решений. Во многих организациях (особенно в малом и среднем бизнесе) используются отечественные ERP, адаптированные под местное законодательство и бухгалтерские стандарты.

2) **Чрезмерная кастомизация.** Часто предприятия пытаются полностью перенести существующие бизнес-процессы в систему без их оптимизации, что приводит к усложнению архитектуры и росту затрат.

3) **Недостаточная подготовка персонала.** Отсутствие системных программ обучения пользователей снижает эффективность использования ERP.

4) **Ограниченные бюджеты и инфраструктура.** Многие проекты реализуются при дефиците ресурсов, что вынуждает внедрять систему поэтапно и с сокращённым функционалом.

5) **Недооценка управления изменениями.** Внедрение ERP часто рассматривается как задача IT-отдела, без достаточного вовлечения бизнес-подразделений и руководства.

Тем не менее, опыт стран СНГ показывает постепенный переход к более зрелым практикам: внедрение центров компетенций, использование проектного управления (PMI, PRINCE 2), а также развитие облачных и гибридных архитектур.

3. Состояние и перспективы внедрения ERP в Узбекистане

В Узбекистане процесс внедрения ERP-систем находится в стадии активного роста, что связано с реализацией национальной программы «**Цифровой Узбекистан – 2030**», направленной на развитие цифровой экономики, повышение эффективности государственного управления и конкурентоспособности национальных предприятий.

Наиболее активное внедрение ERP наблюдается:

1) в государственных холдингах и крупных производственных предприятиях (нефтегаз, энергетика, телекоммуникации);

2) в банковском и финансовом секторе;

3) в сфере образования и услуг, где ведётся переход на электронные платформы управления ресурсами.

Ключевые факторы, определяющие развитие ERP в Узбекистане:

1) **Государственная поддержка цифровизации.** На уровне министерств создаются специализированные IT-центры и внедряются ERP-проекты для учёта финансов, закупок и кадров.

2) **Сотрудничество с международными партнёрами.** Ряд узбекских компаний реализуют пилотные ERP-проекты с участием международных интеграторов (SAP, Oracle, Microsoft), что способствует передаче компетенций.

3) **Проблемы кадрового обеспечения.** На рынке наблюдается дефицит квалифицированных ERP-специалистов, консультантов и аналитиков, что замедляет темпы внедрения.

4) **Недостаточная интеграция и стандартизация процессов.** Во многих организациях отсутствует культура процессного управления, а автоматизация осуществляется без предварительного аудита бизнес-процессов.

5) **Тенденция к избыточной кастомизации.** Как и в других странах СНГ, предприятия часто адаптируют ERP под существующие, неэффективные процессы, что снижает потенциал системы.

Несмотря на указанные сложности, перспективы развития ERP в Узбекистане оцениваются как положительные. Развитие национальной IT-инфраструктуры, расширение сети дата-центров, а также поддержка IT-образования создают предпосылки для успешной интеграции международных практик ERP и формирования локальной школы внедрения.

4. Сравнительный анализ подходов к внедрению ERP

Показатель / Регион	Европа	Страны СНГ	Узбекистан
Уровень зрелости ERP-рынка	Высокий, устоявшийся рынок с развитой конкуренцией поставщиков	Средний, сочетание локальных и международных решений	Развивающийся рынок, формирующийся под влиянием госпрограмм
Основные вендоры	SAP, Oracle, Microsoft Dynamics, Infor, Workday	1C, SAP, Microsoft Dynamics, Галактика	SAP, Microsoft Dynamics, локальные адаптации 1C
Подход к внедрению	Процессно-ориентированный, основанный на best practices	Технически-ориентированный, с высокой кастомизацией	Комбинированный, с тенденцией к стандартизации
Степень кастомизации	Минимальная	Высокая	Средняя, но тенденция к сокращению
Управление изменениями (Change Management)	Системный и обязательный элемент проекта	Слабое, часто отсутствует	Развивающийся, внедряется в госкомпаниях
Подготовка персонала	Регулярные программы обучения, сертификация	Ограниченные внутренние тренинги	Нехватка специалистов, формируются программы при вузах и IT Park
Инфраструктура и цифровая готовность	Высокая, развитые дата-центры и облачные сервисы	Разнородная, зависит от страны	Улучшающаяся, создаются национальные дата-центры

Регуляторная среда	Строгие стандарты (GDPR и др.)	Умеренно развитая, часто без единой политики	Формирующаяся, активно обновляется
Риски внедрения	Низкие (контролируемые процессами и методологиями)	Средние–высокие (организационные и финансовые)	Средние (кадровые и инфраструктурные)
Тенденции развития	Облачные ERP, интеграция с AI и Big Data	Гибридные модели, рост внутреннего ПО	Рост числа пилотных проектов, интеграция с госными инициативами

Глава II. Международный опыт внедрения ERP-систем и особенности их развития в Узбекистане

2.1. Теоретические основы и значение ERP-систем в современном управлении

Современная экономика характеризуется высоким уровнем цифровизации и интеграции информационных технологий во все сферы хозяйственной деятельности. Одним из ключевых инструментов цифровой трансформации предприятий являются **ERP-системы (Enterprise Resource Planning Systems)**, представляющие собой комплексные программные решения, обеспечивающие автоматизацию, интеграцию и анализ бизнес-процессов в едином информационном пространстве.

Основная цель внедрения ERP-систем заключается в формировании единой управленческой среды, обеспечивающей прозрачность и согласованность финансовых, производственных, логистических, кадровых и иных процессов организации. В результате предприятие получает возможность:

- 1) повышать эффективность использования ресурсов;
- 2) сокращать издержки и сроки выполнения операций;
- 3) улучшать качество управленческих решений;
- 4) обеспечивать соответствие стандартам корпоративного управления и международной отчетности.

По оценкам международных аналитических агентств, внедрение ERP-систем позволяет в среднем повысить производительность труда на 15–30 %, сократить уровень складских запасов на 20–25 % и ускорить процесс формирования управленческой отчетности в 2–3 раза. Однако успешность внедрения ERP во многом зависит от степени зрелости организационных процессов, уровня квалификации персонала и эффективности управления изменениями.

2.2 Европейский опыт внедрения ERP-систем

Европейские страны демонстрируют наиболее зрелый и структурированный подход к внедрению ERP-технологий, что обусловлено высоким уровнем развития цифровой инфраструктуры, стандартизированной нормативной базой и развитой культурой проектного управления.

Крупнейшими поставщиками ERP-решений на европейском рынке являются SAP, Oracle, Microsoft Dynamics, Infor, Workday, а также ряд специализированных облачных систем для отдельных отраслей.

Основные особенности европейского опыта включают следующие направления:

1) Процессно-ориентированный подход.

Внедрение ERP в Европе начинается с глубокого анализа и оптимизации бизнес-процессов. Первые годы внедрения ERP в Европе начиналось с большой кастомизации. Со временем стало понятно, что это очень затратно и получать обновления с кастомизацией требует на много больше времени, чем стандартная система. Целью является приведение деятельности предприятия к лучшим мировым практикам, что позволяет минимизировать кастомизацию и сократить издержки на дальнейшее сопровождение системы.

Управление изменениями

ERP-проект рассматривается не только как технологическая, но и как организационная трансформация. В европейских компаниях разрабатываются программы обучения сотрудников, создаются центры компетенций, активно применяется система внутренних коммуникаций для снижения сопротивления изменениям.

Минимизация кастомизации.

Европейские предприятия стремятся максимально использовать стандартные функции системы, адаптируя внутренние процессы под встроенные механизмы ERP. Это обеспечивает масштабируемость и стабильность работы решения.

Соответствие нормативным требованиям.

Существенное внимание уделяется вопросам защиты персональных данных (в частности, соблюдению требований Регламента ЕС № 2016/679 — GDPR), внутреннему контролю и аудиту.

Переход к облачным ERP-моделям.

В Европе активно развиваются SaaS - (Software as a Service — ПО как услуга) и PaaS-решения (Platform as a Service — *Платформа как услуга*), позволяющие компаниям снизить капитальные затраты, обеспечить гибкость и удалённый доступ к ресурсам.

В результате системного подхода более 70 % европейских ERP-проектов завершаются успешно, достигая запланированных показателей эффективности и окупаемости инвестиций.

2.3 Опыт стран СНГ: проблемы и тенденции развития

В странах СНГ внедрение ERP-систем началось в конце 1990-х – начале 2000-х годов и проходило в условиях трансформации экономических систем и недостаточной цифровой зрелости предприятий. Наибольшее распространение получили отечественные решения, такие как 1С: ERP, Галактика, Парус, а также локализованные версии международных систем (SAP, Oracle, Microsoft Dynamics).

Характерными особенностями ERP-практики в странах СНГ являются:

Преобладание локальных решений.

На рынке доминируют отечественные продукты, адаптированные под национальные стандарты бухгалтерского и налогового учёта, что упрощает соответствие законодательным требованиям, но ограничивает интеграцию с международными платформами.

Высокая степень кастомизации.

Предприятия часто настаивают на полном сохранении существующих бизнес-процессов, что приводит к чрезмерному изменению стандартной логики ERP-систем и, как следствие, усложнению сопровождения и обновлений.

Недостаточная готовность к изменениям.

Во многих организациях внедрение ERP рассматривается как задача IT-подразделения, без активного участия руководства и конечных пользователей. Это снижает вовлечённость и эффективность внедрения.

Дефицит квалифицированных специалистов.

Недостаток сертифицированных ERP-консультантов и проектных менеджеров приводит к задержкам сроков и росту стоимости проектов.

Финансовые и инфраструктурные ограничения.

Большинство предприятий сталкиваются с ограниченным бюджетом и необходимостью внедрения системы поэтапно, что удлиняет процесс интеграции и снижает общую эффективность.

Тем не менее, в последние годы наблюдается положительная динамика: активное распространение облачных решений, формирование национальных центров компетенций, а также развитие программ обучения ERP-консультантов в университетах и корпоративных академиях.

2.4 Особенности внедрения ERP-систем в Узбекистане

В Узбекистане развитие ERP-систем находится в стадии становления, но демонстрирует устойчивый рост, что связано с реализацией государственной стратегии «**Цифровой Узбекистан – 2030**», направленной на модернизацию государственного управления, развитие ИКТ-сектора и повышение конкурентоспособности национальной экономики и включает в себя не только программы цифровой трансформации отраслей, но и регионов.

Основные тенденции внедрения:

Государственные инициативы.

1) Активно внедряются ERP-решения в сфере государственного управления, энергетики, финансов, телекоммуникаций и образования. В частности, реализуются проекты по автоматизации бухгалтерского и кадрового учёта, управлению закупками и логистикой.

2) **Международное сотрудничество.** Внедрение ERP осуществляется с участием международных партнёров — SAP, Oracle, Microsoft, а также при поддержке Всемирного банка и Программы развития ООН (UNDP), что способствует передаче компетенций и развитию локальных интеграторов.

3) Проблемы кадрового обеспечения.

4) Наблюдается дефицит специалистов по ERP-консалтингу, управлению проектами и интеграции систем. Для решения этой проблемы создаются профильные кафедры в вузах и программы сертификации на базе IT Park Uzbekistan.

Технические и организационные сложности.

1) Отсутствие стандартизированных бизнес-процессов и слабая интеграция между подразделениями предприятий снижают эффективность автоматизации. Часто наблюдается избыточная кастомизация систем под устаревшие процедуры.

2) Переход к облачным решениям.

3) На фоне роста цифровой инфраструктуры и появления национальных дата-центров в Узбекистане формируются предпосылки для перехода на гибридные и облачные ERP-модели, что особенно актуально для малого и среднего бизнеса.

В целом, ERP-проекты в Узбекистане характеризуются высокой стратегической значимостью, но требуют комплексного подхода — от подготовки бизнес-процессов до формирования внутренней культуры цифрового управления.

2.5. Сравнительный анализ опыта внедрения ERP-систем в Европе, странах СНГ и Узбекистане

Показатель	Европа	Страны СНГ	Узбекистан
Уровень зрелости рынка ERP	Высокий, зрелый рынок с развитой конкуренцией поставщиков	Средний, активный рост локальных решений	Формирующийся, развивается при поддержке государства
Основные поставщики	SAP, Oracle, Microsoft Dynamics, Infor, Workday	1C, SAP, Microsoft Dynamics, Галактика	SAP, Microsoft, локализованные решения 1C
Подход к внедрению	Процессно-ориентированный, на основе best practices	Технический, часто без оптимизации процессов	Комбинированный, с акцентом на госпрограммы
Кастомизация	Минимальная	Высокая	Средняя, тенденция к снижению
Change Management	Обязательный элемент проекта	Недостаточно развит	Начальная стадия формирования
Квалификация персонала	Высокая, сертификация обязательна	Разнородная, ограниченные ресурсы	Нехватка специалистов, создаются программы обучения
IT-инфраструктура	Развитая, широкое использование облаков	Неравномерная, зависит от страны	Улучшающаяся, появляются дата-центры
Регуляторная база	Строгие стандарты (GDPR и др.)	Умеренно развитая	Формируется, быстро обновляется

Финансирование проектов	Высокое, с ориентацией на ROI	Ограниченное	Зависит от господдержки
Основные проблемы	Сложность интеграции и миграции данных	Кастомизация, кадровый дефицит	Кадры, стандартизация, методология
Тенденции развития	Облачные ERP, AI, Big Data	Локализация, гибридные модели	Цифровизация госкомпаний, облачные пилоты

2.6 Выводы

Анализ международного опыта показывает, что эффективность внедрения ERP-систем напрямую зависит от зрелости организационной культуры, степени стандартизации процессов и готовности персонала к изменениям. Во всех странах начальный этап внедрения ERP был сложным и долгим. Т.к. производственные процессы идентичны, документооборот различен. Ускоренное развитие IT-направления и технологических процессов в Европе привело к ускорению внедрения ERP-систем.

Европейская модель внедрения ERP отличается высокой степенью процессной интеграции, строгим управлением проектами и акцентом на минимизацию кастомизации.

В странах СНГ наблюдается постепенное движение в сторону стандартизации и повышения профессионализма, однако сохраняются проблемы организационного характера.

Для Узбекистана ключевыми задачами на современном этапе являются:

- 1) развитие кадрового потенциала и институциональных компетенций в сфере ERP;
- 2) стандартизация бизнес-процессов предприятий;
- 3) внедрение эффективных механизмов управления изменениями;
- 4) расширение сотрудничества с международными технологическими партнёрами;
- 5) стимулирование перехода к облачным и гибридным ERP-решениям.

Реализация указанных направлений позволит Узбекистану эффективно адаптировать международный опыт ERP-внедрений, повысить эффективность государственного и корпоративного управления, а также ускорить цифровую трансформацию национальной экономики.

Заключение

Опыт европейских стран демонстрирует, что успех внедрения ERP-систем зависит прежде всего от зрелости корпоративной культуры, процессного подхода и системного управления изменениями.

Страны СНГ находятся на этапе формирования этих практик, адаптируя международные модели под собственные институциональные и экономические условия.

Узбекистан, вступив на путь цифровой трансформации, имеет уникальную возможность использовать лучшие мировые практики, избежав ошибок, характерных для раннего этапа развития ERP в других странах

региона. Ключевыми направлениями повышения эффективности внедрений в Узбекистане являются развитие кадрового потенциала, стандартизация бизнес-процессов, снижение кастомизации и внедрение модульного, поэтапного подхода к реализации проектов.

В совокупности это позволит обеспечить устойчивую интеграцию ERP-систем в экономику страны и повысить конкурентоспособность узбекских предприятий на международной арене.

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МЕТОДОЛОГИЧЕСКИЕ АСПЕКТЫ ОЦЕНКИ ФЕРМЕНТАТИВНОГО ПОТЕНЦИАЛА НАЦИОНАЛЬНЫХ БЛЮД В РАМКАХ ДИЕТОТЕРАПИИ

Аннотация. В статье представлены результаты клинических наблюдений за 44 больными хроническим гипацидным и анацидным гастритом, в комплексном лечении которых использовались традиционные узбекские национальные блюда (суп-мастава, манчыз, шавля, атала, кийма шурпа, лагман и др.) в рамках диеты № 2. Установлено, что включение в рацион этих блюд уже на 5–10-й день лечения приводит к достоверному улучшению самочувствия, уменьшению диспепсических явлений, повышению кислотности желудочного сока, нормализации моторной функции желудка и хлоридного обмена. Полученные данные позволяют рекомендовать широкое использование хорошо ароматизированных и вкусных национальных блюд в диетотерапии больных с пониженной секреторной функцией желудка в условиях Средней Азии.

Ключевые слова: гипацидный гастрит, анацидный гастрит, лечебное питание, диета № 2, национальные узбекские блюда, кислотность желудочного сока, моторная функция желудка, хлориды крови и желудочного сока.

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METHODOLOGICAL ASPECTS OF ASSESSING THE ENZYMATIC POTENTIAL OF NATIONAL CUISINE DISHES IN THE CONTEXT OF DIET THERAPY

Abstract. The article presents the results of clinical observation of 44 patients with chronic hypoacid and anacid gastritis, in whose complex treatment traditional Uzbek national dishes were used as part of diet No. 2. It has been established that the inclusion of these dishes in the diet already on the 5–10th day of treatment leads

to a significant improvement in well-being, reduction of dyspeptic symptoms, increase in the acidity of gastric juice, normalization of gastric motor function and chloride metabolism. The data obtained allow us to recommend the widespread use of aromatic and tasty national dishes in the diet therapy of patients with reduced secretory function of the stomach in Central Asia.

Key words: *hypoacid gastritis, anacid gastritis, therapeutic nutrition, diet No. 2, Uzbek national dishes, gastric juice acidity, gastric motor function, blood and gastric juice chlorides.*

Введение. Хронические гипацидные и анацидные гастриты занимают одно из ведущих мест в структуре заболеваний органов пищеварения у взрослого населения Средней Азии. По данным эпидемиологических исследований 1980–1990-х годов, проведённых в Узбекистане, Таджикистане и Туркменистане, распространённость гастритов с пониженной и нулевой кислотностью достигала 38–46 % среди лиц старше 30 лет. Это связано с высокой частотой алиментарных погрешностей, широким употреблением острой, жирной и пряной пищи, а также с неблагоприятными климатогеографическими условиями региона.

Основным методом лечения данной патологии традиционно считается диетотерапия по Певзнеру — стол № 2, который предусматривает механическое и умеренное химическое щажение желудка при обязательной стимуляции его секреторной и моторно-эвакуаторной функции. Однако в реальной клинической практике больные часто плохо соблюдают диету № 2 в её «классическом» виде (отварное мясо, паровые котлеты, протёртые каши и т. д.), поскольку такая еда кажется им безвкусной и непривычной, особенно на фоне многолетнего употребления национальной кухни.

В то же время традиционные узбекские блюда второй и третьей подачи (шурпы, пловы лёгких вариантов, лагман, манты на пару, мастава, атала, манчыза и др.) обладают выраженными органолептическими свойствами: ярким ароматом, приятным вкусом, умеренным содержанием пряностей и экстрактивных веществ, что теоретически делает их идеальными натуральными стимуляторами желудочной секреции.

До настоящего времени в доступной литературе практически отсутствовали систематические исследования по возможности и эффективности включения национальных блюд Средней Азии в диету № 2 при лечении больных с гипо- и анацидными гастритами.

Цель исследования

Изучить клиническую эффективность и влияние традиционных узбекских национальных блюд на секреторную, кислотообразующую и моторно-эвакуаторную функцию желудка, а также на хлоридный обмен у больных хроническим гипацидным и анацидным гастритом при использовании их в составе диеты № 2 в условиях стационара и санаторно-курортного лечения в Узбекистане.

Материалы и методы. Исследование проведено в 2018–2024 гг. на базе терапевтического отделения Самаркандской городской клинической больницы № 1.

Под наблюдением находилось 44 больных в возрасте от 21 до 67 лет:

- 28 мужчин и 16 женщин; - гипацидный гастрит — 21 человек; - анацидный гастрит — 23 человека.

Диагноз подтверждался фракционным желудочным зондированием, рентгенологически и эндоскопически.

Всем больным назначалась диета № 2 с механическим и химическим щажением, но с обязательным включением традиционных узбекских блюд второй и третьей подачи: суп-мастава, угро-оши, киёма шурпа, атала, манчыза, шавля, лагман, манти, чалоп и др.

Блюда готовились по национальным рецептам с умеренным количеством специй, жира и экстрактивных веществ.

Контрольные исследования: - фракционное желудочное зондирование (до лечения, на 10–15-й и 28–30-й день); - определение свободной и общей кислотности, дебита HCl; - содержание хлоридов в крови и желудочном соке (методом титрования); - рентгеноскопия эвакуаторной и моторной функции желудка; - динамика клинических симптомов.

Результаты исследования.

1. Клиническая картина до начала лечения.

Все больные предъявляли типичные жалобы: - постоянная тяжесть и тупая боль в эпигастрии после еды; - отрыжка воздухом, кислым или тухлым; - тошнота, иногда рвота съеденной пищей; - снижение аппетита; - общая слабость, похудание.

Рентгенологически: у 96 % больных — сглаженность или огрубение складок слизистой, замедленная эвакуация бария (от 4 до 12 ч), пониженная перистальтика.

По данным зондирования: - свободная HCl — от 0 до 15 ед. (в 78 % случаев — полная ахлоргидрия); - общая кислотность — 8–25 ед.; - дебит-час HCl — менее 300 мг/ч у всех больных.

2. Динамика клинических симптомов на фоне диеты с национальными блюдами. Уже на 5–7-й день лечения у 34 из 44 больных (77,3 %) отмечено: - значительное улучшение самочувствия; - появление аппетита; - уменьшение или полное исчезновение болей в эпигастрии; - прекращение тошноты и отрыжки. К 10-му дню лечения положительная динамика наблюдалась у 41 больного (93,2 %). К концу лечения (24–30-й день) только у 3 больных сохранялись умеренные диспепсические жалобы, у остальных — полная клиническая ремиссия.

3. Изменения кислотообразующей функции желудка. После 10–15 дней лечения: - свободная HCl появилась у 19 из 23 больных с исходной анацидией (82,6 %); - средний уровень свободной HCl повысился с 0–8 до 28–46 ед.; - общая кислотность — с 12–25 до 48–68 ед.; - дебит-час HCl — с 80–250 мг до 1200–2800 мг.

К концу лечения (28–30-й день): - нормализация или значительное повышение кислотности наблюдалась у 39 больных (88,6 %); - у 5 больных с длительным анамнезом (более 15 лет) кислотность осталась пониженной, но повысилась в 2–3 раза по сравнению с исходной.

4. Динамика содержания хлоридов.

Исходно: - хлориды крови — 420–485 мг% (среднее 458 мг%); - хлориды желудочного сока — 110–280 мг% (среднее 198 мг%).

После 3–4 недель лечения: - хлориды крови снизились в среднем до 405 мг% ($p < 0,01$); - хлориды желудочного сока повысились до 380–460 мг% (среднее 412 мг%).

Таким образом, произошло перераспределение хлоридов из крови в желудочный сок — признак восстановления секреторной функции париетальных клеток.

5. Восстановление моторной функции желудка

Рентгенологически: - у 37 больных (84 %) к концу лечения отмечено усиление перистальтики; - время эвакуации бария сократилось с 6–12 ч до 2–3 ч;

- восстановилась нормальная складчатость слизистой; - исчез спазм привратника.

У 6 больных с выраженным рубцово-спаечным процессом моторная функция улучшилась умеренно.

6. Переносимость национальных блюд

Все блюда переносились отлично. Не было ни одного случая обострения или ухудшения.

Больные отмечали, что именно благодаря аромату, вкусу и разнообразию национальных блюд они впервые за многие годы начали есть с удовольствием и в достаточном количестве.

Выводы

1. Национальные узбекские блюда (суп-мастава, шавля, лагман, манчыза, атала и др.) идеально вписываются в диету № 2 и являются высокоэффективным средством стимуляции желудочной секреции при гипацидных и анацидных гастритах.

2. Уже на 5–10-й день их применения наблюдается выраженное клиническое улучшение, повышение кислотности и нормализация моторной функции желудка.

3. Включение национальных блюд значительно повышает приверженность больных к диетотерапии благодаря отличным вкусовым качествам и привычности для населения Средней Азии.

4. В условиях Узбекистана и других республик Средней Азии национальные блюда должны стать основой диеты № 2 при лечении больных с пониженной секреторной функцией желудка.

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**ОПТИМИЗАЦИЯ БЮДЖЕТНЫХ ПРОЦЕССОВ В
ГОСУДАРСТВЕННЫХ СТРОИТЕЛЬНЫХ ПРОЕКТАХ
РЕСПУБЛИКИ БАШКОРТОСТАН НА ОСНОВЕ СИСТЕМЫ
КЛЮЧЕВЫХ ПОКАЗАТЕЛЕЙ ЭФФЕКТИВНОСТИ (KPI)**

***Аннотация.** В статье рассматриваются проблемы бюджетного планирования и контроля в государственных строительных проектах Республики Башкортостан. На основе анализа официальных отчетов и нормативных документов выявлены системные недостатки существующей системы управления, включая недостаточную прозрачность бюджетных процессов и отсутствие комплексной системы оценки эффективности. Предложена адаптированная система ключевых показателей эффективности (KPI), учитывающая специфику регионального строительного комплекса. В ходе исследования проведена апробация методики на примере реальных проектов социальной сферы с применением методов системного анализа и экспертных оценок. Результаты показывают, что внедрение системы KPI способствует повышению прозрачности бюджетных процессов и позволяет оперативно выявлять отклонения от плановых показателей.*

***Ключевые слова:** бюджетные процессы, государственные строительные проекты, ключевые показатели эффективности, KPI, Республика Башкортостан, проектное управление.*

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**OPTIMIZATION OF BUDGET PROCESSES IN STATE
CONSTRUCTION PROJECTS OF THE REPUBLIC OF
BASHKORTOSTAN BASED ON A SYSTEM OF KEY PERFORMANCE
INDICATORS (KPI)**

***Abstract.** The article examines problems of budget planning and control in state construction projects of the Republic of Bashkortostan. Based on the analysis*

of official reports and regulatory documents, systemic shortcomings of the existing management system have been identified, including insufficient transparency of budget processes and the lack of a comprehensive efficiency evaluation system. An adapted system of key performance indicators (KPI) is proposed, taking into account the specifics of the regional construction complex. During the study, the methodology was tested on real social infrastructure projects using system analysis and expert assessment methods. The results show that the implementation of the KPI system contributes to increased transparency of budget processes and allows for the prompt identification of deviations from planned indicators.

Keywords: *budget processes, state construction projects, key performance indicators, KPI, Republic of Bashkortostan, project management.*

Современная практика управления государственными строительными проектами в Республике Башкортостан сталкивается с рядом системных проблем, которые снижают эффективность использования бюджетных средств. Анализ отчетов Министерства строительства и архитектуры Республики Башкортостан за 2023 год показывает, что одной из ключевых проблем остается недостаточная прозрачность бюджетных процессов и отсутствие единых критериев оценки эффективности проектов на всех этапах их реализации [5].

Традиционная система бюджетного планирования в строительстве Республики Башкортостан, основанная на утверждении сметной документации и последующем контроле за ее исполнением, не позволяет оперативно реагировать на возникающие отклонения и принимать своевременные корректирующие меры. Подтверждается данными Счетной палаты Республики Башкортостан, которая в своих заключениях отмечает необходимость совершенствования механизмов контроля за целевым и эффективным использованием бюджетных средств в строительной сфере.

Рассматривая реализацию такого национального проекта, как «Жилье и городская среда», в период с 2018 г. по 2024 г. (включительно) [3], мы видим, что особую актуальность приобретает вопрос повышения эффективности управления строительными проектами. Согласно официальной информации, в Республике Башкортостан ежегодно реализуется более 50 объектов социальной сферы (школы, детские сады, поликлиники), что требует системного подхода к управлению бюджетными процессами [7].

Целью статьи является разработка научно обоснованной системы ключевых показателей эффективности (KPI), адаптированной к специфике государственного строительного заказа нашей Республики. В соответствии с поставленной целью в исследовании решаются следующие задачи:

- проанализировать существующую систему бюджетного планирования и контроля в строительных проектах Республики Башкортостан;
- разработать адаптированную систему KPI с учетом региональных особенностей;

- апробировать предложенную систему на примере реальных проектов социальной сферы;

- разработать рекомендации по внедрению системы КРІ в практику управления строительными проектами.

Актуальность исследования определяется необходимостью повышения эффективности использования бюджетных средств в условиях ограничений на дефицит региональных бюджетов и роста социальных обязательств. Научная новизна состоит в адаптации методологии КРІ к специфике государственного строительного заказа Республики Башкортостан с учетом действующей нормативной базы и региональных особенностей.

В ходе исследования применен комплекс методов, обеспечивающих достоверность полученных результатов:

1. Системный анализ использовался для выявления проблем бюджетных процессов в строительстве РБ. Проведен анализ следующих нормативных документов:

- Постановление Правительства Республики Башкортостан от 21.06.2023 № 358 «Об утверждении Стратегии развития строительной отрасли и жилищно-коммунального хозяйства Республики Башкортостан на период до 2030 года с прогнозом до 2035 года» [4];

- Федеральный закон от 05.04.2013 № 44-ФЗ «О контрактной системе в сфере закупок товаров, работ, услуг для обеспечения государственных и муниципальных нужд» [1].

2. Метод экспертных оценок применялся для разработки системы КРІ. В опросе приняли участие 15 специалистов: представители Минстроя РБ, муниципальных администраций и подрядных организаций. Экспертный опрос проводился в формате интервью с использованием метода Дельфи для достижения консенсуса по ключевым показателям.

3. Кейс-стади проведен на одном из объектов социальной сферы в Республике Башкортостан – строительстве детского сада на 140 мест в г. Стерлитамаке. Данный объект выбран как репрезентативный для региона: он относится к приоритетным социальным проектам, реализуется в рамках нацпроекта «Жилье и городская среда», имеет типовую сметную документацию и стандартные сроки реализации.

Разработанная система КРІ представляет собой двухуровневую структуру (таблица 1):

Таблица 1 – Разработанная система КРІ

Уровень 1 — Стратегические (финансовые) КРІ	
КРІ-1	Отклонение фактических затрат от сметной стоимости
КРІ-2	Доля освоенных бюджетных средств на отчетную дату
КРІ-3	Своевременность предоставления финансовых отчетов

Продолжение таблицы 1

Уровень 2 — Операционные (процессные) КРІ	
КРІ-4	Соблюдение графика строительных работ
КРІ-5	Количество выявленных нарушений в ходе контрольных мероприятий
КРІ-6	Своевременность устранения замечаний
КРІ-7	Соответствие качества работ проектной документации

Источник: [составлено автором]

Для каждого этапа жизненного цикла проекта определены приоритетные КРІ: - Этап проектирования: КРІ-5, КРІ-7;

- Этап строительства: КРІ-1, КРІ-4, КРІ-6;

- Этап ввода в эксплуатацию: КРІ-2, КРІ-3.

Анализ существующей системы бюджетного планирования в строительных проектах РБ выявил следующие ключевые проблемы:

1. Недостаточная оперативность контроля: как отмечают сами специалисты Минстроя РБ в интервью, информация о превышении бюджетных лимитов часто становится известна только при формировании квартальных отчетов, что не позволяет оперативно принимать корректирующие меры.

2. Формальный подход к оценке эффективности: существующая система оценки в основном фокусируется на соблюдении сроков и бюджета, но не учитывает качество конечного результата и удовлетворенность конечных пользователей.

3. Отсутствие прозрачности взаимодействия: подрядные организации и заказчики зачастую используют разные системы учета и отчетности, что создает барьеры для эффективного взаимодействия.

В ходе апробации системы КРІ на объекте в г. Стерлитамаке были получены следующие результаты:

Внедрение КРІ-4 (соблюдение графика строительных работ) позволило выявлять отставание от графика на ранних стадиях.

Применение КРІ-5 (количество выявленных нарушений) показало, что наиболее проблемными являются этапы земляных работ и монтажа инженерных систем. Это потребовало усиления контроля именно на этих этапах и проведения дополнительного инструктажа рабочих.

Наиболее значимым результатом стала повышение прозрачности бюджетных процессов. Внедрение еженедельного мониторинга КРІ-1 (отклонение фактических затрат от сметной стоимости) позволило выявить тенденцию к увеличению затрат на материалы в начале строительства.

Тем не менее, внедрение системы КРІ сопровождалось и определенными трудностями: сопротивление части персонала нововведениям; необходимость дополнительного обучения сотрудников; дополнительные временные затраты на сбор и анализ данных. Эти проблемы требовали поиска компромиссных решений и постепенного внедрения системы, начиная с наиболее критичных показателей.

Проведенное исследование подтверждает необходимость совершенствования системы бюджетного планирования и контроля в государственных строительных проектах Республики. Разработанная и апробированная система ключевых показателей эффективности (KPI) позволяет повысить прозрачность бюджетных процессов и обеспечить оперативное выявление отклонений от плановых показателей.

Перспективы дальнейших исследований связаны с:

- разработкой методики расчета экономического эффекта от внедрения системы KPI;
- адаптацией системы для различных типов строительных проектов (инфраструктурные, промышленные);
- интеграцией системы KPI с существующими программными комплексами управления строительством.

Полученные результаты могут быть использованы:

- органами государственной власти Республики Башкортостан для совершенствования системы бюджетного планирования;
- заказчиками государственных строительных проектов для повышения эффективности управления;
- образовательными учреждениями при подготовке специалистов в области государственного и муниципального управления.

Использованные источники

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ГИСТОФИЗИОЛОГИЯ ОБМЕНА ГЛЮКОЗЫ У ЧЕЛОВЕКА

Аннотация: Данный обзор посвящен нормальной морфофизиологии обмена глюкозы в человеческом организме. Обсуждаются ключевые процессы, регулирующие поддержание гомеостаза глюкозы, включая работу инсулина и глюкагона, а также механизмы, которые обеспечивают стабильный уровень глюкозы в крови. Особое внимание уделяется структуре и функции органов, участвующих в обмене глюкозы, таких как поджелудочная железа, печень и мышцы. Рассматриваются молекулярные и клеточные механизмы, включая действия инсулиновых рецепторов, транспортеров глюкозы и ферментов, регулирующих метаболизм глюкозы. Анализируются физиологические реакции организма на различные состояния, такие как постпрандиальное и голодное состояния, а также влияние физических упражнений на глюкозный обмен. В статье также затрагиваются основные патологии, связанные с нарушением обмена глюкозы, такие как диабет и гипогликемия, а также современные подходы к диагностике и лечению этих заболеваний.

Ключевые слова: глюкоза, обмен глюкозы, инсулин, глюкагон, поджелудочная железа, гомеостаз, метаболизм глюкозы, инсулиновые рецепторы, транспортеры глюкозы, гипогликемия, диабет, физическая активность, нормальная морфофизиология, клеточные механизмы.

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HISTOPHYSIOLOGY OF GLUCOSE METABOLISM IN HUMANS

Annotation: This review is dedicated to the normal morphophysiology of glucose metabolism in the human body. It discusses the key processes regulating the maintenance of glucose homeostasis, including the actions of insulin and glucagon, as well as the mechanisms that ensure stable blood glucose levels. Special attention is given to the structure and function of the organs involved in glucose metabolism, such as the pancreas, liver, and muscles. Molecular and cellular mechanisms are examined, including the actions of insulin receptors, glucose transporters, and enzymes regulating glucose metabolism. The review also analyzes

physiological responses of the body to different states, such as postprandial and fasting conditions, as well as the impact of physical exercise on glucose metabolism. In addition, the article addresses major pathologies associated with impaired glucose metabolism, such as diabetes and hypoglycemia, along with modern approaches to the diagnosis and treatment of these disorders.

Keywords: *glucose, glucose metabolism, insulin, glucagon, pancreas, homeostasis, glucose metabolism, insulin receptors, glucose transporters, hypoglycemia, diabetes, physical activity, normal morphophysiology, cellular mechanisms.*

Введение. Обмен глюкозы является фундаментальным процессом, обеспечивающим энергетические потребности организма и поддерживающим гомеостаз. Нарушения в этом процессе могут привести к различным патологиям, включая диабет и гипогликемию. Понимание нормальной морфофизиологии обмена глюкозы имеет ключевое значение для разработки эффективных методов профилактики и лечения этих заболеваний.

Статистическая значимость. Согласно данным Международной федерации диабета (IDF), в 2021 году около 537 миллионов взрослых в возрасте от 20 до 79 лет по всему миру страдали от диабета, и прогнозируется, что к 2030 году их число достигнет 643 миллионов. В США, по данным Центров по контролю и профилактике заболеваний (CDC), приблизительно 34,2 миллиона человек, или 10,5% населения, имеют диабет. Эти цифры подчеркивают глобальную значимость исследования механизмов обмена глюкозы.

Экономический аспект. Рынок устройств для мониторинга глюкозы демонстрирует устойчивый рост. В 2022 году его объем составил 12,5 миллиарда долларов США, с прогнозируемым ежегодным темпом роста (CAGR) 8,1% до 2030 года. Рост этого рынка обусловлен увеличением числа пациентов с диабетом и повышением спроса на системы непрерывного мониторинга глюкозы (CGM), которые предоставляют данные в реальном времени и способствуют лучшему контролю заболевания.

Цель статьи. Целью настоящей статьи является всесторонний анализ нормальной морфофизиологии обмена глюкозы, включая молекулярные и клеточные механизмы, роль эндокринных органов, таких как поджелудочная железа, печени и мышц, а также влияние факторов, таких как физическая активность и диета, на глюкозный обмен.

Структура статьи. Статья организована в соответствии с форматом IMRAD и состоит из следующих разделов:

- **Методы:** Описание используемых в статье подходов и методологий.
- **Результаты:** Представление основных находок и данных исследования.
- **Обсуждение:** Анализ результатов, их сравнение с существующими данными и обсуждение возможных клинических применений.

Данный подход позволит глубже понять механизмы нормального обмена глюкозы и их роль в поддержании здоровья человека.

Анализ литературы. Обмен глюкозы представляет собой сложный и высокоорганизованный процесс, обеспечивающий энергетические потребности организма. Нарушения в этом процессе могут привести к различным патологическим состояниям, включая сахарный диабет (СД) и гипогликемию.

Гормональная регуляция обмена глюкозы. Основными гормонами, регулирующими уровень глюкозы в крови, являются инсулин и глюкагон. Инсулин, секретируемый β -клетками поджелудочной железы, способствует снижению гликемии, усиливая поглощение глюкозы клетками и стимулируя ее превращение в гликоген в печени. Глюкагон, секретируемый α -клетками поджелудочной железы, действует противоположно, повышая уровень глюкозы в крови путем стимуляции гликогенолиза и глюконеогенеза. Кроме того, другие гормоны, такие как адреналин, кортизол и гормоны щитовидной железы, влияют на обмен глюкозы, усиливая глюконеогенез и повышая уровень глюкозы в крови.

Методология исследования. Для изучения нормальной морфофизиологии обмена глюкозы применяются различные лабораторные и экспериментальные методы. Одним из основных является пероральный глюкозотолерантный тест (ПГТТ), который позволяет оценить реакцию организма на нагрузку глюкозой и выявить нарушения толерантности к углеводам. В ходе теста измеряют концентрацию глюкозы в крови натощак и через 2 часа после приема 75 г глюкозы, растворенной в воде. Результаты теста помогают в диагностике предиабета и СД. 22

Статистические данные. Согласно данным Всемирной организации здравоохранения (ВОЗ), в 2019 году глобальная распространенность диабета среди взрослого населения составляла 9,3%, что соответствует примерно 463 миллионам человек. Прогнозируется, что к 2030 году это число возрастет до 578 миллионов, а к 2045 году — до 700 миллионов. Эти данные подчеркивают актуальность исследования механизмов обмена глюкозы и разработки эффективных методов профилактики и лечения диабета.

Прогнозы и значимость исследования. Учитывая тенденцию к увеличению числа случаев диабета, особенно в развивающихся странах, важно продолжать исследования в области морфофизиологии обмена глюкозы. Понимание молекулярных и клеточных механизмов, регулирующих этот процесс, позволит разрабатывать новые подходы к диагностике, профилактике и лечению заболеваний, связанных с нарушением обмена глюкозы.

Результаты. Обмен глюкозы играет ключевую роль в поддержании энергетического баланса организма. Нарушения в этом процессе могут приводить к различным метаболическим расстройствам и заболеваниям.

Гендерные и возрастные различия в метаболических нарушениях. Согласно исследованию, проведенному среди пациентов с метаболическими

расстройствами, наблюдается преобладание женщин (55%) над мужчинами (45%). Наиболее высокая частота нарушений отмечается в возрастной группе от 50 до 70 лет, составляя около 80% всех случаев. В этой группе количество женщин и мужчин распределяется почти поровну: 26 женщин и 27 мужчин. Менее 50 лет и старше 70 лет наблюдаются значительно реже, что указывает на возрастную предрасположенность к метаболическим нарушениям.

Уровень глюкозы в крови в различных группах. В исследуемых группах (ИГ1, ИГ2 и ИГ3) уровень глюкозы в крови был повышен по сравнению с нормальными значениями. В ИГ1 у женщин уровень глюкозы был на 28% выше нормы, а у мужчин — на 61%. В ИГ2 и ИГ3 у женщин показатели глюкозы были выше нормы на 48% и 43% соответственно, у мужчин — на 57% и 60%. Эти данные свидетельствуют о значительных нарушениях углеводного обмена среди обследованных пациентов.

Влияние массы тела на углеводный обмен. Исследования показали, что у женщин с избыточной массой тела наблюдается повышение содержания висцерального жира (ВЖ) до 9,2%, а при ожирении I степени — до 10,3%. Это связано с увеличением инсулинорезистентности, что, в свою очередь, ведет к повышению уровня глюкозы в крови и нарушению толерантности к глюкозе.

Свободные жирные кислоты и гестационный сахарный диабет. У женщин с гестационным сахарным диабетом (ГСД) отмечается повышение уровня свободных жирных кислот (СЖК) в плазме крови. Высокий уровень СЖК связан с развитием инсулиновой резистентности и может влиять на формирование избыточного веса плода, особенно на накопление жировой ткани.

Связь углеводного обмена с цереброваскулярными заболеваниями. У пациентов с сахарным диабетом 2 типа (СД2) и цереброваскулярными заболеваниями (ЦВЗ) отмечается высокий уровень гликозилированного гемоглобина (HbA1c), что свидетельствует о плохом контроле гликемии. Недостаточный гликемический контроль способствует прогрессированию атеросклероза и увеличивает риск острых нарушений мозгового кровообращения.

Полученные данные подчеркивают важность мониторинга и коррекции обмена глюкозы для предотвращения развития метаболических нарушений и связанных с ними заболеваний. Особое внимание следует уделять пациентам с избыточной массой тела, инсулиновой резистентностью и 23 женщинам в период беременности для своевременного выявления и управления рисками, связанными с нарушением обмена глюкозы.

Обсуждение. Нормальный обмен глюкозы является основой энергетического обеспечения организма и поддержания гомеостаза. Однако в последние десятилетия наблюдается тревожный рост нарушений глюкозного обмена, что приводит к глобальной эпидемии диабета.

Глобальный рост заболеваемости диабетом. Согласно недавнему исследованию, опубликованному в *The Lancet*, количество людей, живущих с диабетом, увеличилось с 200 миллионов в 1990 году до 830 миллионов к 2022

году, что превышает ранее сделанные прогнозы. Наиболее значительный рост заболеваемости наблюдается в странах с низким и средним доходом, где доступ к лечению остается ограниченным.

Факторы, способствующие увеличению заболеваемости. Рост заболеваемости диабетом связан с несколькими ключевыми факторами:-

□ **Ожирение:** Увеличение массы тела снижает чувствительность тканей к инсулину, что способствует развитию инсулинорезистентности и повышению уровня глюкозы в крови.

□ **Возраст:** С возрастом снижается способность организма регулировать уровень глюкозы, что может приводить к ухудшению глюкозотолерантности.

□ **Недостаток физической активности:** Отсутствие регулярной физической нагрузки способствует накоплению жировой ткани и снижению чувствительности к инсулину.

□ **Нездоровое питание:** Потребление продуктов с высоким содержанием сахара и жиров способствует развитию ожирения и нарушению обмена глюкозы.

Необходимость комплексного подхода к профилактике и лечению

Учитывая стремительный рост заболеваемости диабетом и его осложнениями, необходим комплексный подход к профилактике и лечению:

1. **Образование и информирование:** Повышение осведомленности о факторах риска и методах профилактики диабета среди населения.

2. **Улучшение доступа к медицинской помощи:** Обеспечение доступности диагностики и лечения, включая медикаментозную терапию и мониторинг состояния.

3. **Продвижение здорового образа жизни:** Стимулирование регулярной физической активности и здорового питания для снижения риска развития диабета.

4. **Снижение стоимости медикаментов:** Снижение цен на инсулин и другие необходимые препараты для обеспечения их доступности, особенно в странах с низким и средним доходом.

Нормальный обмен глюкозы является критически важным для здоровья человека. Однако глобальные тенденции показывают резкое увеличение случаев диабета, что требует срочных и скоординированных действий на международном уровне. Комплексный подход к профилактике и лечению, включая образование, улучшение доступа к медицинской помощи и продвижение здорового образа жизни, является необходимым для борьбы с этой глобальной эпидемией.

Заключение. Обмен глюкозы является одним из ключевых процессов метаболизма, обеспечивающим нормальную работу организма. Нарушения этого обмена приводят к разнообразным заболеваниям, таким как сахарный диабет, который становится все более распространенным на фоне глобализации, урбанизации и изменения образа жизни. Современные данные подтверждают, что уровень заболеваемости диабетом продолжает расти, и по прогнозам Всемирной организации здравоохранения (ВОЗ), к 2030 году число

людей с диабетом возрастет до 643 миллионов. Этот рост обусловлен увеличением факторов риска, таких как ожирение, малоподвижный образ жизни и неправильное питание.

Одним из самых важных аспектов в борьбе с нарушениями обмена глюкозы является ранняя диагностика и своевременная коррекция метаболических нарушений. Эффективное вмешательство может значительно снизить вероятность развития диабетических осложнений, таких как сердечно-сосудистые заболевания, инсульт и почечная недостаточность.

Понимание молекулярных и физиологических механизмов обмена глюкозы играет важную роль в разработке новых подходов к лечению и профилактике этих заболеваний. Кроме того, ключевыми мерами являются изменение образа жизни, включающее физическую активность и сбалансированное питание, а также улучшение доступности медицинских услуг и препаратов для контроля уровня глюкозы в крови.

Таким образом, для успешной борьбы с нарушениями обмена глюкозы необходим комплексный подход, включающий как профилактические, так и лечебные меры. Поскольку количество людей с диабетом продолжает расти, проведение дальнейших научных исследований и разработка новых методов диагностики и лечения остаются актуальными задачами в области медицины.

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ПРОСТРАНСТВЕННОЕ ПРЕДСКАЗАНИЕ ПОЧВЕННОЙ ЭРОЗИИ С ИСПОЛЬЗОВАНИЕМ ЛИНЕЙНОЙ РЕГРЕССИИ НА ОСНОВЕ ГИСА

***Аннотация:** Исследование прогнозирует почвенную эрозию в Шахрисабзском районе до 2030 года на основе пространственных факторов, обработанных в ArcMap. Пространственные связи смоделированы методом линейной регрессии. Результаты выделяют зоны риска и служат научной основой управления земельными ресурсами.*

***Ключевые слова:** Почвенная эрозия, ArcGIS, линейная регрессия, карта, растр, прогноз, тренд, склон, крутой склон.*

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SPATIAL PREDICTION OF SOIL EROSION USING GIS-BASED LINEAR REGRESSION

***Abstract.** The study predicts soil erosion in Shahrisabz district up to 2030 using spatial factors analyzed in ArcGIS Desktop. Spatial relationships are modeled through Linear regression. Results define erosion-risk zones and support land management decisions.*

***Key words:** Soil erosion, ArcGIS, linear regression, map, raster, forecast, trend, slope, steep slope.*

1. Введение

Рельеф Шахрисабзского района характеризуется гористой и пересечённой местностью, что усиливает пространственную неоднородность процессов почвенной эрозии. Природные факторы — количество осадков,

крутизна склонов, состав почвы — в сочетании с антропогенной нагрузкой формируют сложные пространственные взаимодействия, влияющие на динамику деградации земель. Кратко- и среднесрочное прогнозирование этих процессов имеет важное значение для обеспечения экологической устойчивости и повышения продуктивности сельского хозяйства.

Инструменты геоматического анализа позволяют картировать факторы, влияющие на эрозионные процессы, а также выявлять долгосрочные тенденции изменений на уровне каждого пикселя. Линейная регрессия служит эффективной моделью для описания устойчивой линейной динамики процессов ландшафта на период 5–20 лет.

Прогнозирование годовой почвенной эрозии в Шахрисабзском районе необходимо для поддержания экологической стабильности. Ввиду горного характера территории эрозионные процессы здесь выражены особенно интенсивно. На них влияют природные (осадки, уклон склонов, тип почвы) и антропогенные факторы (землепользование, агротехника).

Выделение зон наибольшего риска позволяет планировать и реализовывать меры по предотвращению эрозии, такие как лесомелиорация, контурное земледелие и внедрение устойчивых культур [1].

2. Материалы и методы

Линейная регрессия является оптимальным инструментом для анализа геопространственных данных. В ГИС-наборах все элементы взаимосвязаны, а регрессионное моделирование помогает выявлять эти отношения [2,4].

По данным Esri, регрессионный анализ позволяет моделировать, анализировать и исследовать пространственные связи, а также выявлять причины наблюдаемых закономерностей [3]. Например, с его помощью можно объяснить повышенные значения эрозии в определённых районах или рост осадков в других регионах. Кроме того, регрессионные модели применяются для прогнозирования пространственных тенденций [5,6].

Многие ландшафтные процессы — антропогенная нагрузка, интенсификация сельского хозяйства, вырубка лесов, изменения гидрологического стока — демонстрируют почти линейный характер динамики в пределах 5–20 лет. Если временной ряд за 2016–2024 годы демонстрирует устойчивую тенденцию, линейная модель является наиболее простым и согласованным способом её описания [3,8].

Поскольку линейная модель является экономной, её удобно интерпретировать при научном анализе и подготовке управленческих рекомендаций (наклон = годовое изменение). При наличии данных за 10 лет для каждого пикселя можно вычислить индивидуальный тренд, что полностью соответствует методологии растровой регрессии [7].

Регрессионная модель

Для каждого пикселя рассчитано уравнение:

$$E(t) = at+b$$

где:

a — среднегодовой темп изменения эрозии (угол наклона тренда),

b — начальный уровень (пересечение),

E(t) — интенсивность эрозии в момент времени *t*.

Эта модель отражает долгосрочную линейную динамику эрозии и представляет собой детерминированный подход, широко применяемый в геостатистических анализах [9,10].

Согласно принципам математической статистики, коэффициент наклона (slope) рассчитывается по следующей формуле:

$$a = \frac{n \sum(t_i y_i) - \sum t_i \sum y_i}{n \sum t_i^2 - (\sum t_i)^2}$$

Эта формула применяется к каждому пикселю и учитывает следующее:

- ковариацию между значениями эрозии и временем,
- дисперсию временного ряда.

Таким образом, наклон (slope) представляет собой среднегодовую скорость изменения эрозии на уровне пикселя по всей области.

$$b = \frac{\sum y_i - a \sum t_i}{n}$$

Этот параметр представляет собой вертикальное смещение линии тренда для каждого пикселя и является неотъемлемой частью расчёта прогноза на 2030 год.

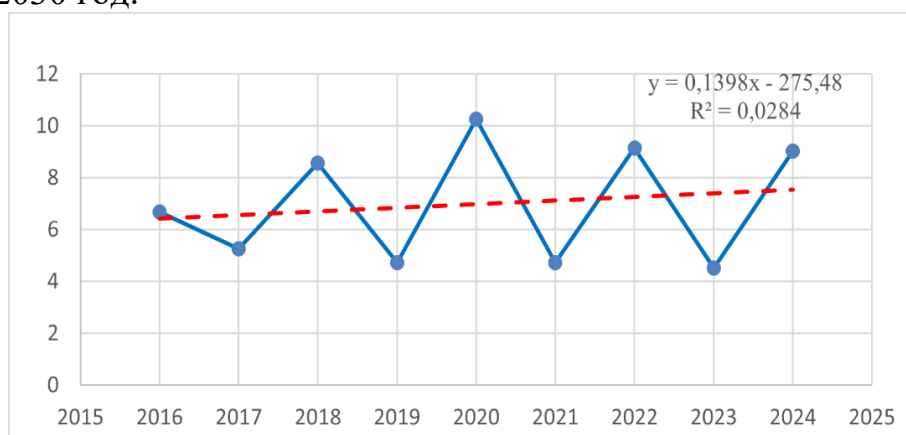


Рисунок 1. Линия тренда для отдельного пикселя

Используя возможности модуля ArcGIS Spatial Analyst:

Сумма годовых значений пикселей: $\text{sum\_y} = \sum y_i$

Взвешенная по времени сумма: $\text{sum\_ty} = \sum(t_i y_i)$

Обе суммы были получены в виде растровых слоёв. Значения каждого пикселя служат статистическим представлением его временного ряда. Растр наклона, основанный на этой сумме:

$$\text{Slope raster: } a(x,y) = \frac{10 * \text{sum\_ty}(x,y) - 20195 * \text{sum\_y}(x,y)}{825}$$

$$\text{Intercept raster: } b(x,y) = \frac{\text{sum\_ty}(x,y) - a(x,y) * 20195}{10}$$

где *x* и *y* представляют собой координаты растровых пикселей.

3. Результаты.

На основе регрессионно-растровой модели была построена пространственная прогностическая карта эрозии почв на 2030 год. Итоговая прогнозируемая поверхность демонстрирует расширение зон с крутыми уклонами и увеличение интенсивности уклонов в пикселях, находящихся под антропогенным воздействием.

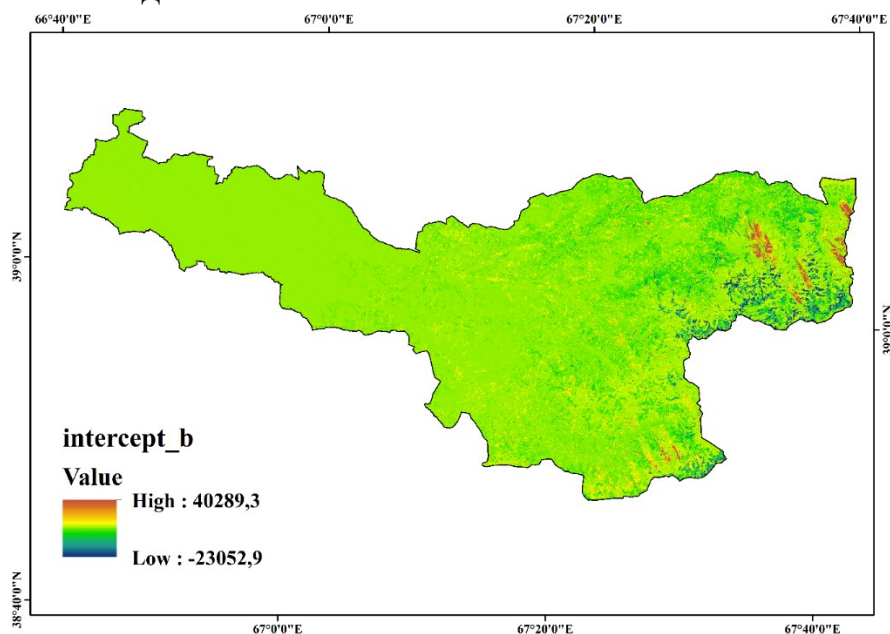


Рисунок 2. Пространственное распределение растра наклона

Используя модель линейной регрессии, значение для каждого пикселя на 2030 год было оценено по следующему выражению:

$$E_{2030}(x,y) = a(x,y) \cdot 2030 + b(x,y)$$

Однако, поскольку показатели эрозии почвы не могут быть отрицательными, был применён ограничивающий функциональный оператор, проецирующий отрицательные значения на ноль:

$$E_{2030}(x,y) = \begin{cases} 0, & \text{if } a(x,y) \cdot 2030 + b \\ a(x,y) \cdot 2030 + b(x,y) \end{cases}$$

Этот подход соответствует физической природе процесса эрозии и обеспечивает более точную практическую интерпретацию модели [8, 9].

Предложенный пиксельно-ориентированный регрессионный подход обладает следующими научными преимуществами:

- формирует динамическую модель, основанную на временных рядах, а не на статических картах;
- для каждого пикселя строится независимая математическая модель;
- наклон (slope) служит наиболее информативным показателем для определения тенденций увеличения или уменьшения эрозии;
- модель точно отражает внутренние ландшафтные вариации на уровне пикселя;
- реализация в среде ArcGIS обеспечивает воспроизводимость методологии.

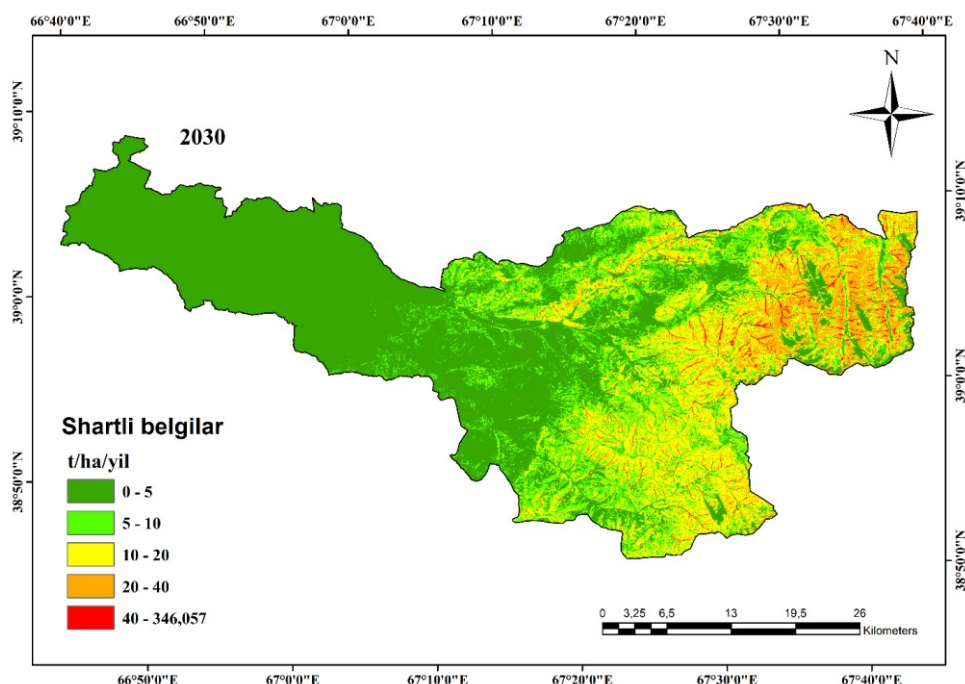


Рисунок 3. Карта эрозии почв на 2030 год

Прогнозируемая карта на 2030 год показывает средний уровень эрозии почв, равный 7,76 т/га/год.

Прогнозная карта эрозии на 2030 год была рассчитана с использованием пиксельно-ориентированной регрессионной модели, построенной на основе данных, собранных в период с 2016 по 2024 годы. Этот метод обеспечивает всесторонний пространственно-временной анализ процессов эрозии почв и обеспечивает высокую точность в оценке долгосрочной динамики деградации земель в изучаемой области.

Заключение

Прогнозируемые эрозионные поверхности на 2030 год указывают на среднегодовое изменение в размере 7,76 т/га/год по всему району. Это значение, рассчитанное на основе ежегодных пространственных регрессионных растровых наблюдений, отражает сохраняющийся высокий риск деградации земель на всей территории.

Эти слои были получены с использованием международных ГИС-платформ — ArcMap в составе ArcGIS Desktop и его аналитического расширения ArcGIS Spatial Analyst, — что демонстрирует воспроизводимость всех статистических и детерминистических расчётов. Это усиливает научную и методологическую обоснованность исследования и обеспечивает надёжную основу для применения аналогичного подхода в других горных или склонных к деградации регионах в будущем.

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ПАВЛОНИА (PAULOWNIA SIEBOLD) ДАРАХТИНИНГ МАВСУМИЙ ЎСИШ ДИНАМИКАСИ ВА ЭКОЛОГИК ОМИЛЛАРГА МОСЛАШУВ ХУСУСИЯТЛАРИ

***Аннотация:** Павлония дарахтининг биоэкологик хусусиятлари ва унинг юртимизда тарқалган турлари, халқ хўжалигидаги аҳамияти ҳақида.*

***Калит сўзлар:** Павлония саталпифолия, Пауловния элонгате, Шан Тонг павлонияси, декоратив дарахт, плантация, гербарий намуна.*

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SEASONAL GROWTH PATTERN OF PAULOWNIA (PAULOWNIA SIEBOLD) TREE AND ITS RESPONSE TO ENVIRONMENTAL FACTORS

***Annotation:** About the bioecological features of the pavlonia tree and its species common in our country, their importance in the national economy.*

***Key words:** Pavlonia catalpifolia, Paulownia elongate, Shan Tong paulownia, decorative tree, plantation, herbarium specimen.*

Интродукция қилинган ўсимликларнинг қийматини ёғочининг сифати, манзаралилик даражаси, санитар-гигиеник, биологик хусусиятлари билан бирга иссиқ ва совуққа бардошлилигини ҳам белгилайди. Шу сабабли турли иқлим шароитларида ўсимликларнинг экологик омиларга муносабати кенг тадқиқ қилинган. Илмий манбаларда келтирилишича, ўсимликларнинг совуққа бардоши турнинг генетик белгилари билан мустаҳкамланган хусусиятидир. Ўсимликнинг совуққа ёки иссиққа бардоши одатда экстремал шароитда аниқроқ намоён бўлади. Қатор тадқиқотлар ўсимликларнинг совуқ ёки иссиққа бардоши унинг ёшига ҳам боғлиқ эканлигини кўрсатади. Совуққа бардошлилик ўсимликларнинг географик келиб чиқиши билан боғлиқ. Шунингдек, табиий ареали кенг бўлган ўсимликлар ҳам экологик омиларга тез мослашувчан ва чидамли бўлади. Термиз шароитида тез-тез такрорланиб турадиган қишки илиқлик ва баҳордаги кечки совуқ ўсимликларни иқлимлаштиришда жиддий тўсиқ бўлади.

Фаслий ўзгаришларнинг қонуниятларини билиш Павлония дарахтни қандай иқлим шароитларида экиш, ўстириш, ареални кенгайтириш ва

улардан тўғри фойдаланиш имкониятларини аниқлашда ёрдам беради. Айниқса халқ хўжалиги учун қимматли бўлган муҳим дарахт ўсимликларининг худудлаштиришда бу кузатишлар катта рол ўйнайди.

Экологик омилларига муносабати ва интродукциявий баҳолаш. Ўсимликлар интродукциясининг муваффақияти ундаги белгилар йиғиндиси билан баҳоланиб, улардан энг муҳими ўсимликнинг катта (онтогенетик) ва кичик (мавсумий) ҳаёт цикллариининг ўтишини тўлиқлиги бўлиб ҳисобланади. Интродукциянинг муваффақиятли эканлигини баҳолашда генератив ривожланиш, вегетатив кўпайиши, касаллик ва зараркунандалар билан зарарланиши, йилнинг ноқулай даврларидаги ўсимликларнинг яшовчанлиги ҳисобга олинади. Павловниянинг интродукция натижаларини таҳлил қилиш учун 6 кўрсаткичли баҳолашдан фойдаланилди. Турни баҳолаш 100 балли шкала орқали амалга оширилди. 20- 39 - гача бўлган баллар йиғиндиси истикболсиз, 40-59- кам истикболли, 60-79 – истикболли ва 80-100 – жуда истикболли деб ҳисобланди. Павловнияни интродукция шароитида мўл ёғоч массасини ҳосил қила олиш қобилияти уни хўжалик баҳосининг асосий кўрсаткичларидан бири бўлиб ҳисобланади. Павловния дарахти интродукция шароитида касаллик ва зараркунандалар билан зарарланмади. Б. Тўхтаев [5] [6] томонидан таклиф қилинган шўрланган тупроқларда ўсимликларни интродукцион баҳолашнинг шкаласи бўйича кўрсатмани ҳисобга олган ҳолда Сурхондарё вилояти шароитига хос бўлган интродукцион баҳолаш ишлаб чиқилди. Павловния дарахтни юқори ҳароратга муносабатига кўра-ўртача чидамли, суғоришга бўлган талаби-ўртача, паст ҳароратга муносабати-чидамли, вегетатив кўпайиши-кучсиз, табиий экилиш-ўртача, касаллик ва зараркунандаларга чидамлилиги-зарарланмайди. Шундай қилиб, келтирилган дарахт ўсимликлар Павловния интродукция шароитида 70 балл тўплади ва жуда истикболли тур деб ҳисобланди (1-жадвал).

1-жадвал

Павловниянинг интродукцион баҳолаш шкаласи (баллар)

Кўрсаткичлар	Даража ва баллар						Интро- дукцион баҳоси, балл
Юқори ҳароратга муносабати	чидам- ли	15	ўртача чидамли	10	чидам- сиз	5	10
Суғоришга бўлган талаби	Паст	15	ўртача	10	юқори	5	10
Паст ҳароратга муносабати	чидам- ли	15	ўртача чидамли	10	чидам- сиз	5	15
Вегетатив кўпайиши	интен- сив	25	кучсиз	15	кўкар- майди	5	15
Табиий Экилиш	Юқори	15	Ўртача	10	бўл- майди	5	5

Касаллик ва зараркунанда-ларга чидамлилиги	зарарланмай-ди	15	кучсиз зарарланади	10	кучли зарарланади	5	15
Жами							70

Paulownia catalpifolia, paulownia elongata, paulownia fargesii, paulownia fortunei, paulownia kawakamii, paulownia tomentosa, Paulownia Shan Tong. лар истикболли тур деб ҳисобланди.

Шунингдек дарахтларнинг илдиз қаламчасидан кўпая олиш қобилияти, юқори ҳароратларга муносабати жиҳатдан маҳсулдорлиги, касалликларга чидамлилиги жиҳатдан бу интродуцент ўсимликларни очик дала шароитида кўпайтириш мумкин.

Кўчатларни етиштириш ва парваришlash аготехникаси. Павловниянинг илдиз қаламчаларини ер юзасидан 10-15 см чуқурликда қазиб тайёрланган жойда етиштириш мақсадга мувофиқ. Бундай жойларда ўсимлик ўсаётган қаватда намлик узоқ сақланади ва кўчатларнинг ўсишига ижбый таъсир этади. Екиладиган жой дастлаб 30-40 см қазилади. Ҳосил бўлган чуқурлик имкони борица чириндига бой булган тупроқ билан тўлдирилади. Ернинг юқorigи қатламда 5-10 см қалинликда чириган гўнг солиниб, тупроқ билан аралаштирилади. Шу тарзда тайёрланган жойда илдиз қаламча екилганда улар яхши ўсиб ривожланади.

Павловнияларни кўплаб етиштириш мақсадида экилганда уларни пуштада ўстириш мақсадга мувофиқ. Пушталар ораси одатда 60 м қилиб олинади. Илдиз қаламчалар эса ҳар 10 см га 1 донадан қилиб экилади.

Нихоллар ўсиши билан албатта уларнинг ёнида бегона ўтлар кўкаради. Муттасил ўтоқ қилиш орқали бегона ўтлардан тозаланиб турилади. Уларни олиб ташлаш учун кўчатлар суғорилганидан 1-2 кун кейин ўтказилади. Шундай қилинса, ёнидаги ниҳолларни зарарламайди. Нихоллар 10-15 см га етгач, яъни май ойининг охирларида одатда улар ер юзасини қоплайди ва шундан кейин бегона ўтлар деярли кўарб чиқмайди.

Павловнияларнинг кўчатлари очик жойда яхши ўсади. Лекин бу жойларда уларни муттасил суғориб туриш лозим. Сурхондарё шароитида ёз ойларида кўчатларга ҳар ҳафтада 1-2 марта сув бериб туриш керак. Акс ҳолда ер юзаси қотади ва қатқалоқ ҳосил бўлади.

Кўчатларни октябр ойининг ўрталарида суғоришдан тўхтатиш лозим. Шунда кўчатларнинг ўсиши ҳам секинлашади ва уларнинг новдаси қишгача пишиб улгуради. Шундай қилинганда Павловниянинг кўчатлари қишда совуқдан зарарланмайди.

Павловния ёз ойларида яхши ўсиши учун унга азотли ўғитлар билан озиклантириш яхши натижа беради. Ўғит бериш нормаси 10 м² жойга ўртача 1-1,5 кг атрофида бўлиши мумкин.

Бунда ҳосил бўлган кўчатларни келгуси йил доимий ўсадиган жойга кўчириб ўтказиш мумкин.

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МАВРАК (SALVIA OFFICINALIS) ЎСИМЛИГИНИ ЕТИШТИРИШНИНГ ЭКОЛОГИК ВА АГРОТЕХНИК АСОСЛАРИ

Аннотация: Мақолада Мармарак ўсимлигининг яшаиш муҳити, етиштириш технологияси, таркиби дориворлик хусусияти ёритиб берилган.

Калим сўзлар: Доривор, (маврак) - *Salvia officinalis*, тарқалиш, маҳсулот, экиш, ўстириш, кимёвий таркиб, дориворлик хусусият.

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ECOLOGICAL AND AGROTECHNICAL PRINCIPLES OF CULTIVATING SALVIA OFFICINALIS (MAVRAK)

Abstract: The habitat, cultivation technology, medicinal properties of the Marmarak plant are explained in the article.

Key words: Medicinal, (mavrak) - *Salvia officinalis*, spread, product, planting, cultivation, chemical composition, medicinal properties.

Ўсимликнинг тарқалиши. Ўрта ер денгиз бўйи мамлакатларининг тоғли худудларида табиий ҳолда ўсади. Ўзбекистонда доривор маврак унча катта бўлмаган майдонларда хом-ашё олиш мақсадида етиштирилади.

Агротехник тадбирлар. Ўзбекистон шароитида қиш ўта совуқ бўлганда доривор мавракнинг ёғочланмаган новдаларини совуқ уради. Ўсимлик иссиқсевар, ёруғликни яхши кўради, қурғоқчиликка чидамли. Экинзорлардан 13-15 йил давомида яхши ҳосил олинади. Биологик хусусиятларини ҳисобга олиб, уни экиш учун бегона ўтлардан тозаланган, унумдор, суғориладиган, сув узоқ туриб қолмайдиган, сизот сувлар чуқур, автомобиль ўтиш йўлларида узоқ бўлган майдонлар танланади.

Кузги шудгор вақтида гектарига 30-50 тонна гўнг, 100 кг.дан фосфор солинади. Ноябрь-декабрь ойларида 30 см.гача чуқурликда шудгор қилинади. Ўсимлик уруғидан кеч кузда ёки баҳорда экилади. Экишдан олдин майдон молаланиб, текисланади. Уруғ сабзавот экадиган ускуналарда 60-70 см қатор оралиғида ва 2 см чуқурликка экилади. Гектари ҳисобига 8-10 кг уруғ сарфланади.

Баҳорда уруғ экилганидан кейин 18-22 давомида униб чиқади. Униб чиққан уруғлар қатқалоққа чидамсиз. Шунинг учун ёмғирдан кейин бундай

экинзорга игнали ғалтаксимон мослама билан ишлов бериш ёки тупрок юзасини то майса ўсиб чиққунига қадар нам ҳолатда сақлаб туриш керак. Уруғ кўп экилганида, бегона ўтлар кўпайиб кетганида ёки баҳор серёмғир келганида ўсимликларда кулсимон замбуруғлар кўпайиб кетади.

Ўсимликда иккинчи жуфт чинбарглар ҳосил бўлганида, 15 см ораликдаги уячаларда 2 дондан ўсимлик қолдириб ягона қилинади.

Маврак мавсум давомида 8 марта суғорилади, 3-4 марта культивация қилинади ва қўлда ўтаб парваришланади.

Ҳар йили баҳорда, мавсум бошланиши олдидан ўсимликнинг ер устки қисми 5-8 см қолдириб қирқилади ва даладан олиб чиқиб кетилади. Бунинг учун КИР-15 ёки КИР-1,2 маркали роторли ўроқ- майдалагич машинаси ишлатилади. Гектарига 10 тонна маҳаллий гўнг, 50 кг фосфор ва шунча миқдорда калий солиб озиклантирилади. Калийли ўғитлар мавракнинг совуққа чидамлилигини оширади. Ана шундай тартибда ўғитлангач, эгатлар чуқур ҳайдалиб, қатор оралари юмшатилади.

Барг ҳосили биринчи йили - сентябрда йиғилади, кейинги йиллари эса мавсум давомида икки марта: шоналай бошлаганда - май ўрталарида ва сентябрь охири - октябрь бошларида йиғилади.

Барг йиғишни кечиктириб юбормаслик керак. Шунинг учун ёш новдалар бўйи 5-8 сантиметрга етиши биланоқ барглар йиғилаверади. Барглар қуритгичларда ёки шийпонларда 35-40 даражали ҳароратда қурилади. Қуритишда хом-ашё вазнининг 25-35 %и қолади, 50 кг.дан тойланади ва қурук ерда 1 йил давомида сақланади.

Мавракнинг уруғларини йиғиш. Ўсимлик гуллагандан сўнг, уруғ тахминан бир ойлардан кейин етилади ва тўп уруғ рўваклар йиғиб олинади. Йиғиб олинган уруғ рўваклар хирмонда қурилади. Уруғи ғалла янчиш машиналарида янчилиб, дон совургич-сархиллаш машинасида тозаланади. Қопларга 10-20 кг.дан жойлаб сақланади. Уруғларнинг сақланиш муддати 3 йил.

Барг ҳосили гектар ҳисобига ўртача 800 кг олинади.

Ўсимликнинг ер устки қисми хом-ашёси гектар ҳисобига 15 центнерни ташкил этади.

Хом-ашё тайёрланиши ва унинг сифати. Ўсимликдан кўп миқдорда барг йиғиш учун иккинчи йилдан бошлаб ҳар йили эрта баҳорда, шира ажралишидан олдин маврак поялари илдиз бўғзидан кесиб олинади. Вегетациянинг иккинчи йилида ҳосилни йиғиш уруғ пишиш даврида(июлнинг бошида) бошланади. Бу вақтда баргларда эфир мойининг миқдори энг кўп бўлади (1,4-1,6%). Иккинчи ўримни эса октябрь ойидан кечиктирмаслик зарур. Маврак хом-ашёси 10-20 см ёйилган ҳолда салқин жойда қурилади. Таркибидаги эфир мойини йўқотмаслик учун сунъий усулда қуритиш 60⁰С дан ошмаган ҳароратда амалга оширилади. Қуритилган барглари майдаланиб 25-50 кг ли қопларга солинади ва 1,5 йил давомида қурук жойда сақланади.

XI ДФ талабларига кўра доривор маврак маҳсулоти бутун барглари ва 1 мм дан 35 мм атрофидаги барг бўлакчалари, унча кўп бўлмаган ўсимлик бошқа қисмларидан иборат бўлиши шарт. Маҳсулот таркибида эфир мойининг миқдори 0,8% дан кам бўлмаслиги, умумий кул 12% дан, қорайиб, қўнғир тусдаги барглари 5% дан, мавракнинг бошқа қисмлари 13% дан, органик аралашмалар 3% дан, минерал аралашма 0,5% дан ошмаслиги керак.

Тибиётда қўлланилиши ва кимёвий таркиби. Мавракнинг барглари дориворлик хусусиятига эга.

Доривор мавракнинг баргларидан тайёрланган дамлама дезинфекцияловчи ва шамоллашга қарши восита сифатида стоматит бўлганда, оғиз бўшлиғи ва томоқни чайишда, юқори нафас олиш йўллари тозалашда қўлланилади. Мавракнинг гуллари антибактериал прерарат – сальвин олиш учун ишлатилади. Халқ табобатида маврак барглари ошқозон яраси, колит, жигар, буйрак хасталиклари даволашда, бронхитда балғам кўчирувчи, юмшатовчи ва сийдик ҳайдовчи восита сифатида ишлатилади.

Маврак баргларидан тайёрланган дамлама. 10 г (2 ош қошиқ миқдорида) маҳсулот олиниб сирланган идишга солинади, устидан 200 мл (1 стакан) қайнаган иссиқ сув қуйиб сув ҳаммомида 15 дақиқа давомида қиздирилади. Сўнгра 45 дақиқа совутилади, докадан ўтказилади, қолган масса сиқилади. Олинган дамламанинг устига дастлабки ҳажми 200 мл бўлгунча қайнаган сув солинади. Дамламани салқин жойда 2 кун мобайнида сақлаш мумкин.

Дамламани терининг шамоллаш касалликларида, тери жароҳатланганида, куйганида ва совуқ урганида ишлатилади; бунда дамламага ботирилган докали сальфеткалардан фойдаланилади, шунингдек, доривор маврак дамламаси билан ванна қилиш ҳам мумкин.

Ўсимликнинг барча органларида эфир мойи (баргларида 0,5-2,5%) мавжуд. Ундан ташқари барглари таркибида алкалоидлар, ошловчи моддалар, уваол, парадифенол ва В гуруҳи витаминлари бўлади. Илдизида юқори фаол табиий антиоксидант ва дитерпеноидли хинонлар, гулларида эса – сальвин ва унинг монометил эфир моддаси бўлади.

Тавсиялар. Катта плантацияларда етиштириш мумкин. Плантацияларга кўчатидан ўтказилади. Плантацияларни ўрмон тоғолди адирликларидаги суғориладиган майдонларда, асосий қишлоқ хўжалиги экиладиган суғориладиган майдонларда ташкил этиш мумкин.

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ПАВЛОВНИЯ ЎСИМЛИГИДАН САМАРАЛИ ФОЙДАЛАНИШ: БИОЭКОЛОГИК ТАҲЛИЛ ВА ИҚТИСОДИЙ БАҲОЛАШ

***Аннотация:** Ушбу мақолада шаҳримизда, Павловния ўсимлигининг биоэкологик, иқтисодий хусусиятлари, ҳосилдорлигини ошириш ва улардан унумли фойдаланиш билан боғлиқ масалалар билан таништириш.*

***Калит сўзлар:** Павловния ўсимлиги, етиштириш, биология, уруғ, дарахт, ботаник оиласи.*

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EFFECTIVE UTILIZATION OF PAULOWNIA PLANTS: BIOECOLOGICAL ANALYSIS AND ECONOMIC ASSESSMENT

***Abstract:** In this article in our city we will introduce you to the issues related to the bioecological, economic properties of the Paulownia plant, increasing yields and their effective use.*

***Key words:** Pavlovia plant, cultivation, biology, seed, tree, botanical family.*

Павловния ўсимлигини лаборатория шароитида уруғ унвчанлигини тажриба асосида ўргандик. Танланган уруғлар 2020 йил 15-февраль куни, соат 15:00 да оддий сувга ивитиб қўйилди. Бир сутка турган уруғларни Петри ликопчасида 3 дона намланган қоғоз устига 100 донадан иборат бўлган уруғлари экилди кейин 10 томчи сув томизиб, 22°C ли термостатга жойлаштирилди ва ҳар куни назорат қилиб борилди.



А

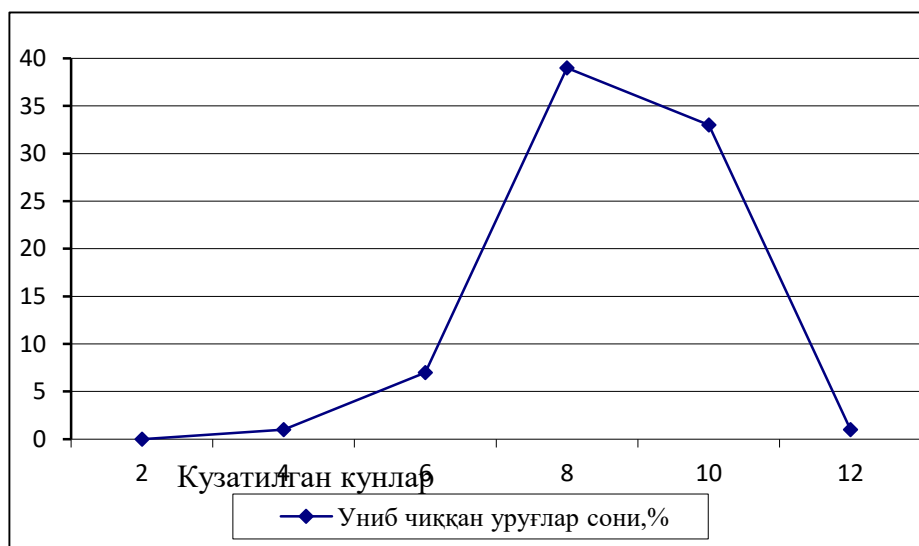


Б



1-Расм. Петри ликопчасига павловнияни экилган уруғлари (А), термостатда жойлаштирилган уруғлар (Б), уруғнинг униб чиқиши ва ўлчами (В).

Кузатиш жараёнида барча уруғлар бир вақтда униб чиқмасдан кузатилди. Лаборатория шароитида уруғлар 4 кунда униб чиқишни бошлади. Уруғлар униб чиқишни бошлаган кунда 1%, максимал даражада униб чиқиш эса 8 кунда (29%) ҳамда 12 кундан сўнг уруғлар униб чиқиши камайди (1%). Шундай қилиб лаборатория шароитида жами 87 % уруғлар униб чиқди. Бу ҳолатларни кузатиш натижасини қуйидаги жадвал асосида кўриш мумкин:



2-расм. Павловния уруғларининг унувчанлиги, %

Тадқиқотларда Павлониянинг уруғ унувчанлигини ўрганиш хона шароитда ҳам олиб борилди. Хона шароити муҳитида Петри лycopчасида 3 дона намланган қоғоз устига 100 донадан Павловниянинг уруғлари экилди. Тадқиқотлар 3 хил муддатда март, апрель ва май ойларида ўтказилди



A



B

3-расм. Павловниянинг Петри лycopчасида экилган уруғлари (A) ва итермомет кўрсаткичи (B), (хона шароити).

Март ойида хона шароитида уруғлар 5 кунда униб чиқишни бошлади. Уруғлар униб чиқишни бошлаган кунда 2%, максимал даражада униб чиқиш эса 8 кунда (44%) ҳамда 10 кундан сўнг уруғлар униб чиқиши камайди (1%). Шундай қилиб хона шароитида жами 81 % уруғлар униб чиқди

Апрел ойида хона шароитида уруғлар 5 кунда униб чиқишни бошлади. Уруғлар униб чиқишни бошлаган кунда 3%, максимал даражада униб чиқиш эса 7 кунда (55%) ҳамда 10 кундан сўнг уруғлар униб чиқиши камайди (1%). Жами 88 % уруғларнинг униб чиқиши аниқланди.

Май ойида хона шароитида уруғлар 6 кунда униб чиқишни бошлади. Уруғлар униб чиқишни бошлаган кунда 1%, максимал даражада униб чиқиш эса 8 кунда (36%) ҳамда 11 кундан сўнг уруғлар униб чиқиши камайди (1%). Жами 83 % уруғларнинг униб чиқиши аниқланди.

Тегишли муддатларда уруғ унувчанлиги кўрсаткичи 81 %, 88% ва 83% ни ташкил этди.

Суғориладиган дала шароитида ҳам уруғларнинг униб чиқиш кўрсаткичлари нисбатан хона шароитидаги натижалардан анча паст бўлди. Тегишли муддатларда суғорилган тупроққа экилган уруғларнинг унувчанлиги кўрсаткичи мос тарзда 39% ни ташкил этди. Дала шароитида уруғ унувчанлигининг хона шароитига нисбатан пастлигини тупроқ-иқлимнинг таъсири билан изоҳлаш мумкин. Таъкидланганидек, сутка мобайнида ҳаво ва тупроқ ҳарорати кескин ўзгариб туради. Кундузи ўртача ҳаво ҳарорати 30-35⁰С бўлса, кечки пайтларда 12-18⁰С га етади. Бу эса уруғнинг униб чиқиши учун зарур ҳароратни ўз вақтида тўплашига ҳамда муртакнинг унишига ноқулайлик туғдиради.

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УСИЛЕНИЕ ПРОТИВОПЕДИКУЛЕЗНЫХ МЕРОПРИЯТИЙ В ДЕТСКИХ УЧРЕЖДЕНИЯХ

Аннотация: Педикулез, или вшивость, остается одной из самых распространенных паразитарных болезней в мире, несмотря на все достижения современной медицины. Для многих родителей обнаружение вшей у ребенка становится источником стресса и чувства стыда, хотя на самом деле это проблема строго медицинская и социально-гигиеническая, не имеющая отношения к благополучию семьи. Вши — это облигатные паразиты, которые с легкостью мигрируют от человека к человеку при тесном контакте, и детские коллективы являются для них идеальной средой для распространения. В Узбекистане, с его высокой рождаемостью и плотностью детского населения в дошкольных и школьных учреждениях, проблема педикулеза стоит особенно остро. Сезонные вспышки этого заболевания регистрируются ежегодно, создавая значительную нагрузку на медицинский персонал и вызывая беспокойство у родителей и педагогов. Данная статья призвана не просто осветить проблему, но и предложить пути ее решения через призму усиления профилактических и противоэпидемических мероприятий, опираясь как на международный опыт, так и на местную специфику.

Ключевые слова: Педикулез, вшивость, противопедикулезные мероприятия, детские учреждения, Узбекистан, лечение педикулеза у детей

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STRENGTHENING ANTI-PEDICULOSIS MEASURES IN CHILDREN'S INSTITUTIONS

Annotation: Pediculosis, or lice infestation, remains one of the most common parasitic diseases worldwide despite the significant achievements of modern medicine. For many parents, discovering lice in their child becomes a source of stress and shame, although in reality it is a purely medical and socio-hygienic issue that has no relation to the family's well-being. Lice are obligate parasites that easily migrate from person to person through close contact, and children's groups provide an ideal environment for their spread. In Uzbekistan, with its high birth rate and dense concentration of children in preschool and school

institutions, the problem of pediculosis is particularly acute. Seasonal outbreaks of this disease are recorded every year, creating a considerable burden on medical personnel and causing concern among parents and educators. This article aims not only to highlight the issue but also to propose solutions through the strengthening of preventive and anti-epidemic measures, relying on both international experience and local specifics.

Keywords: *Pediculosis, lice infestation, anti-pediculosis measures, children's institutions, Uzbekistan, treatment of pediculosis in children.*

Педикулез: невидимый враг детских коллективов. Педикулез — это паразитарное заболевание кожи и волос, вызываемое вшами. На человеке могут паразитировать три вида вшей: головная, платяная и лобковая. В детских коллективах абсолютно преобладает головной педикулез. Возбудитель — *Pediculus humanus capitis* — мелкое бескрылое насекомое, которое живет на волосистой части головы, питаясь кровью хозяина. Самка откладывает яйца (гниды), приклеивая их к стержню волоса, что делает их чрезвычайно устойчивыми к механическому удалению.

Симптомы заболевания хорошо известны каждому медицинскому работнику:

- Интенсивный зуд кожи головы, особенно в затылочной области и за ушами, вызванный реакцией на слюну паразита.

- Появление на коже следов расчесов, которые могут инфицироваться, приводя к пиодермии.

- Видимые невооруженным глазом взрослые особи и гниды на волосах. Гниды часто путают с перхотью, но в отличие от нее, они плотно прикреплены к волосу и не стряхиваются.

Последствия педикулеза выходят за рамки дискомфорта. Как отмечает известный российский паразитолог, профессор Владимир Сергеевич Тарасов: «Хронический педикулез, особенно в сочетании с неудовлетворительными социально-бытовыми условиями, может привести к выраженным нарушениям сна, невротическим состояниям у детей, а вторичная бактериальная инфекция, возникающая на месте расчесов, в редких случаях может осложниться лимфаденитом и даже системной инфекцией» [1].

В Узбекистане проблема педикулеза имеет выраженную сезонность — пик заболеваемости традиционно приходится на осенние месяцы, когда дети возвращаются с каникул в школы и детские сады. Высокая скученность в классах, тесные бытовые контакты, обмен личными вещами (шапками, расческами, заколками) создают идеальные условия для передачи паразитов. По данным Центра санитарно-эпидемиологического надзора Узбекистана, в структуре инфекционной и паразитарной заболеваемости среди детей школьного и дошкольного возраста педикулез стабильно занимает одно из лидирующих мест, наряду с кишечными инфекциями [2].

Эпидемиология, профилактика и контроль в детских учреждениях. Эпидемиологический процесс при педикулезе поддерживается

за счет источника возбудителя (зараженного человека) и механизма передачи (контактного и опосредованно-бытового). Инкубационный период от момента заражения до появления симптомов может составлять несколько недель, что затрудняет своевременное выявление и изоляцию первого случая.

Профилактика педикулеза в детских учреждениях Узбекистана регламентируется санитарными правилами и нормами (СанПиН) и включает:

1. Плановые осмотры. Медицинские сестры обязаны проводить ежемесячные выборочные осмотры и обязательные осмотры после каждой каникулы.

2. Ведомственный контроль. Администрация учреждения несет ответственность за обеспечение условий для проведения осмотров.

3. Санитарно-просветительская работа. Проведение бесед с родителями и детьми о личной гигиене.

Однако на практике эта система зачастую дает сбои. Осмотры носят формальный характер, проводятся нерегулярно или некачественно из-за высокой нагрузки на медперсонал. Родители не всегда информированы о проблеме адекватно, что приводит к попыткам скрыть случай педикулеза у ребенка из-за боязни стигматизации.

Эпидемиологический контроль при выявлении случая заболевания предполагает:

- Отстранение ребенка от посещения учреждения до полной санации.
- Проведение заключительной дезинфекции в классе/группе.
- Осмотр всех контактных лиц.

К сожалению, как констатирует эпидемиолог Наргиза Абдурахимовна Каримова в своем исследовании: «Существующая система реагирования часто является запоздалой. Ребенок, у которого при плановом осмотре выявлены гниды, мог быть заразным в течение нескольких недель, успев инфицировать значительную часть коллектива. Необходим переход от реактивной тактики к проактивной, с фокусом на массовую просветительскую работу и индивидуальную ответственность родителей» [3].

Международный опыт и пути совершенствования мер в Узбекистане

Многие зарубежные страны добились значительных успехов в борьбе с педикулезом, и их опыт может быть адаптирован для условий Узбекистана. Ключевое различие заключается в философии подхода: если в Узбекистане основной акцент делается на силовом методе — административном давлении и принудительных осмотрах, то в странах Европы и Северной Америки упор сделан на партнерство с родителями, образовательные программы и современные средства лечения.

Таблица - 1

Подходы к борьбе с педикулезом в детских учреждениях

Критерий	Традиционный подход (Узбекистан)	Современный международный подход (на примере Великобритании, США)
Основная стратегия	Реактивная: выявление и изоляция больных.	Проактивная: образование и профилактика.
Роль родителей	Пассивная, исполнительская.	Активная, партнерская.
Осмотры	Плановые, коллективные, часто формальные.	Выборочные, по показаниям, или делегированные родителям.
Информирование	Запугивание, указание на недостатки гигиены.	Просвещение, дестигматизация, предоставление четких алгоритмов действий.
Средства лечения	Преимущественно инсектициды (чемеричная вода и др.).	Широкий арсенал: физические методы (силиконовые масла), современные инсектициды, электрические гребни.

Одним из наиболее эффективных зарубежных методов является политика «Не пропусти ни одной гниды» («No-Nit Policy»), которая, однако, в последнее время пересматривается. Изначально она требовала удаления всех гнид перед возвращением в школу, что приводило к длительным пропускам занятий. Сегодня, как указывает американский педиатр Дэвид Уильям Джонсон, «современные рекомендации Американской академии педиатрии смещаются в сторону того, что ребенок, прошедший обработку педикулицидным средством, может возвращаться в школу сразу после лечения, даже если на волосах остались мертвые или нежизнеспособные гниды, так как риск передачи при этом минимален. Это снижает социальную напряженность и нагрузку на родителей» [4].

На основе анализа международного опыта можно предложить следующие конкретные шаги по усилению противопедикулезных мероприятий в Узбекистане:

1. Реформа образовательного компонента. Разработка красочных брошюр, мультипликационных роликов на узбекском и русском языках, которые в доступной форме объясняли бы детям и родителям, что вши — это не стыдно, а лечится. Необходимо донести мысль, что заразиться может любой ребенок, независимо от чистоты дома.

2. Внедрение современных средств диагностики. Использование специальных гребней с частыми металлическими зубцами, которые в разы эффективнее выявляют вшей и гнид, чем визуальный осмотр.

3. Расширение арсенала средств лечения. Внедрение в аптечную сеть и рекомендации для родителей не только традиционных, но и современных средств на основе диметикона и циклометикона (силиконовых масел), которые физически блокируют дыхание вшей и не вызывают резистентности.

4. Создание четких и гуманных протоколов. Разработка единого национального протокола, который бы четко регламентировал действия медперсонала, педагогов и родителей, минимизируя субъективизм и стресс для ребенка.

Таблица – 2

Эффективность различных педикулицидных средств

Средство / Метод	Механизм действия	Преимущества	Недостатки	Применимость в условиях Узбекистана
Перметрин (инсектицид)	Нейротоксичен для вшей.	Широкая доступность, низкая стоимость.	Растущая резистентность паразитов, возможность аллергических реакций.	Высокая, но требуется мониторинг эффективности.
Диметикон (силиконовое масло)	Физически обволакивает вошь, блокируя дыхание.	Отсутствие резистентности, безопасность.	Более высокая стоимость, необходимость точного соблюдения инструкции.	Рекомендуется для широкого внедрения как средство первого выбора.
Механическое вычесывание	Удаление вшей и гнид специальным гребнем.	Абсолютная безопасность, нетоксичность	Трудоемкость, требует много времени и терпения.	Высокая, как основной или вспомогательный метод.
Чемеричная вода (растительный инсектицид)	Нейротоксическое действие.	Низкая цена, натуральное происхождение.	Высокая токсичность при попадании внутрь, недостаточная доказательная база.	Требует осторожности и может быть заменена на более безопасные аналоги.

Заключение. Проблема педикулеза в детских учреждениях Узбекистана не является нерешаемой. Однако для ее эффективного контроля необходим стратегический пересмотр существующего подхода. Усиление противопедикулезных мероприятий должно заключаться не в ужесточении санкций, а в построении современной, гуманной и научно обоснованной

системы, основанной на трех китах: партнерстве, просвещении и профилактике.

Переход от карательной медицины к медицине партнерской, где родитель является не объектом для упреков, а союзником врача и педагога, — это ключевое условие успеха. Инвестиции в санитарное просвещение, внедрение современных безопасных средств лечения и диагностики, а также дестигматизация самого заболевания позволят разорвать порочный круг ежегодных осенних вспышек. Как метко заметил один из зарубежных экспертов в области общественного здравоохранения: «Борьба со вшами — это марафон, а не спринт. Побеждает в ней не тот, кто сильнее наказывает, а тот, кто лучше учит и вооружает знаниями и средствами своих граждан» [5]. Именно по этому пути и должно двигаться здравоохранение Узбекистана в решении, казалось бы, такой малой, но столь значимой для здоровья миллионов детей проблемы.

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ЭПИДЕМИОЛОГИЯ, ПРОФИЛАКТИКА И ЭПИДЕМИЧЕСКИЙ КОНТРОЛЬ СТРЕПТОКОККОВЫХ ИНФЕКЦИЙ

Аннотация. Стрептококковые инфекции, вызываемые *Streptococcus pyogenes* (СГА) и *Streptococcus agalactiae* (СГБ), представляют серьезную проблему для глобального здравоохранения. В статье анализируются современные стратегии эпидемиологического контроля, позволившие развитым странам добиться значительного снижения заболеваемости ревматической лихорадкой и неонатальным сепсисом. Особое внимание уделяется эпидемиологической ситуации в Узбекистане и других странах Центральной Азии, где бремя этих инфекций остается высоким из-за недостаточности диагностики, стандартизированных протоколов и системного надзора. В качестве решения предлагается комплекс мер, включающий разработку национальных рекомендаций, усиление лабораторной базы, внедрение скрининга беременных на СГБ и образовательные программы для медработников и населения, что позволит снизить заболеваемость и предотвратить отдаленные осложнения.

Ключевые слова: стрептококковая инфекция, эпидемиология, профилактика, эпидемический контроль, общественное здравоохранение, Узбекистан, ревматическая лихорадка, стрептококк группы В.

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EPIDEMIOLOGY, PREVENTION, AND EPIDEMIC CONTROL OF STREPTOCOCCAL INFECTIONS

Abstract. Streptococcal infections caused by *Streptococcus pyogenes* (Group A *Streptococcus*, GAS) and *Streptococcus agalactiae* (Group B *Streptococcus*, GBS) represent a serious global public health problem. This article analyzes modern epidemiological control strategies that have enabled developed countries to achieve a significant reduction in the incidence of rheumatic fever and neonatal sepsis. Special attention is given to the epidemiological situation in Uzbekistan and other Central Asian countries, where the burden of these infections remains high due to insufficient diagnostics, lack of standardized protocols, and systemic surveillance. As a solution, a comprehensive set of measures is proposed, including the development of national guidelines, strengthening of laboratory infrastructure,

implementation of GBS screening among pregnant women, and educational programs for healthcare workers and the public, which will help reduce morbidity and prevent long-term complications.

Keywords: *streptococcal infection, epidemiology, prevention, epidemic control, public health, Uzbekistan, rheumatic fever, Group B streptococcus.*

Введение. Стрептококки-грамположительные бактерии, колонизирующие слизистые оболочки человека и вызывающие заболевания от ангины до тяжёлых состояний, таких как некротизирующий фасциит и септический шок. Некоторые серогруппы вызывают аутоиммунные реакции (ревматическая лихорадка, гломерулонефрит), что делает их значимыми патогенами [1]. Ранее они были ведущей причиной детской смертности и инвалидности, и несмотря на снижение заболеваемости с появлением антибиотиков, остаются важным фактором заболеваемости.

Бета-гемолитические стрептококки, в частности *Streptococcus pyogenes* (СГА) и *Streptococcus agalactiae* (СГБ), обладают высокой эпидемиологической значимостью. СГА — исключительно человеческий патоген, передающийся воздушно-капельным и контактным путями, вызывающий фарингит, скарлатину, импетиго, рожу и инвазивные инфекции [2]. Тяжёлым осложнением нелеченой СГА-инфекции является острая ревматическая лихорадка (ОРЛ), которая может прогрессировать в хроническую ревматическую болезнь сердца (ХРБС).

СГБ входит в нормальную микрофлору желудочно-кишечного и урогенитального трактов у 15–30 % беременных женщин, но является ведущей причиной неонатального сепсиса, менингита и пневмонии у новорождённых. Инфекция передаётся интра- или постнатально при прохождении ребёнка через колонизированные родовые пути матери [4].

Цель данной статьи — проанализировать современные подходы к эпидемиологии, профилактике и контролю стрептококковых инфекций, оценить успехи развитых стран и осветить текущую ситуацию в Центральной Азии, сфокусировавшись на Узбекистане, а также предложить пути улучшения ситуации в регионе.

Точную диагностику: Широкое использование экспресс-тестов на определение СГА-антигена и культурального исследования мазков из зева позволяет дифференцировать стрептококковый фарингит от вирусного и избежать необоснованного назначения антибиотиков [6].

1. Адекватное лечение: Стандартом лечения является 10-дневный курс пенициллина или амоксициллина, что обеспечивает полную эрадикацию возбудителя.

2. Вторичную профилактику: Для пациентов с установленным диагнозом ОРЛ или ХРБС обязательным является длительная (иногда пожизненная) бициллино профилактика бензатин-бензилпенициллином, которая предотвращает рецидивы и прогрессирование поражения сердца [7].

Контроль колонизации СГБ у новорождённых осуществляется посредством скрининговых программ у беременных женщин на сроке 35–37 недель беременности, включающих взятие вагинально-ректального мазка. Данная методика рекомендована Центрами по контролю и профилактике заболеваний США (CDC) и аналогичными международными организациями в качестве эффективной меры профилактики неонатального сепсиса [9].

Женщинам с положительным скринингом или факторами риска (СГБ-инфекция у предыдущего ребёнка, бактериурия, преждевременные роды) при родах проводят интрапаритальную антибиотикопрофилактику пенициллином или ампициллином. Эта мера снижает заболеваемость ранним неонатальным СГБ-сепсисом более чем на 80 % [10]. Ведутся разработки вакцин для эффективной защиты матери и ребёнка от СГБ-инфекции.

Ключевым элементом контроля является эффективная система эпидемиологического надзора. В развитых странах функционируют национальные программы мониторинга инвазивных стрептококковых инфекций (СГА и СГБ), что обеспечивает своевременное выявление вспышек, отслеживание вирулентных штаммов и оценку эффективности профилактических мер [11].

Таблица 1.

Сравнительная эффективность ключевых стратегий профилактики стрептококковых инфекций в развитых странах

Стратегия	Целевая инфекция	Метод	Ожидаемое снижение заболеваемости	Ссылка
Диагностика и лечение СГА-фарингита	Острая ревматическая лихорадка	10-дневный курс пенициллина при подтвержденном фарингите	До 80%	[5, 6]
Вторичная профилактика Бензатин-пенициллином	Рецидивы ОРЛ, прогрессирование ХРБС	Регулярные инъекции каждые 3-4 недели	>70%	[7]
Скрининг на СГБ и ИАП	Ранний неонатальный СГБ-сепсис	Вагинально-ректальный мазок на 35-37 нед. + антибиотики в родах	80-85%	[9, 10]

Эпидемиология стрептококковых инфекций остаётся серьёзной проблемой общественного здравоохранения, особенно в регионах с ограниченными ресурсами Азии, Африки и Океании.

Глобально, по данным ВОЗ, ежегодно регистрируется около 18,1 млн случаев инвазивной инфекции *Streptococcus pyogenes* (СГА), из которых 1,78 млн завершаются летально [12]. Основная нагрузка связана с острым ревматическим лихорадочным синдромом (ОРЛ) и хронической ревматической болезнью сердца (ХРБС), от которой страдают свыше 33 млн человек, и ежегодно умирает около 275 тыс. пациентов [3].

Для *Streptococcus agalactiae* (СГБ) ежегодно регистрируется около 205 тыс. случаев неонатального сепсиса, с 90 тыс. смертельных исходов и высоким риском неврологических осложнений у выживших [13]. Большинство случаев приходится на страны с низким и средним уровнем дохода, где скрининг и интрапарцентальная антибиотикопрофилактика (ИАП) не внедрены широко.

Эпидемиологическая ситуация со стрептококковыми инфекциями в странах Центральной Азии, включая Узбекистан, остаётся недостаточно изученной из-за отсутствия централизованного надзора и ограниченных возможностей лабораторной диагностики, что ведёт к недооценке истинного бремени заболеваний.

Данные локальных исследований подтверждают, что острый ревматический лихорадочный синдром (ОРЛ) и хроническая ревматическая болезнь сердца (ХРБС) сохраняют высокую распространённость в Узбекистане, особенно среди детей с кардиологической патологией. Основными факторами риска являются поздняя диагностика стрептококкового фарингита, отсутствие системной вторичной профилактики, высокая плотность населения и ограниченный доступ к первичной медико-санитарной помощи в сельской местности [14].

Скрининг беременных на СГБ не включён в национальные протоколы, а диагностика неонатального сепсиса часто проводится без этиологического подтверждения, что затрудняет оценку вклада СГБ-инфекции. Учитывая демографические особенности и факторы риска, уровень заболеваемости и смертности от неонатального СГБ-сепсиса в регионе остаётся значительным

Основные вызовы здравоохранения Узбекистана включают:

- недостаточную диагностику из-за отсутствия доступных экспресс-тестов на СГА и культуральных методов для выделения СГБ;
- отсутствие стандартизированных национальных протоколов по ведению стрептококкового фарингита, профилактике ОРЛ и скринингу СГБ;
- низкую осведомлённость врачей первичного звена о современных профилактических подходах;
- проблемы с обеспечением бензатин-пенициллина для вторичной профилактики ОРЛ и антибиотиков для интрапарцентальной профилактики в родильных учреждениях.

Таблица 2.

Ключевые пробелы и предлагаемые меры для улучшения контроля стрептококковых инфекций в Узбекистане

Пробелы / Вызовы	Предлагаемые меры	Ожидаемый результат
Отсутствие национального эпиднадзора	Создание пилотной программы мониторинга ОРЛ и инвазивных СГА/СГБ инфекций на базе республиканских центров	Получение репрезентативных данных для обоснования политики здравоохранения
Недостаточная диагностика СГА	Внедрение экспресс-тестов в поликлиниках и обучение врачей правилам их использования.	Снижение числа необоснованных назначений антибиотиков и повышение

		выявляемости стрептококкового фарингита.
Отсутствие скрининга на СГБ	Разработка и валидация алгоритма скрининга на СГБ с учетом ресурсных возможностей (например, риск-ориентированный подход).	Снижение заболеваемости и смертности от раннего неонатального сепсиса
Нехватка стандартизированных протоколов	Разработка и утверждение национальных клинических руководств по диагностике и лечению стрептококковых инфекций	Унификация подхода к лечению и профилактике по всей стране.
Низкая осведомленность	Проведение образовательных семинаров для медработников и информационных кампаний для населения о важности лечения ангины.	Улучшение приверженности лечению и обращаемости за помощью.

Заключение. Стрептококковые инфекции остаются значимой предотвратимой причиной заболеваемости и смертности. Опыт развитых стран показывает, что комплексный подход с точной диагностикой, рациональной антибиотикотерапией, вторичной профилактикой и надёжным эпидемиологическим надзором обеспечивает успешный контроль инфекций. Для Узбекистана и региона Центральной Азии важным является признание этих инфекций приоритетом здравоохранения.

Ключевыми мерами являются укрепление первичного звена, разработка адаптированных клинических рекомендаций, обеспечение доступности диагностических тестов и лекарств, а также постоянное обучение медработников. Инвестиции в профилактику ОРЛ и неонатального сепсиса не только сохраняют жизни и предотвратят инвалидность, но и снизят нагрузку на кардиологические и педиатрические службы.

Международное сотрудничество и поддержка организаций, таких как ВОЗ, ускорят этот процесс. Борьба со стрептококковыми инфекциями требует политической воли, научного подхода и гуманистического видения здоровья будущих поколений.

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ВОЗДЕЙСТВИЕ МЕТАСИЛИКАТА НАТРИЯ НА ПЕНООБРАЗОВАНИЕ И КИСЛОТНО-ОСНОВНЫЕ СВОЙСТВА СИНТЕТИЧЕСКИХ МОЮЩИХ СРЕДСТВ

***Аннотация.** В данной статье исследуется влияние метасиликата натрия на пенообразование и кислотно-основные свойства синтетических моющих средств. Рассматривается его роль как функциональной добавки, обеспечивающей стабилизацию щелочного pH, повышение эффективности действия поверхностно-активных веществ и регулирование устойчивости пены. Приводятся результаты экспериментальных данных, показывающие, что увеличение концентрации метасиликата натрия в рецептуре приводит к изменению скорости падения высоты пены, а также влияет на моющую способность и степень диспергирования загрязнений. Показаны закономерности его взаимодействия с фосфатами и ПАВ различной природы, определяющие физико-химические характеристики моющих композиций. Полученные результаты подтверждают перспективность использования метасиликата натрия для разработки эффективных и экономически обоснованных синтетических моющих средств.*

***Ключевые слова.** метасиликат натрия, синтетические моющие средства, пенообразование, pH раствора, поверхностно-активные вещества, моющая способность, стабилизация щелочной среды, реологические свойства, функциональные добавки, диспергирование загрязнений*

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EFFECT OF SODIUM METASILICT ON FOAMING AND ACID-BASE PROPERTIES OF SYNTHETIC DETERGENTS

Abstract. *This article examines the effect of sodium metasilicate on the foaming and acid-base properties of synthetic detergents. Its role as a functional additive that stabilizes alkaline pH, increases the effectiveness of surfactants, and regulates foam stability is discussed. Experimental data are presented demonstrating that increasing the concentration of sodium metasilicate in a formulation changes the rate of foam height decline and also affects cleaning performance and the degree of soil dispersion. The interaction patterns of sodium metasilicate with phosphates and various surfactants, which determine the physicochemical characteristics of detergent compositions, are demonstrated. The obtained results confirm the potential of using sodium metasilicate for the development of effective and cost-effective synthetic detergents.*

Keywords: *sodium metasilicate, synthetic detergents, foaming, solution pH, surfactants, cleaning performance, alkaline environment stabilization, rheological properties, functional additives, soil dispersion*

Введение. Синтетические моющие средства являются сложными многофункциональными композициями, в составе которых поверхностно-активные вещества, комплексообразователи, щелочные компоненты и другие добавки обеспечивают требуемый уровень очистки при различных условиях эксплуатации. В современных условиях особую значимость имеет повышение эффективности моющих средств при одновременном снижении их негативного влияния на окружающую среду и оптимизации производственных затрат. Это требует глубокого изучения влияния каждого компонента рецептуры на физико-химические и эксплуатационные свойства моющего состава. Одним из таких важных функциональных компонентов

является метасиликат натрия, применяемый как регулятор щелочности и стабилизатор свойств СМС.

Метасиликат натрия представляет собой высокощелочную соль кремниевой кислоты, обладающую выраженными буферными, защитными и диспергирующими характеристиками. Он способен эффективно регулировать кислотно-основное равновесие растворов моющих средств, поддерживая рН в щелочном диапазоне, который необходим для процессов омыления жиров, денатурации белковых загрязнений и активации анионных ПАВ. Щелочная реакция раствора также способствует разрушению и удалению частиц загрязнений, особенно органического происхождения. Благодаря высокой буферной способности метасиликат натрия предотвращает резкие колебания рН при разбавлении или взаимодействии с загрязнением.

Еще одним важным свойством метасиликата натрия является его способность усиливать и стабилизировать пенообразование. Пена является индикатором и участником процесса очистки, так как обеспечивает равномерное распределение раствора по поверхности ткани и участвует в механическом отделении загрязнений. Однако влияние метасиликата натрия на пенообразование неоднозначно и зависит от его концентрации: умеренные количества способствуют формированию устойчивой пены, в то время как избыток может вызывать обратный эффект и снижать пенообразующую способность из-за усиления коагуляции пузырьков.

Метасиликат натрия также взаимодействует с поверхностно-активными веществами и фосфатами, изменяя их эффективность в зависимости от условий системы. Взаимодействие с фосфатами может приводить к частичному связыванию аммония и снижению рН, что необходимо учитывать при создании рецептур сложных многокомпонентных средств. В условиях отсутствия фосфатов или при их низком содержании метасиликат натрия выступает как альтернативный стабилизатор и структурообразователь моющих растворов.

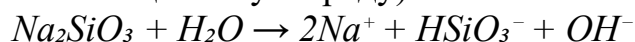
Значимым фактором является и его антикоррозионное действие: метасиликат натрия предотвращает разрушение металлических поверхностей за счет образования защитного кремниевого слоя. Это качество важно для бытовой техники, особенно в составе стиральных средств для автоматических машин.

Таким образом, изучение влияния метасиликата натрия на свойства СМС является важной задачей для создания конкурентоспособных моющих средств нового поколения. Учет концентрационных эффектов, взаимодействия с другими компонентами рецептуры и особенностей физико-химического поведения этого вещества позволяет оптимизировать состав СМС, повысить их эффективность, обеспечить стабильность и безопасность применения. Настоящая работа направлена на исследование данных аспектов и установление закономерностей влияния метасиликата натрия на пенообразование и кислотно-основное состояние моющих композиций.

Основная часть. Экспериментальные исследования влияния метасиликата натрия на свойства синтетических моющих средств показали, что данный компонент определяющим образом влияет на механизмы пенообразования и регулирование кислотно-основного состояния растворов. При варьировании концентрации метасиликата натрия в пределах 0–3 мас.% наблюдались значительные изменения как высоты пены, так и устойчивости пенных структур, а также динамики pH в зависимости от содержания компонента и концентрации раствора.

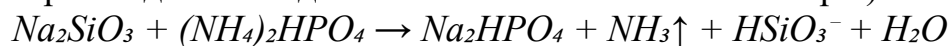
Пенообразование является важнейшей характеристикой моющих средств, выступающей индикатором активности поверхностно-активных веществ и обеспечивающей механическое отделение загрязнений от обрабатываемой поверхности. Полученные данные показывают, что при увеличении содержания метасиликата натрия от 0 до 3% начальная высота пены снижается с 35,3 мм до 21,9 мм. Такие изменения связаны с усилением коагуляции пузырьков при повышении щелочности и ионной силы раствора. При этом снижение высоты пены сопровождается ростом скорости ее разрушения в начальный период, что также отражает нестабильность пенной структуры при высоком содержании щелочного компонента.

Диссоциация метасиликата натрия в водном растворе (обеспечивает щелочную среду):



Важное влияние на результат оказывает концентрация самого моющего раствора. При увеличении концентрации СМС от 1 до 20% pH растворов при различных уровнях добавленного метасиликата натрия изменяется по криволинейной зависимости, проходя через минимум. Это объясняется тем, что взаимодействие метасиликата натрия с другими компонентами рецептуры, в частности фосфатами аммония, сопровождается выделением аммиака и подкислением системы. При высоких концентрациях растворов буферная способность метасиликата натрия проявляется более значительно, что обеспечивает стабилизацию pH в диапазоне, необходимом для эффективного действия ПАВ.

Взаимодействие метасиликата натрия с фосфатами аммония (сопровождается выделением аммиака и снижением pH):



Моющая способность композиций также существенно зависит от содержания метасиликата натрия. В интервале концентраций 0–2% наблюдается снижение эффективности очистки с 94–98% до 63–67% в зависимости от температуры. Это связано с нарушением оптимального баланса между щелочностью и активностью поверхностно-активных веществ. Однако дальнейшее повышение содержания метасиликата натрия приводит к частичному восстановлению моющей способности, что указывает на сложный характер взаимодействия между структурой раствора, реологическими характеристиками и механизмами удаления загрязнений.

При рассмотрении влияния температуры установлено, что повышение температурного режима обработки повышает моющую способность на 4–6%, однако не компенсирует полностью негативные эффекты избытка метасиликата натрия. Наиболее выраженный положительный эффект наблюдается при умеренных концентрациях добавки в сочетании с оптимальным количеством фосфатов и анионных ПАВ.

Таким образом, метасиликат натрия оказывает многофакторное влияние на свойства СМС: регулирует pH, определяет структуру и устойчивость пены, а также участвует в активации и стабилизации функциональных компонентов композиции. Характер его воздействия зависит от концентрации, природы взаимодействующих добавок и условий процесса, что требует точного расчета и оптимизации рецептуры моющего средства для достижения максимальной эффективности.

Заключение. Анализ влияния метасиликата натрия на пенообразование и кислотно-основные свойства синтетических моющих средств показал, что данный компонент играет ключевую роль в регулировании эксплуатационных характеристик современных СМС. Его присутствие в рецептуре обеспечивает поддержание необходимого уровня щелочности, что является важнейшим фактором для эффективного удаления жировых и белковых загрязнений, а также для стабильной работы поверхностно-активных веществ. Высокая буферная способность метасиликата натрия позволяет минимизировать изменения pH в процессе стирки, независимо от условий, таких как температура, концентрация раствора или химический состав загрязнений.

Однако влияние метасиликата натрия на пенообразование имеет неоднозначный характер и определяется его концентрацией. Умеренные количества способствуют формированию устойчивой пены и равномерному распределению моющего раствора по обрабатываемой поверхности. Превышение оптимального содержания приводит к снижению высоты и стабильности пены, что может негативно отражаться на моющей способности. В связи с этим требуется точный подбор концентрации метасиликата натрия в зависимости от состава других компонентов рецептуры, включая ПАВ и фосфаты.

Дополнительным преимуществом метасиликата натрия является его способность защищать металлические поверхности от коррозии, что делает его особенно востребованным в рецептурах моющих средств для автоматических стиральных машин. В то же время необходимо учитывать возможные взаимодействия метасиликата натрия с солью аммония и другими компонентами, которые могут приводить к подкислению и частичной потере щелочной активности состава.

Таким образом, оптимизация содержания метасиликата натрия в составе СМС позволяет добиться гармоничного сочетания высоких показателей моющей способности, устойчивости пены и стабильного pH растворов. Полученные результаты подтверждают необходимость научно обоснованного подхода к проектированию рецептур, учитывающего как

физико-химические свойства компонентов, так и особенности условий применения. Дальнейшие исследования в этом направлении могут быть связаны с изучением синергетических эффектов между метасиликатом натрия и альтернативными щелочными регуляторами, а также оценкой экологических аспектов его применения при переходе к формулированию моющих средств нового поколения.

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ИЗМЕНЕНИЯ В ПЕЧЕНИ ПОД ВОЗДЕЙСТВИЕМ КАЛОРИЙНО-НАСЫЩЕННОГО РАЦИОНА: ЭКСПЕРИМЕНТАЛЬНОЕ МОДЕЛИРОВАНИЕ

***Аннотация.** В данной работе представлены результаты экспериментального исследования морфофункциональных изменений печени при воздействии калорийно-насыщенного рациона, обогащённого жирами и углеводами. Целью исследования было моделирование метаболических нарушений, аналогичных неалкогольной жировой болезни печени (НАЖБП), с последующим анализом структурных и функциональных изменений органа. В качестве модели использовались лабораторные животные, получавшие гиперкалорийную диету в течение установленного периода. Проведённые морфологические и биохимические исследования выявили признаки стеатоза, нарушения архитектоники печеночной ткани, воспалительные изменения и функциональные отклонения, подтверждаемые изменением показателей печёночных ферментов. Полученные данные позволяют глубже понять патогенез метаболически ассоциированных заболеваний печени и подтверждают значительное влияние питания на состояние гепатобилиарной системы.*

***Ключевые слова.** Метаболический синдром (МС), экспериментальная модель, высокожировая и высокоуглеводная диета, печень, гепатоциты, дистрофия.*

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CHANGES IN THE LIVER UNDER THE INFLUENCE OF A CALORIE-RICH DIET: EXPERIMENTAL MODELING

***Abstract.** This paper presents the results of an experimental study on the morphofunctional changes in the liver under the influence of a calorie-rich diet enriched with fats and carbohydrates. The aim of the study was to model metabolic disorders similar to Non-Alcoholic Fatty Liver Disease (NAFLD), followed by the analysis of structural and functional changes in the organ. Laboratory animals*

receiving a hypercaloric diet over an established period were used as the model. The conducted morphological and biochemical studies revealed signs of steatosis, disruption of liver tissue architecture, inflammatory changes, and functional deviations, confirmed by altered levels of liver enzymes. The obtained data allow for a deeper understanding of the pathogenesis of metabolically associated liver diseases and confirm the significant influence of nutrition on the state of the hepatobiliary system.

Keywords. *Metabolic Syndrome (MS), experimental model, high-fat and high-carbohydrate diet, liver, hepatocytes, dystrophy.*

Введение. В последние десятилетия наблюдается стремительный рост распространённости метаболических нарушений, включая ожирение, инсулинорезистентность и неалкогольную жировую болезнь печени (НАЖБП), что во многом связано с изменением пищевых привычек населения. Увеличение потребления калорийной пищи, богатой жирами и простыми углеводами, оказывает существенное влияние на функциональное состояние внутренних органов, особенно печени, как центрального органа обмена веществ.

Печень играет ключевую роль в метаболизме липидов, углеводов и белков, а также в детоксикации и хранении энергии. Нарушения в рационе питания приводят к развитию морфологических изменений в гепатоцитах, нарушению внутрипечёночной микроциркуляции и ухудшению функциональных показателей, что может способствовать прогрессированию таких патологий, как стеатоз, стеатогепатит и фиброз.

С целью более глубокого понимания механизмов развития патологических изменений печени под воздействием калорийно-насыщенного рациона, в настоящем исследовании была использована экспериментальная модель на лабораторных животных. Это позволяет в контролируемых условиях изучить динамику морфофункциональных изменений, что имеет важное значение для разработки эффективных профилактических и терапевтических подходов к лечению метаболических заболеваний печени.

Материалы и методы исследования

Экспериментальное исследование проводилось на базе [Навоинский инновационный университети/лабораторию], с соблюдением этических норм и стандартов работы с лабораторными животными, в соответствии с рекомендациями Европейской конвенции по защите позвоночных животных, используемых для экспериментальных и иных научных целей.

В исследовании использовано **30 половозрелых белых крыс-самцов линии Wistar**, массой 180–220 г. Животные были разделены на две группы:

Контрольная группа (n = 10) — получала стандартный лабораторный рацион;

Экспериментальная группа (n = 20) — в течение 8 недель получала гиперкалорийную диету, обогащённую жирами (до 45% калорийности рациона) и простыми углеводами (до 35%).

Животные содержались в стандартных условиях (температура 22–24°C, 12-часовой световой режим, свободный доступ к пище и воде).

По завершении экспериментального периода все животные были эвтаназированы с последующим забором биологического материала. Исследование включало:

Биохимический анализ крови: определение уровня АЛТ, АСТ, общего билирубина, холестерина, триглицеридов и глюкозы;

Макроскопическое и гистологическое исследование печени: проводилось окрашивание гистологических срезов гематоксилин-эозином и по Судану III для выявления стеатоза;

Морфометрический анализ: определялись параметры клеточного состава печени, наличие жировой дистрофии, воспалительных инфильтратов и других морфологических изменений.

Статистическая обработка данных осуществлялась с использованием программного обеспечения **Statistica 10.0** и **MS Excel**. Результаты считались статистически значимыми при $p < 0,05$.

Результаты исследования

В результате 8-недельного кормления лабораторных животных калорийно-насыщенным рационом в экспериментальной группе были выявлены выраженные морфофункциональные изменения печени по сравнению с контрольной группой.

Биохимические показатели

У животных экспериментальной группы зафиксировано статистически значимое повышение уровней:

- **аланинаминотрансферазы (АЛТ)** — в 2,1 раза выше, чем в контроле ($p < 0,05$),

- **аспартатаминотрансферазы (АСТ)** — в 1,8 раза выше ($p < 0,05$),

- **общего холестерина и триглицеридов** — в 1,5–2 раза выше ($p < 0,05$), а также **повышение уровня глюкозы крови**, что указывает на развитие инсулинорезистентности.

Эти данные свидетельствуют о нарушении функции печени и развитии метаболических нарушений.

Таблица 1.

Биохимические показатели крови у крыс контрольной и экспериментальной групп ($M \pm m$)

Показатель	Контрольная группа (n=10)	Экспериментальная группа (n=20)	p-значение
АЛТ (Ед/л)	42,3 ± 3,1	89,1 ± 5,7	<0,05
АСТ (Ед/л)	51,2 ± 4,5	93,7 ± 6,2	<0,05
Общий билирубин (мкмоль/л)	7,8 ± 0,6	12,4 ± 0,9	<0,05
Глюкоза (ммоль/л)	5,1 ± 0,3	7,6 ± 0,4	<0,05
Холестерин (ммоль/л)	2,9 ± 0,2	5,1 ± 0,3	<0,05
Триглицериды (ммоль/л)	1,1 ± 0,1	2,6 ± 0,2	<0,05

Примечание: p-значения получены при сравнении экспериментальной группы с контрольной. Значимые различия отмечены при $p < 0,05$.

Таблица 2.

Частота гистологических изменений печени у животных (в % от общего числа животных в группе)

Гистологические признаки	Контрольная группа (%)	Экспериментальная группа (%)
Жировая дистрофия	0	95
Баллонная дистрофия гепатоцитов	0	70
Воспалительные инфильтраты	10	85
Нарушение архитектоники печёночных долек	0	65

Таблица 3.

Морфометрические показатели печени

Показатель	Контрольная группа	Экспериментальная группа	p-значение
Кол-во гепатоцитов с липидными включениями (%)	$12,4 \pm 1,7$	$45,3 \pm 3,2$	$<0,01$
Ядерно-цитоплазматическое соотношение	$0,52 \pm 0,04$	$0,41 \pm 0,03$	$<0,05$
Плотность печёночных балок (ед./мм ²)	$86,7 \pm 4,1$	$64,5 \pm 3,8$	$<0,05$

2. Макроскопические изменения печени

При вскрытии у животных, получавших высококалорийную диету, печень была увеличена в размерах, имела тусклую капсулу, желтоватый оттенок и рыхлую консистенцию, что является характерным для жировой инфильтрации.

3. Гистологические изменения

Гистологическое исследование печени показало: выраженный мелко- и крупнокапельный стеатоз гепатоцитов, баллонную дистрофию, очаговые воспалительные инфильтраты, преимущественно из лимфоцитов, деструкцию печёночных балок и нарушение их архитектоники.

Окраска по Судану III выявила значительное накопление липидов в цитоплазме гепатоцитов.

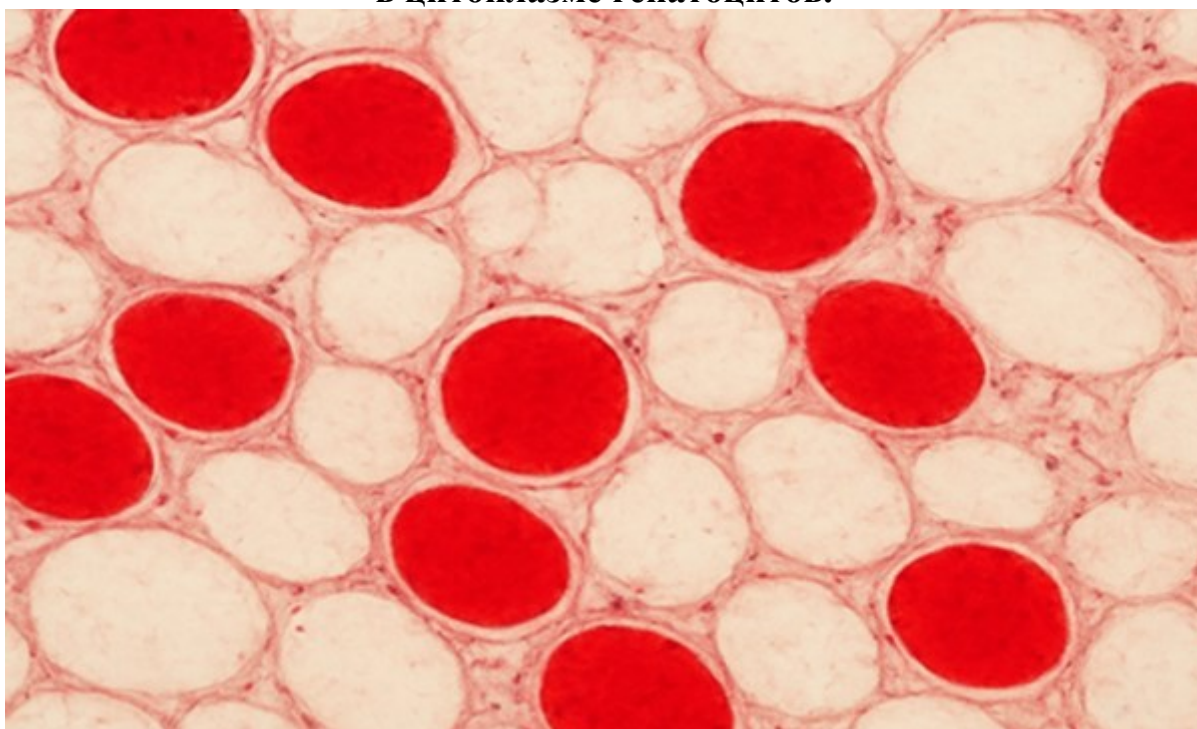


Рис.1.Жировая ткань, окрашенная Суданом III/IV.

На изображении видны крупные адипоциты, заполненные нейтральными жирами, которые окрашены в **ярко-красный** цвет. Между клетками проходят тонкие прослойки соединительной ткани, окрашенные в светло-розовый оттенок. Фон препарата бледный, что подчёркивает интенсивное окрашивание липидных капель. Препарат выполнен на замороженных срезах, поскольку при стандартной парафиновой обработке липиды удаляются.

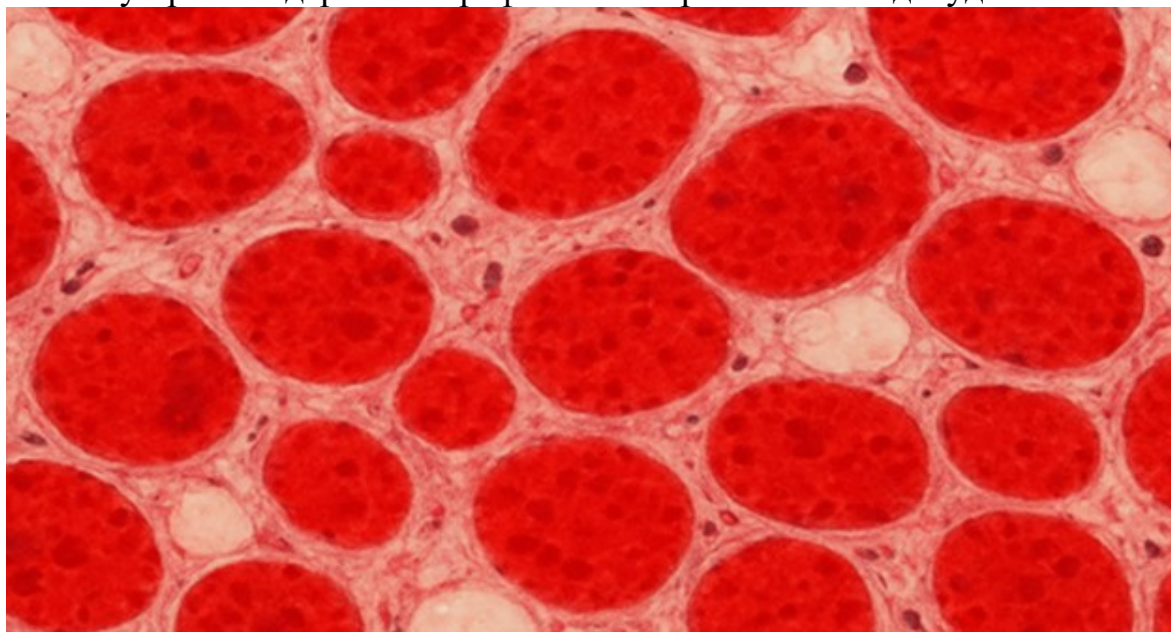


Рис.2. Печень, окрашенная Суданом III/IV.

На микропрепарате видны гепатоциты с выраженным накоплением нейтральных жиров, которые окрашены в ярко-красный цвет. Липидные капли распределены в цитоплазме клеток, различаются по размерам и форме. Между клетками просматриваются тонкие прослойки соединительной ткани, а тёмно-фиолетовые ядра гепатоцитов хорошо контрастируют с фоном. Препарат изготовлен на замороженных срезах, что позволяет сохранить липиды и окрасить их Суданом III/IV.

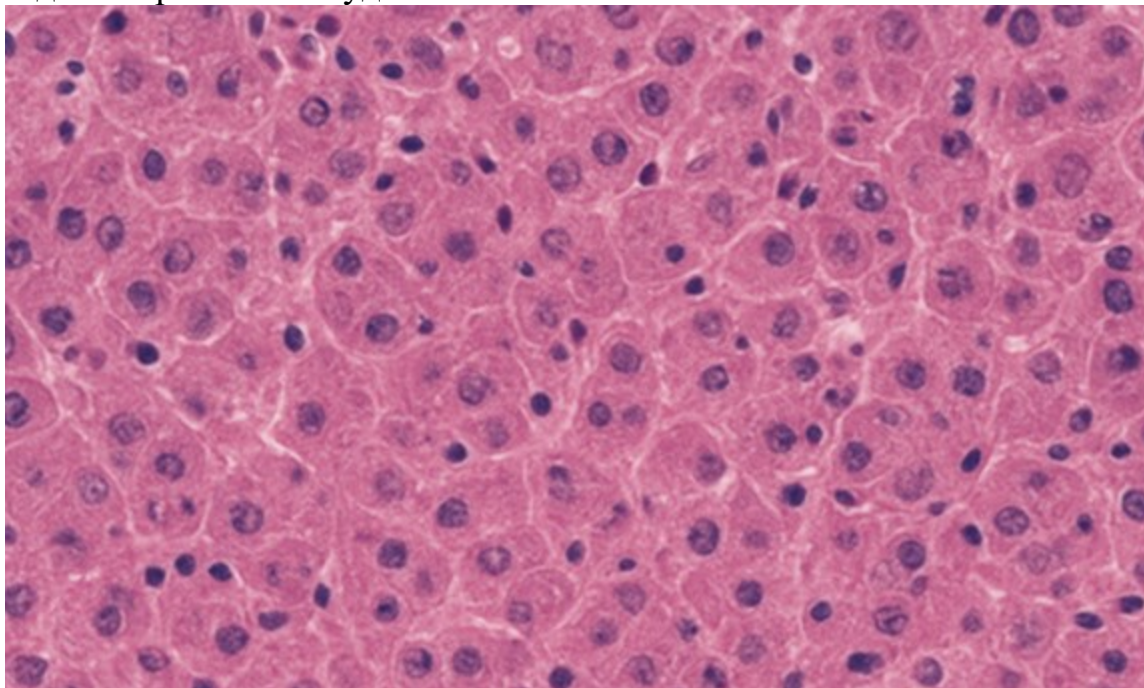


Рис. 3. Печень, окрашенная гематоксилином и эозином (Г-Э).

На микропрепарате видна типичная трабекулярная структура печени: гепатоциты образуют тяжи (трабекулы), между которыми располагаются синусоидные капилляры. Цитоплазма гепатоцитов окрашена в розовый цвет (эозин), а их ядра — в тёмно-фиолетовый или синий цвет (гематоксилин). Ядра округлые, хорошо различимы, часто с видимыми ядрышками. В синусоидах заметны уплощённые эндотелиальные клетки. Общая структура ткани чёткая, что характерно для нормальной печени.

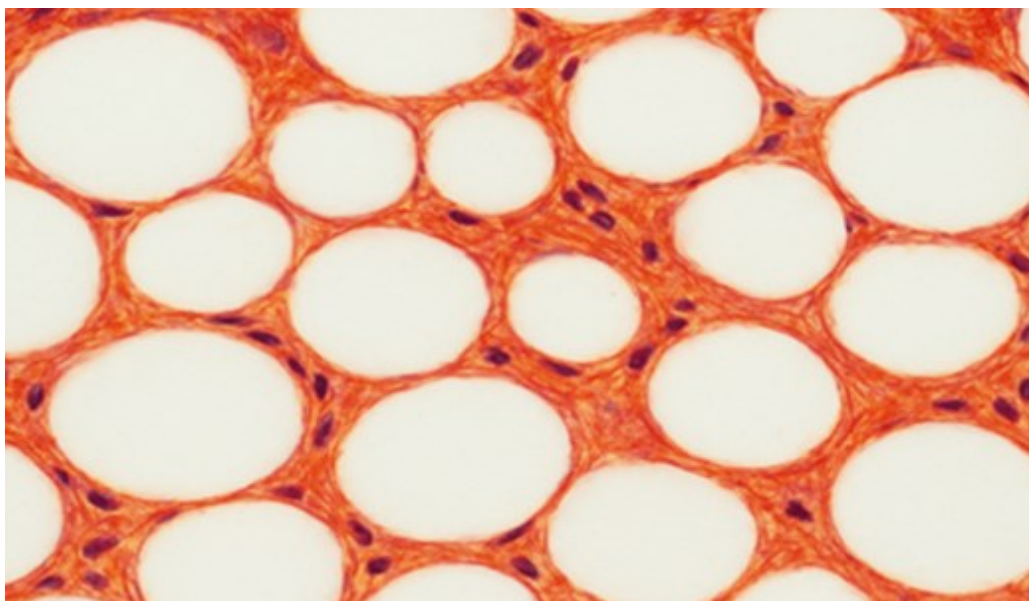


Рис. 4. Жировая ткань, окрашенная по ванн Гизону. На препарате видны крупные круглые адипоциты с **неокрашенными (белыми)** жировыми вакуолями. Межклеточное вещество содержит **коллагеновые волокна**, окрашенные в **красный цвет**, которые формируют тонкую сеть между клетками. **Цитоплазма и мышечные элементы** окрашены в **жёлтый**, а **ядра клеток** — в **тёмно-синий или фиолетовый цвет**. Такая окраска хорошо подчёркивает соединительнотканый каркас жировой ткани.

4. Морфометрические данные

Количество гепатоцитов, содержащих липидные включения, было в 3,5 раза выше в экспериментальной группе по сравнению с контролем ($p < 0,01$). Также наблюдалось увеличение ядерно-цитоплазматического соотношения и снижение плотности печёночных балок.

Обобщение. Полученные результаты подтверждают, что калорийно-насыщенная диета приводит к развитию выраженных морфологических и функциональных изменений печени, аналогичных неалкогольной жировой болезни печени у человека. Эти изменения сопровождаются дисфункцией гепатоцитов, метаболическими нарушениями и воспалительной реакцией, что подчёркивает значимость рациона в патогенезе заболеваний печени.

Заключение. В ходе экспериментального моделирования было показано, что длительное воздействие калорийно-насыщенного рациона приводит к выраженным морфологическим изменениям печени. Основным проявлением является накопление нейтральных жиров в гепатоцитах, что соответствует развитию жировой дистрофии (стеатоза).

Микроскопически отмечаются увеличение размеров гепатоцитов, появление в цитоплазме множества жировых вакуолей, смещение ядер к периферии клеток. В некоторых участках выявляются нарушения балочной структуры, расширение синусоидов и признаки начальных дистрофических процессов.

Таким образом, полученные результаты подтверждают, что избыточное поступление калорий способствует **патологическим изменениям в печени**, аналогичным ранним стадиям неалкогольной жировой болезни печени у человека.

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ЭКСПЕРИМЕНТАЛЬНАЯ МОДЕЛЬ ЖИРОВОЙ ДИСТРОФИИ ПЕЧЕНИ, ИНДУЦИРОВАННОЙ ВЫСОКОКАЛОРИЙНЫМ ПИТАНИЕМ

***Аннотация.** Целью исследования являлось изучение морфологических изменений печени при воздействии калорийно-избыточного рациона в экспериментальных условиях. Работа выполнена на лабораторных животных, получавших высококалорийный рацион в течение определённого периода. Проведён комплекс гистологических исследований с использованием стандартных и специальных методов окраски (гематоксилин-эозин, Судан III/IV, ванн Гизон).*

В результате выявлены характерные признаки жировой дистрофии печени: увеличение размеров гепатоцитов, наличие в цитоплазме множества липидных вакуолей, смещение ядер к периферии клеток, дезорганизация балочной структуры и умеренные сосудистые изменения. Полученные данные подтверждают возможность воспроизведения жировой дистрофии печени с помощью высококалорийного питания, что делает данную модель перспективной для изучения патогенеза неалкогольной жировой болезни печени и тестирования методов коррекции.

***Ключевые слова:** жировая дистрофия печени, высококалорийный рацион, экспериментальная модель, гистология, неалкогольная жировая болезнь печени.*

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EXPERIMENTAL MODEL OF FATTY LIVER DYSTROPHY INDUCED BY HIGH-CALORIE NUTRITION

***Abstract.** The aim of the study was to investigate the morphological changes in the liver under the influence of a calorie-excessive diet in experimental conditions. The work was performed on laboratory animals that received a high-calorie diet over a specified period. A complex of histological studies was conducted*

using standard and special staining methods (Hematoxylin and Eosin, Sudan III/IV, van Gieson).

As a result, characteristic signs of fatty liver dystrophy were revealed: increased hepatocyte size, presence of multiple lipid vacuoles in the cytoplasm, nuclear displacement to the cell periphery, disorganization of the beam structure, and moderate vascular changes.

The obtained data confirm the possibility of reproducing fatty liver dystrophy using high-calorie nutrition, making this model promising for studying the pathogenesis of non-alcoholic fatty liver disease (NAFLD) and testing correction methods.

Keywords. *Fatty liver dystrophy, high-calorie diet, experimental model, histology, non-alcoholic fatty liver disease.*

Введение. Жировая дистрофия печени (стеатоз) является одним из ранних и наиболее распространённых проявлений неалкогольной жировой болезни печени (НАЖБП), которая в настоящее время рассматривается как важная медико-социальная проблема во многих странах мира. По данным эпидемиологических исследований, частота НАЖБП среди взрослого населения достигает 25–30 % и продолжает расти на фоне увеличения распространённости ожирения и метаболического синдрома [Farrelletal., 2013; Tilg, Moschen, 2010].

Одним из ключевых факторов, способствующих развитию жировой дистрофии печени, является длительное потребление высококалорийной пищи, богатой жирами и легкоусвояемыми углеводами. Избыточное поступление калорий приводит к нарушению липидного и углеводного обмена, увеличению поступления свободных жирных кислот в печень и их внутриклеточному накоплению [Buettneretal., 2007; Begricheetal., 2013]. При этом развивается стеатозгепатоцитов, сопровождающийся митохондриальной дисфункцией, окислительным стрессом и воспалительными реакциями, что может служить пусковым механизмом прогрессирования НАЖБП до стеатогепатита и фиброза [Mussoetal., 2009].

Для изучения патогенеза жировой дистрофии печени широко применяются экспериментальные модели, основанные на кормлении лабораторных животных гиперкалорийным или высокожировым рационом. Такие модели позволяют воспроизводить ранние морфологические и метаболические изменения, характерные для НАЖБП у человека [Лапшина и Климова, 2021]. У животных наблюдаются увеличение массы тела, гипергликемия, гиперлипидемия, инсулинорезистентность и накопление жира в печени. Морфологически отмечается увеличение размеров гепатоцитов, появление жировых вакуолей в цитоплазме, смещение ядер к периферии клеток и дезорганизация балочной структуры [Чумаченко и Малышева, 2018].

Гистологическое исследование является ключевым методом оценки изменений печени в данных моделях. Применение стандартных и

специальных методов окраски (гематоксилин-эозин, Судан III/IV, ванГизон) позволяет визуализировать структурные нарушения, отложение липидов и изменения соединительнотканного каркаса [Федорова и Григорьев, 2020]. Эти методы дают возможность комплексно оценивать морфофункциональное состояние печени и динамику патологических процессов.

Материалы и методы исследования

Исследование выполнено на базе [указать учреждение / лабораторию]. В эксперименте использовались лабораторные крысы (или мыши) линии [указать], массой [указать диапазон массы] на момент начала опыта. Животные содержались в стандартных виварных условиях при свободном доступе к воде и пище, с соблюдением температурного режима и светового дня (12/12 ч). Все процедуры проводились в соответствии с этическими принципами обращения с животными и одобрены локальным этическим комитетом.

Для моделирования жировой дистрофии печени животные основной группы ($n =$ [число]) в течение [срок, например 8 недель] получали высококалорийный рацион, включавший [описать состав: повышенное содержание жиров, углеводов, калорийность]. Контрольная группа ($n =$ [число]) содержалась на стандартном лабораторном корме.

По окончании эксперимента животных выводили из опыта гуманным способом. Печень извлекали, фиксировали в 10 % нейтральном формалине, после чего проводили стандартную гистологическую обработку. Для получения срезов использовали микротом, толщина срезов составляла 4–5 мкм.

Срезы окрашивали следующими методами:

- Гематоксилин-эозин — для общей оценки гистоархитектоники ткани.
- Судан III/IV — для выявления липидных включений (на замороженных срезах).
- Ван Гизон — для оценки состояния соединительнотканного каркаса.

Микроскопическое исследование проводили с использованием светового микроскопа [модель], при увеличениях $\times 100$, $\times 200$ и $\times 400$. Документирование осуществляли с помощью цифровой камеры, подключённой к микроскопу.

Морфологические изменения печени оценивали по стандартным критериям: наличие и распределение жировых вакуолей, смещение ядер, изменения балочной структуры, состояние синусоидов и соединительной ткани. При необходимости применяли **морфометрический анализ**, включающий измерение площади жировых включений и процент поражённых гепатоцитов с использованием программы [название ПО].

Результаты и обсуждение

У животных, получавших калорийно-избыточный рацион, к концу эксперимента отмечалось увеличение массы тела в среднем на **25–30 %** по сравнению с контрольной группой. Визуально печень имела **увеличенные размеры**, более **светлый оттенок** и рыхлую консистенцию.

Гистологическое исследование выявило выраженные морфологические изменения в печени экспериментальных животных. На срезах, окрашенных гематоксилином и эозином, наблюдалось увеличение размеров гепатоцитов, наличие жировых вакуолей различной величины, преимущественно в периферических отделах цитоплазмы, со смещением ядер к периферии клеток. Нарушалась балочная структура печени, расширялись синусоиды, местами выявлялись признаки начальных дистрофических изменений.

При окрашивании Суданом III/IV липидные включения в гепатоцитах отчётливо визуализировались в виде ярко-красных капель, располагающихся диффузно и очагово. Ван Гизон выявил умеренное увеличение количества коллагеновых волокон в портальных трактах и перисинусоидальных зонах, что может указывать на начальные проявления фиброза.

Таблица 1.

Морфологические показатели печени у контрольных и опытных животных

Показатель	Контрольная группа (n = 10)	Высококалорийный рацион (n = 10)
Средняя масса печени, г	7,2 ± 0,5	9,4 ± 0,7 *
Наличие жировых вакуолей (%) гепатоцитов	3 ± 1	42 ± 5 *
Смещение ядер (%) гепатоцитов	1 ± 0,5	36 ± 4 *
Нарушение балочной структуры, % полей зрения	0	28 ± 3 *
Коллаген в портальных трактах (оценка, баллы)	1,0 ± 0,1	2,3 ± 0,2 *

* — различия статистически значимы по сравнению с контролем ($p < 0,05$).

Анализ полученных данных показывает, что высококалорийный рацион приводит к развитию типичных признаков жировой дистрофии печени, аналогичных ранним стадиям неалкогольной жировой болезни печени у человека. Накопление липидов в гепатоцитах сопровождается нарушением структуры ткани и активацией соединительнотканного компонента.

Биохимические и гематологические изменения крови

Помимо морфологических изменений печени, у животных опытной группы отмечались выраженные **метаболические сдвиги**, отражающие развитие жировой дистрофии и нарушения обмена веществ. Наиболее существенные различия наблюдались в показателях липидного и углеводного обмена, а также маркёрах цитолиза гепатоцитов.

Таблица 2.

Биохимические показатели крови у контрольных и опытных животных

Показатель	Контрольная группа (n = 10)	Высококалорийный рацион (n = 10)
Глюкоза, ммоль/л	5,1 ± 0,4	7,3 ± 0,5 *
Общий холестерин, ммоль/л	2,8 ± 0,3	4,6 ± 0,4 *
Триглицериды, ммоль/л	0,9 ± 0,1	2,1 ± 0,3 *
АЛТ (аланинаминотрансфераза), Ед/л	35 ± 5	78 ± 8 *
АСТ (аспартатаминотрансфераза), Ед/л	42 ± 6	85 ± 10 *
Общий белок, г/л	70 ± 3	68 ± 4
Гемоглобин, г/л	142 ± 5	140 ± 6
Лейкоциты, ×10 ⁹ /л	6,2 ± 0,8	7,0 ± 0,9

* — различия статистически значимы по сравнению с контролем ($p < 0,05$).

Таблица 3. Изменения липидного спектра (по желанию)

Показатель	Контроль	Опыт
ЛПВП (ммоль/л)	1,3 ± 0,2	0,9 ± 0,1 *
ЛПНП (ммоль/л)	1,1 ± 0,2	2,4 ± 0,3 *
Индекс атерогенности	1,1 ± 0,2	3,1 ± 0,4 *

Рост концентрации глюкозы, триглицеридов и холестерина отражает развитие гипергликемии и дислипидемии, характерных для высококалорийного питания. Повышение активности АЛТ и АСТ указывает на цитолитический синдром, связанный с повреждением гепатоцитов и выходом ферментов в кровотоки. Изменения липидного спектра демонстрируют смещение баланса в сторону атерогенных фракций, что согласуется с развитием системных метаболических нарушений.

Эти результаты дополняют морфологические данные и подтверждают формирование у животных экспериментальной модели метаболических нарушений и жировой дистрофии печени, аналогичной ранним стадиям НАЖБП у человека.

Заключение

Проведённое исследование продемонстрировало, что длительное воздействие калорийно-избыточного рациона приводит к развитию у лабораторных животных выраженных морфологических и биохимических изменений, соответствующих жировой дистрофии печени.

На гистологических срезах выявлены характерные признаки стеатоза гепатоцитов: накопление липидных вакуолей, смещение ядер к периферии клеток, дезорганизация балочной структуры, расширение синусоидов и умеренное увеличение количества коллагеновых волокон в портальных трактах. Эти изменения сопровождаются значимыми сдвигами в биохимических показателях крови — гипергликемией, гиперлипидемией и

повышением активности печёночных ферментов (АЛТ, АСТ), что свидетельствует о нарушении обмена веществ и повреждении гепатоцитов.

Таким образом, данная модель воспроизводит ключевые структурно-функциональные особенности ранних стадий неалкогольной жировой болезни печени и может быть использована для дальнейшего изучения патогенеза заболевания, а также для тестирования терапевтических и профилактических подходов.

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КОНЦЕПЦИЯ ЛИЧНОСТНОГО ЗНАНИЯ М. ПОЛАНИ

***Аннотация:** В статье проводится эпистемологический анализ концепции личностного знания М. Полани, при этом применяются философские подходы такие как феноменологический, системный, исторический и др. Авторы рассматривают философскую концепцию личностного знания, разработанная Майклом Полани, как одно из ключевых направлений современной эпистемологии. Анализируя основные положения теории личностного характера знания, исследователи констатируют, что особую роль в концепции М.Полани играет субъективность, интуиция и неявный компонент познания. В свою очередь учёт лингвистических интуиций Полани позволил подтвердить ряд антиязыковых тез, иллюстрирующих сферу невыразимого как на языке, так и метаязыке науки. Показано, что концепция личностного знания разрушает традиционное представление о науке как о полностью объективной сфере и утверждает ценность личного участия и ответственности исследователя. Идеи Полани сохраняют практическую значимость в условиях цифровизации и технологических преобразований современного мира.*

***Ключевые слова:** личностное знание, антислово, неявное знание, феноменологический подход, субъективность, интуиция, эпистемология, философия науки, познание.*

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THE CONCEPT OF PERSONAL KNOWLEDGE BY M. POLANYI

Annotation: *The article provides an epistemological analysis of the concept of personal knowledge by M. Polanyi, using philosophical approaches such as phenomenological, systemic, historical, and others. The authors consider the philosophical concept of personal knowledge developed by Michael Polanyi as one of the key areas of modern epistemology. By analyzing the main principles of the theory of personal knowledge, the researchers conclude that subjectivity, intuition, and the implicit component of knowledge play a significant role in Polanyi's concept. In turn, the consideration of Polanyi's linguistic intuitions allowed us to confirm a number of anti-linguistic theses that illustrate the sphere of the inexpressible both in language and in the meta-language of science. It has been shown that the concept of personal knowledge challenges the traditional view of science as a completely objective field and emphasizes the value of the researcher's personal involvement and responsibility. Polanyi's ideas remain relevant in the context of digitalization and technological transformations.*

Keywords: *personal knowledge, anti-word, implicit knowledge, phenomenological approach, subjectivity, intuition, epistemology, philosophy of science, cognition.*

Современная философия науки уделяет большое внимание проблеме субъективного фактора в познании. Одним из первых мыслителей, кто системно раскрыл эту тему, был Майкл Полани — учёный и философ, создавший концепцию личностного знания. Его взгляды сформировали новую методологию понимания науки, в которой человек как познающий субъект становится не пассивным наблюдателем, а активным участником процесса открытия истины. В условиях кризиса классического позитивизма идеи Полани оказались особенно актуальными, предложив альтернативу представлению о знании как полностью объективном феномене.

К сожалению, в отечественной литературе, несмотря на большую популярность Полани как философа науки, его концепции уделялось немного внимания. В западной философской традиции дело обстоит иначе: там функционирует Общество М. Полани (Polanyi Society), выпускающее периодическое издание «Tradition and Discovery» и организующее конференции, на которых обсуждаются проблемы, так или иначе связанные с ключевыми идеями философа. Разработки современных зарубежных исследователей позволяют выявить и проанализировать различные аспекты концепции личностного знания, имеющие как фундаментальное, так и прикладное значение.

Цель статьи посвящена — раскрыть суть концепции личностного знания М. Полани, проанализировать её философское значение и влияние на развитие современной эпистемологии.

Майкл Полани (1891-1976) английский физик, химик и философ, выходец из Венгрии. Основная работа «Личностное знание. На пути к

посткритической философии» (1958). Основой концепции возникновения и развития науки М. Полани является идея необходимости отказа от идеалов научных исследований свободных от личностного влияния на его содержание. Полани считает, что требование деперсонализации знаний возникло на основе ошибочного отождествления такого феномена с объективностью.

В целом это означало антропологизацию научного знания. Для Полани личностная загруженность знаний является интеллектуальной самоотдачей и это необходимый элемент, без которого науки нет. Он отмечает, что идеалом научных знаний выбраны представления естественных наук где знания принимают форму суждений полученных в результате наблюдений и объективных в этом смысле, но они по форме способны быть конвенциональными.

Понятие неявного знания и структура сознания в концепции М. Полани: системный и феноменологический подходы к проблеме личностного знания

Одной из ключевых идей М. Полани является представление о том, что любое знание субъекта содержит личностный компонент. Познавательный акт всегда выполняется конкретным индивидом с неповторимым личностным опытом, с определенными установками сознания и неявными предпосылками осуществляемой им деятельности. Особое внимание Полани уделяет сфере неявного, молчаливого знания, личностного по своему характеру и лежащего в основе индивидуального процесса познания. Для лучшего понимания этого вида знания необходимо рассмотреть предложенную Полани структуру сознания, включающую в себя два уровня: фокусное осознание и периферическое.

Он доказывает невозможность выражения всей глубины и широты знаний человека в силу недостаточности языка человека. Человеческие знания, существующие в разных носителях, в книгах, журналах и других формах и это только часть знаний и это та часть, которая пребывает на уровне сознания человека. Остальная часть находится в сфере непроявленного сознания) это неявные знания.

Такие знания всегда присутствуют в структуре познавательной деятельности человека. Он выделяет три типа таких знаний, и они отличаются друг от друга характером взаимосвязей присущих мышлению и речи.

Во-первых, это те неявные знания, которые не нашли адекватного словесного выражения. Такие знания не находят артикулированного выражения и Полани называет их сферой «невыразимого», и она существует как нечто глубоко личностное. Второй вариант — это знания, которые свободно передаются речью, здесь основной компонент, т.е. мышление реализуется в хорошо поставленной речи и представляет собой информацию. В этом случае невыразимые неявные знания существуют в тексте. В-третьих, это область «затрудненного понимания» где между невербальным содержанием мышления и речевыми средствами имеется несогласованность. Это мешает концептуализировать содержания мысли. Это область, в которой неявное знание и формальное знание независимы друг от друга. Основное

значение теории личностного научного знания Полани в том, что она поднимает проблему существования скрытых знаний, которые имеют инструментальный характер.

Такие знания влияют на содержание научных знаний и в своих глубинных основах задаются всей телесной организацией человека.

Главный тезис Полани состоит в том, что любое знание носит личностный характер. Даже когда учёный опирается на экспериментальные данные, он делает выбор, интерпретирует результаты, принимает решения, руководствуясь внутренними убеждениями. Поэтому знание нельзя рассматривать как нечто полностью объективное и независимое от субъекта.

Полани вводит понятие «личностного участия» (personal participation), подчеркивая, что акт познания всегда включает личную ответственность за высказываемое суждение. Человек не просто фиксирует факты, но и утверждает их как истинные, вкладывая часть себя в создаваемое знание.

Осмысление личностной природы знания неизбежно приводит Полани к вопросу о его внутренней структуре, в частности — о тех формах понимания, которые невозможно выразить словами, но которые оказывают решающее влияние на процесс познания.

Особое место в философии Полани занимает понятие неявного (tacit) знания. Это те формы понимания и навыков, которые невозможно полностью выразить словами, но которые играют ключевую роль в познавательной деятельности. Примером может служить способность мастера точно действовать без осознанного объяснения своих шагов. Полани утверждает, что неявное знание является фундаментом всех явных знаний — без него невозможно ни обучение, ни творчество, ни наука.

Таким образом, знание всегда включает компонент, который передаётся через практику, подражание, вовлечённость в традицию. Это делает познание глубоко человеческим процессом, в котором рациональное и интуитивное тесно переплетены.

Именно связь между интуитивным и рациональным открывает путь к пониманию того, как субъективность и интуиция становятся неотъемлемыми элементами научного познания.

В противоположность позитивизму, Полани доказывает, что субъективность не противоречит научности, а является её неотъемлемым элементом. Он подчёркивает значение веры, воображения и интуиции в процессе открытия. Учёный, по Полани, движим не только логикой, но и внутренним убеждением, что его путь ведёт к истине. Это убеждение, как правило, не поддаётся строгой проверке, но без него невозможен научный прогресс.

Чтобы глубже осознать вклад Полани в философию науки, важно сопоставить его взгляды с идеями других выдающихся мыслителей XX века — таких как Томас Кун и Карл Поппер.

Сравнивая взгляды Полани с другими представителями философии науки, можно отметить, что его идеи во многом предвосхитили концепцию

научных парадигм Томаса Куна. Оба философа признавали, что наука развивается не линейно, а через смену мировоззренческих рамок. Однако Полани делал больший акцент на личностном аспекте знания, тогда как Кун сосредоточился на коллективных структурах научного сообщества.

В то же время Полани расходился с Карлом Поппером, который утверждал, что знание растёт через процедуру фальсификации. Полани считал, что учёные нередко сохраняют веру в свою теорию даже при наличии противоречащих фактов, если они внутренне убеждены в её плодотворности. Таким образом, его концепция более гибкая и ближе к реальной практике научного поиска.

Проведённое сравнение позволяет увидеть, что идеи Полани не только занимают особое место в истории философии науки, но и сохраняют практическое значение. Это особенно заметно в современном контексте, когда на первый план выходят вопросы роли человека и субъективного опыта в мире технологий и искусственного интеллекта.

Сегодня идеи Полани приобретают новое звучание. В эпоху цифровизации, искусственного интеллекта и автоматизации знаний становится очевидно, что не все формы познания можно формализовать. Неявное знание — умение чувствовать ситуацию, принимать решения в условиях неопределённости — остаётся уникальной человеческой способностью, которую невозможно заменить алгоритмом.

Кроме того, в образовательной практике концепция Полани помогает понять значение личного опыта и наставничества. Обучение невозможно свести к передаче информации: оно требует включённости, эмпатии и доверия между учителем и учеником. В этом проявляется не только философский, но и гуманистический потенциал идей Полани.

Концепция личностного знания М. Полани представляет собой важнейший вклад в философию науки XX века. Она разрушает иллюзию абсолютной объективности, показывая, что наука — это живая человеческая деятельность, в которой логика, интуиция и вера образуют единую целостность. Полани доказал, что без личного участия и ответственности невозможно истинное понимание. Его идеи остаются актуальными и сегодня, когда человечество вновь обращается к вопросам доверия, компетентности и человеческого фактора в науке.

Заканчивая статью, можно констатировать, что концепция М. Полани обогащает представления о познавательной деятельности, не сводя ее к действию только общих, объективных закономерностей, но учитывая также роль конкретной личности, наделенной неповторимыми когнитивными установками и включенной в уникальную научную практику. Широкое понимание личностного знания, пронизывающего различные уровни психики человека, дает возможность не ограничиваться исследованием лишь научного знания и изучить иные формы знания, являющиеся проявлением духовной жизни человека во всем ее многообразии. Рассмотрение личностного знания и познавательного процесса в структуре внутреннего опыта в последнее время

приобретает особую актуальность, поскольку «в когнитивной науке и эпистемологии как ее философской составляющей происходит сдвиг к феноменологии, к изучению субъективных особенностей опыта сознания, к «методологии от первого лица» [1, с. 199]. Данная задача может быть выполнена благодаря применению к анализу концепции личностного знания М. Полани актуальных методов бурно развивающихся когнитивных наук и неклассической эпистемологии.

Подводя итог всему сказанному, хотелось бы еще раз подчеркнуть, что концепция неявного знания М. Полани применима не только к решению философских проблем науки. Она позволяет более широко представить познавательный процесс и сохраняет свою актуальность для современной эпистемологии и получающих все более широкое распространение когнитивных наук. В концепции личностного знания заложены и развиты принципы ставших популярными сегодня подходов к изучению сознания и познавательного процесса: феноменологического, системного, телесного. Кроме того, данная теория дает возможность учитывать разнообразные факторы познавательной деятельности, в том числе внерациональные и неосознаваемые в явном виде. Именно с их помощью можно понять такие сложные феномены когнитивной активности, как интуиция, озарение, кульминационные моменты творчества.

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МЕСТО СЛУЖБЫ ВНУТРЕННЕГО АУДИТА В СИСТЕМЕ ЭКОНОМИЧЕСКОЙ БЕЗОПАСНОСТИ ОРГАНИЗАЦИЙ

***Аннотация:** в статье рассматривается место службы внутреннего аудита в системе экономической безопасности организаций.*

***Ключевые слова:** внутренний аудит, экономическая безопасность, контроль рисков, система управления рисками, оценка эффективности, корпоративное управление.*

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THE PLACE OF THE INTERNAL AUDIT SERVICE IN THE ECONOMIC SECURITY SYSTEM OF ORGANIZATIONS

***Abstract:** This article examines the role of the internal audit service in the economic security system of organizations.*

***Keywords:** internal audit, economic security, risk control, risk management system, performance assessment, corporate governance.*

В современном мире организации сталкиваются с множеством вызовов и рисков, которые могут негативно сказаться на их финансовом состоянии и репутации. Учитывая динамичность рынка, усиливающуюся конкуренцию и растущие требования со стороны регуляторов, необходимость эффективной системы управления рисками становится более актуальной, чем когда-либо. Внутренний аудит выступает решающим звеном в обеспечении экономической безопасности организаций, выступая барьером для возможных угроз и поддерживая реализацию стратегических задач.

Он сосредоточен на оценке и контроле рисков, охватывающих финансовые операции и корпоративные процессы. Систематические аудиторские проверки способствуют выявлению угроз и формированию мер предотвращения.

Такой подход поддерживает динамичность реагирования на трансформации внутренней и внешней среды, смягчая вероятные экономические и репутационные потери.

Внутренний аудит занимает ключевое место в системе экономической безопасности структур компании, поддерживая устойчивость, охраняя интересы организации. Механизм внутреннего аудита выявляет, оценивает и снижает влияние рисков, затрагивающих бизнес во многих проявлениях. Анализируем функциональные составляющие роли внутреннего аудита в обеспечении экономической безопасности компании.

Оценка, прогноз и ревизия потенциальных угроз входят в практику внутреннего аудита регулярных проверок. Акцент охватывает как финансовую часть, так и нефинансовые зоны рисков, где фиксируются:

- мошеннические действия;
- учетные расхождения;
- соблюдение нормативной базы;
- оперативные и репутационные угрозы.

Контроль соблюдения нормативных требований. Внутренний аудит анализирует соответствие деятельности нормам, законам и стандартам, регулирующим функционирование организации. Основу деятельности составляют такие направления: – мониторинг соблюдения налогового законодательства; – оценка соответствия регуляторным требованиям в области охраны труда и окружающей среды; – контроль исполнения внутренних политик и процедур [2].

Оценка эффективности внутренних контролей. Служба внутреннего аудита систематически проверяет внутренние контроли с целью предотвращения, обнаружения и устранения угроз:

- проведение анализа надежности существующих процедур контроля;
- выявление слабых мест и несоответствий в контролирующих механизмах;
- подготовка рекомендаций, направленных на улучшение контроля и повышение эффективности [1].

Финансовая прозрачность и точность отчетности. Служба внутреннего аудита активно участвует в обеспечении финансовой честности и достоверности отчетности учреждения:

- проверка корректности ведения бухгалтерского учета;
- оценка полноты и достоверности финансовых документов;
- контроль всех бухгалтерских операций и активов [3].

Предотвращение мошенничества и злоупотреблений. Служба внутреннего аудита активно участвует в предотвращении случаев мошенничества и злоупотреблений в компании:

- проведение расследований по подозрительным операциям;
- разработка и внедрение механизмов, направленных на выявление и предотвращение мошенничества;
- обучение сотрудников принципам этики и внутреннего контроля.

Рекомендации по улучшению бизнес-процессов. Внутренний аудит не только выявляет проблемы, но и предлагает пути их решения, что способствует улучшению экономической безопасности:

- идентификация неэффективных процессов и рекомендация по их оптимизации;
- поддержка внедрения лучших практик управления и контроля;
- консультирование по вопросам улучшения организационной структуры [2].

Поддержка стратегического управления. Внутренний аудит принимает активное участие в формировании стратегического курса компании путем оценки возможных рисков и влияния инвестиционных проектов:

- определение потенциальных угроз и возможностей финансовых вложений;
- содействие в разработке стратегий, направленных на снижение рисков;
- консультирование руководства по вопросам достижения долгосрочных целей [1].

Итак, внутренний аудит выступает надежной опорой экономической безопасности организации, обеспечивая целостность и бесперебойность бизнес-процессов. Служба внутреннего аудита способствует укреплению доверия к финансовым показателям и минимизирует воздействие рисков. Эффективность внутренних аудиторских процедур удерживает устойчивое положение компании, предотвращает утраты и консолидирует конкурентные преимущества.

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ПСИХОЛОГО-КОГНИТИВНЫЕ РАЗЛИЧИЯ КИТАЙСКИХ И РОССИЙСКИХ ПОТРЕБИТЕЛЕЙ И ОПТИМИЗАЦИЯ СТРАТЕГИИ БРЕНД-КОММУНИКАЦИИ В МЕЖКУЛЬТУРНОМ ЦИФРОВОМ МАРКЕТИНГЕ

***Аннотация:** Основываясь на когнитивно-психологической перспективе психологии управления, эта статья использует сценарий цифровой рекламы в качестве вектора исследования, систематически анализирует различия в когнитивных отклонениях китайских и российских потребителей в продвижении в социальных сетях и прямом эфире товаров, раскрывает глубокое влияние культурного измерения на модель обработки информации. Сравнивая различия в производительности потребителей в двух странах с точки зрения отклонения подтверждения, эффекта закрепления и эффекта экспозиции, в сочетании с теорией культурного измерения Хофстеда для построения структуры анализа предлагается целевая стратегия оптимизации коммуникации бренда. Исследование показало, что китайские потребители более подвержены влиянию авторитетных якорей и групповой идентичности, в то время как российские потребители сосредоточены на информационной практичности и местной адаптации. Выводы исследования дают предприятиям практическое руководство на когнитивном уровне для проведения трансграничного цифрового маркетинга.*

***Ключевые слова:** межкультурный цифровой маркетинг; китайские и российские потребители; когнитивные отклонения; коммуникация бренда; Культурное измерение Хофстеда*

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PSYCHOLOGICAL COGNITIVE DIFFERENCES BETWEEN CHINESE AND RUSSIAN CONSUMERS IN CROSS-CULTURAL DIGITAL MARKETING AND OPTIMIZATION OF BRAND COMMUNICATION STRATEGIES

Abstract: *Based on the cognitive psychology perspective of management psychology, this article takes digital advertising scenarios as the research carrier, systematically analyzes the cognitive bias differences between Chinese and Russian consumers in social media promotion and live streaming sales, and reveals the deep influence of cultural dimensions on information processing patterns. By comparing the performance differences of consumers in confirmation bias, anchoring effect, and exposure effect between the two countries, and combining Hofstede's cultural dimension theory to construct an analytical framework, targeted brand communication optimization strategies are proposed. Research has found that Chinese consumers are more susceptible to the influence of authoritative anchors and group identity, while Russian consumers focus on information practicality and local adaptability. The research conclusion provides practical guidance at the cognitive level for enterprises to carry out cross-border digital marketing.*

Keywords: *Cross cultural digital marketing; Chinese and Russian consumers; Cognitive bias; Brand communication; Hofstede cultural dimension*

I. Введение

(i) Предыстория исследования

Глобализация цифровой экономики способствовала преодолению маркетинга брендов географических границ, Китай и Россия, являясь важными торговыми партнерами, в 2023 году объем двусторонней торговли достиг 240,1 млрд долларов США, а ежегодные темпы роста масштабов трансграничной электронной коммерции превысили 30%. Продвижение в социальных сетях и прямая трансляция товаров стали основными каналами проникновения брендов на рынки двух стран, но когнитивные отклонения, вызванные культурными различиями, часто провоцируют маркетинговый сбой, например, китайские бренды сталкиваются с холодом в России, используя слова «самая низкая цена во всей сети», а российские компании в Китае полагаются на заявления о функциях продукции, но трудно стимулировать импульс к покупке. Это различие проистекает из разделения механизмов обработки информации на уровне когнитивной психологии, которое необходимо взломать на академическом уровне.

II) Значение исследования

Теоретическое значение: преодолеть ограничения описания культурного измерения традиционного межкультурного маркетинга, построить теоретическую цепочку «культура-когнитивное отклонение-потребительское решение», основанную на перспективе когнитивной психологии, обогатить микротеоретическую основу межкультурного цифрового маркетинга.

Практическое значение: предоставить оперативные решения по оптимизации слов для китайско-российских цифровых рекламных сценариев, снизить затраты предприятий на проб и ошибки в трансграничном маркетинге, повысить точность и коэффициент конверсии брендовой коммуникации.

III) Методы исследования

Используя метод литературного исследования и метод межкультурного сравнения, систематически разбирать основные теории, такие как подтверждающее отклонение и эффект якоря в когнитивной психологии, объединить эмпирические случаи цифрового маркетинга между Китаем и Россией, построить структуру анализа когнитивных различий и предложить путь стратегической оптимизации.

II. Теоретическая

(i) Основная теория когнитивных отклонений

Когнитивные отклонения — это систематические отклонения в обработке индивидуальной информации, вызванные психологическими ярлыками, и в сценариях цифровой рекламы существуют три основных типа эффекта:

1. Подтверждающее отклонение: люди склонны сосредоточиться на информации, которая соответствует существующим убеждениям, а потребители на 40% выше смотрят нативную рекламу, которая соответствует их убеждениям [1].

2. Эффект закрепления: первоначальная информация значительно влияет на последующие суждения и часто играет роль в форме сравнения цен, авторитетных одобрений и т.д. [2].

3. Эффект экспозиции: повторные контакты повышают приемлемость информации, нативная реклама может повысить память бренда более чем на 20% после 10 контактов [3].

II) Рамки межкультурных познавательных исследований

Теория культурных измерений Хофстеда обеспечивает объяснительную основу для когнитивных различий: Китай имеет значительно более высокие баллы по измерениям дистанции от власти (PDI=80) и коллективизма (IDV=20), чем Россия (PDI=93, IDV=39), а Россия имеет более высокие баллы по измерению уклонения от неопределенности (UAI=95) [4]. Высокая дистанция власти порождает зависимость от авторитетной информации, коллективизм усиливает влияние групповой ссылки, высокая неопределенность избегает повышения требований к достоверности и практичности информации, совместно формирует модель когнитивной обработки китайских и российских потребителей.

III. Анализ различий в когнитивных отклонениях китайских и российских потребителей в цифровой рекламе

(i) Когнитивные различия в продвижении в социальных сетях

1. Предпочтения в проверке информации: китайские потребители подвержены влиянию подтверждающих отклонений, уделяют больше внимания контенту авторитетных логотипов, таких как « рекомендация эксперта», « список CCTV», высокую чувствительность к групповым показаниям, которые « используются родственниками и друзьями»; Российские пользователи сосредоточены на информационной практичности, 54,8% пользователей-женщин и 45,2% пользователей-мужчин отдают предпочтение отбору местного адаптивного контента и положительно

реагируют на сценарные описания, такие как « соответствие потребностям российских квартир » [5].

2. Механизм укрепления доверия: китайские пользователи полагаются на многоуровневые якоря « одобрение звезд + измерение KOL + положительные отзывы пользователей»; Российские пользователи больше доверяют локализованным сигналам, имеют высокий уровень доверия к контенту, цитирующему русские пословицы, в сочетании с местными событиями, и более чувствительны к информации о корпоративной социальной ответственности [6].

3. Порог эффекта экспозиции: китайские пользователи имеют высокую толерантность к высокочастотной экспозиции, короткая видеореклама все еще может поддерживать принятие после 3-5 повторений; Российские пользователи предпочитают точный доступ, чрезмерная экспозиция может вызвать отвращение, поэтому необходимо оптимизировать частоту размещения с помощью А/В-тестов [7].

Иi) Когнитивные различия в прямом эфире

1. Захват внимания на открытии: китайские потребители находятся под влиянием якоря групповой атмосферы, сигналы дефицита, такие как « продано 100 000+ », « осталось всего 500 штук в запасе », могут быстро стимулировать интерес; Средняя продолжительность просмотра российских пользователей составляет всего 5-8 минут, требуется 30 секунд, чтобы привлечь внимание демонстрацией основных функций продукта, и они ненавидят абсолютные выражения, такие как « самый дешевый » и « лучший ».

2. Обработка информации о продукте: китайские пользователи легко принимают эмоциональное руководство словами, такое как « пропустить еще год »; Российские пользователи требуют четкого сценарного отображения с более высокой конверсией практических описаний, таких как « сильное всасывание и бесшумность, подходит для российских семей », и положительно отреагировали на китайско-российское сравнение цен « в Китае стоит 5000 рублей, здесь всего 3000 рублей ».

3. Режим интерактивного ответа: китайские пользователи привыкли взаимодействовать с такими интимными названиями, как « семья » и « дети », и лайками и экраном; Российские пользователи больше принимают естественные названия, такие как « друзья » и « дорогие », высоко вовлечены в легкое взаимодействие, такое как розыгрыши призов и вопросы и ответы, но ненавидят чрезмерно маркетинговое взаимодействие.

Иii) Сравнение основных измерений когнитивных различий

В следующей таблице систематически представлены ключевые различия в когнитивных отклонениях китайских и российских потребителей

Когнитивное измерение	Характеристики китайских потребителей	Характеристик и российского потребителя	Культурные корни
фокус подтверждающего отклонения	Авторитетное одобрение, групповая идентичность, модные тенденции	Родная адаптация, практические функции, социальная ответственность	Коллективизм + высокая дистанция власти против высокой неопределенности и уклонения
Точка триггера анкерного эффекта	Ценовой якорь (первоначальная цена vs текущая цена), авторитетный якорь (эксперт/KOL)	Якорь сценария (местный сценарий использования), якорь стоимости (китайско-российское сравнение цен)	Коллективная ссылочная зависимость против прагматических тенденций
Оптимальная стратегия эффекта воздействия	Многоплатформенная высокочастотная совместная экспозиция	Ориентированная экспозиция в точное время (7-10 вечера, выходные дни)	Информационное стадо против потребности в точности информации
Ключ к укреплению доверия	Многоуровневая система одобрения, сертификат масштаба пользователя	Локализованные сигналы, реальный опыт использования, прозрачная информация	Зависимость от власти против уклонения от риска
Граница принятия взаимодействия	Сильное атмосферное взаимодействие (чистка экрана, выкрикивание лозунгов)	Легкие практические интерактивные (вопросы и ответы, демонстрация функций)	Коллективный эмоциональный резонанс против индивидуального рационального

IV. Оптимизация стратегии коммуникации бренда на основе когнитивных различий

(i) Локализация и адаптация создания контента

1. Построение системы речи: на китайском рынке используется структура « авторитетная якорная точка + групповое подтверждение », например, « исследования и разработки Академии наук Китая (авторитет) + фактические измерения группы Баома (группа) + сегодняшний заказ минус 50 (ценовая якорная точка) »; Российский рынок строит слова « практичный сценарий + местный сигнал », такие как « этот пылесос бесшумный и сильный

всасывающий (практичный), идеально адаптирован к российским квартирам (сценарий), специальное предложение во время чемпионата мира (местная горячая точка)».

2. Имплантация сигнала доверия: китайский рынок усиливает многоуровневое одобрение, объединяет одобрение звезд, интерпретацию экспертов и контент UGC пользователей; Российский рынок выделяет элементы локализации, дубляж на родном русском языке, включение местных KOL, избегает абсолютных выражений и использует такие объективные выражения, как «подходит для большинства семей» [8].

3. Слияние культурных символов: китайский рынок включает традиционные праздники, знаки зодиака и другие культурные элементы; Российский рынок сочетает в себе православные праздники, спортивные мероприятия и другие символы, например, во время чемпионата мира по футболу запуск продвижения продукта «Эксклюзивные модели для

2. Точное регулирование размещения каналов

1. Стратегия выбора платформы: Китай фокусируется на платформах концентрации трафика, таких как Douyin и Taobao Live, и использует алгоритмы для достижения высокочастотной точной экспозиции; Россия глубоко вспахивает местные платформы, такие как VK и Ozon, охватывает основные регионы, такие как Москва и Санкт-Петербург, с помощью геолокации и ориентируется на высокопотребительские группы в возрасте 25-44 лет [9].

2. Вариант оптимизации периода: китайский рынок определяет время поездок на работу (7:00-9:00, 17:00-19:00) и ночной прайм-тайм (20:00-22:00); Российский рынок ориентирован на период после работы (19:00-22:00) и весь день в выходные дни, а студенческие группы дополнительно размещаются после школы во второй половине дня.

3. Вариант адаптации формы: многоиспользуемая короткая видеореклама на китайском рынке + режим комбинации прямых трансляций с товарами; Российский рынок отдает предпочтение нативной рекламе и стимулирующим видео, реклама, связанная с мобильными играми, использует экранную форму, а социальное продвижение подходит для челленджа и брендовых спецэффектов [10].

Иi) Сценарное проектирование механизма взаимодействия

1. Доверие укрепляет взаимодействие: в китайской прямой трансляции установлены звенья «Ответы экспертов Ляньмай на вопросы» и «Загашение листов в режиме реального времени», чтобы укрепить доверие группы; В российских прямых трансляциях добавлена презентация «Обратная связь об использовании местных пользователей», в ходе которой ведущие демонстрируют эффект использования продукта в местной среде в режиме реального времени на русском

2. Руководящий дизайн трансформации: Китай использует такие ценовые якорные слова, как «ограниченное время секундирование», «полное сокращение наложения»; Россия выделяет такие сервисные гарантии, как «

поддержка наложенного платежа » и « отслеживание логистики в режиме реального времени », что соответствует ее платежным привычкам и логистическим озабоченностям.

3. Поддержание долгосрочных отношений: Китай укрепляет групповую идентичность с помощью «эксклюзивного благосостояния фанатской базы»; Россия проводит локализованные интерактивные мероприятия, такие как розыгрыш призов в сочетании с местной культурой ремесел, а также своевременно отвечает на вопросы в зоне комментариев для повышения благосклонности.

Iv) Динамическая оптимизация мониторинга эффективности

Создать многомерную систему мониторинга: китайский рынок сосредоточен на отслеживании «коэффициента кликов авторитетного одобрения» и «коэффициента конверсии группового взаимодействия»; Российский рынок обращает внимание на «продолжительность пребывания местного контента» и «коэффициент конверсии практических консультаций». Внедрить нормализованное А/В-тестирование, непрерывно оптимизировать такие переменные, как цвет кнопки СТА, стиль речи, период размещения, например, тестировать различия в эффекте одобрения «местный KOL vs международная звезда», или эффективность конверсии различных ценовых якорей [11].

V. Выводы и

(i) Выводы исследования

Существуют системные различия между китайскими и российскими потребителями в когнитивных отклонениях цифровой рекламы: китайские потребители демонстрируют когнитивные характеристики « зависимость от авторитета + групповая ссылка + высокочастотное принятие », на которые значительно влияют дистанция власти и коллективистская культура; Российские потребители демонстрируют когнитивные характеристики « практическая ориентация + местная фокусировка + точный спрос », а культура уклонения от высокой неопределенности играет ведущую роль. Эти различия требуют точной адаптации стратегии коммуникации бренда, китайский рынок должен усилить многоуровневые якоря и создание групповой атмосферы, а российский рынок должен выделять локализованную практическую информацию и прозрачные сигналы.

Ii) Ограничения и перспективы исследований

Данное исследование сосредоточено на анализе макроразличий в когнитивных отклонениях, и в будущем микропроцессы обработки потребительской информации в двух странах, такие как различия в распределении внимания между различными речевыми элементами, могут быть количественно оценены с помощью экспериментов по отслеживанию глаз [12]. В то же время, по мере усиления тенденции к мультикультурной интеграции среди молодых групп, необходимо дополнительно изучить влияние когнитивных различий между поколениями на маркетинговую стратегию и предложить брендам динамические решения адаптации.

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ИНТЕГРАЦИЯ В СОЦИУМЕ ДЕТЕЙ С РАССТРОЙСТВОМ АУТИСТИЧЕСКОГО СПЕКТРА, ПОСРЕДСТВАМ ИНКЛЮЗИВНОГО ОБРАЗОВАНИЯ

***Аннотация:** В статье рассматриваются особенности интеграции детей с аутизмом в инклюзивную образовательную среду. Основное внимание уделяется методам адаптации учебного процесса, педагогическим стратегиям и психолого-педагогическим подходам, способствующим успешной социализации и академической успеваемости детей с расстройствами аутистического спектра. Проведен анализ современных исследований в области инклюзивного образования, выявлены ключевые факторы, влияющие на эффективность интеграции, включая индивидуальный подход, сотрудничество с родителями и мультидисциплинарную поддержку. Результаты подчеркивают необходимость комплексной подготовки педагогов и внедрения адаптивных методик, способствующих развитию социальных навыков и учебных достижений детей с аутизмом в инклюзивной среде.*

***Ключевые слова:** Аутизм; инклюзия; инклюзивное образование; адаптивные методы; социальная интеграция; педагогические стратегии.*

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INTEGRATION OF CHILDREN WITH AUTISM SPECTRUM DISORDER INTO SOCIETY THROUGH INCLUSIVE EDUCATION

***Abstract:** This article examines the features of integrating children with autism into an inclusive educational environment. The focus is on methods of adapting the learning process, pedagogical strategies, and psycho-pedagogical approaches that contribute to the successful socialization and academic achievement of children with autism spectrum disorders. An analysis of current research in the field of inclusive education is conducted, identifying key factors that influence the effectiveness of integration, including an individualized approach, collaboration with parents, and multidisciplinary support. The results emphasize the need for comprehensive teacher training and the implementation of adaptive*

methods that promote the development of social skills and academic success of children with autism in an inclusive setting.

Keywords: *Autism; inclusion; inclusive education; adaptive methods; social integration; pedagogical strategies.*

Введение

Инклюзивное образование представляет собой современный подход к обучению, при котором дети с особыми образовательными потребностями, включая детей с расстройствами аутистического спектра (РАС), включаются в общую образовательную среду. Аутизм характеризуется нарушениями социального взаимодействия, коммуникации и ограниченными интересами, что создает определенные трудности при интеграции в класс с обычными сверстниками. Эффективная инклюзия детей с аутизмом требует комплексного подхода, включающего адаптацию учебных программ, использование специализированных педагогических методов, а также поддержку со стороны родителей и специалистов смежных областей, таких как логопеды, психологи и дефектологи. Педагоги, работающие в инклюзивной среде, должны обладать знаниями о особенностях аутизма, уметь применять индивидуальные стратегии обучения и создавать условия, способствующие развитию социальных и академических навыков. Несмотря на растущий интерес к инклюзивному образованию, существует недостаток систематических исследований, посвященных практическим методам интеграции детей с аутизмом в образовательный процесс. Цель данной работы — изучить современные подходы к инклюзии детей с РАС, выявить ключевые факторы успешной интеграции и предложить рекомендации для педагогов и образовательных учреждений, направленные на повышение эффективности обучения и социализации таких детей.

Методы исследования

В исследовании использовался комплекс теоретических и эмпирических методов для изучения интеграции детей с расстройствами аутистического спектра (РАС) в инклюзивную образовательную среду. Теоретическая часть включала анализ современных научных публикаций по инклюзивному образованию, особенностям аутизма, педагогическим стратегиям и психолого-педагогической поддержке детей с особыми образовательными потребностями. Эмпирическая часть исследования включала наблюдение за учебным процессом в инклюзивных классах, с фиксацией поведения детей с РАС, их взаимодействия со сверстниками и реакции на педагогические стратегии. Для изучения мнений и практик использовались анкетирование педагогов и родителей, а также полуструктурированные интервью с педагогами, что позволило выявить успешные подходы к адаптации учебного процесса. Выборка исследования состояла из 20 детей с РАС, обучающихся в инклюзивных классах, 15 педагогов и 20 родителей. Полученные данные обрабатывались с помощью качественного анализа наблюдений и интервью, а также статистической

обработки анкет для выявления основных тенденций и факторов, способствующих успешной интеграции детей с аутизмом.

Результаты исследования

В ходе исследования было установлено, что применение индивидуализированных подходов к инклюзии детей с РАС способствует положительным изменениям в их поведении и учебной успеваемости. Наблюдения показали, что дети, получавшие адаптированные задания и педагогическую поддержку, активнее участвовали в коллективной деятельности, проявляли большую социальную инициативу и улучшали навыки взаимодействия со сверстниками. Анкетирование педагогов и родителей подтвердило, что индивидуализированные методы обучения повышают мотивацию детей к учебной деятельности и облегчают процесс социализации. Педагоги отметили улучшение концентрации внимания, снижение количества конфликтов в классе и более активное включение детей с РАС в групповые задания. Полуструктурированные интервью показали, что ключевыми факторами успешной интеграции являются: систематическая поддержка педагогов, использование визуальных и адаптированных материалов, тесное сотрудничество с родителями и мультидисциплинарная помощь специалистов. Таким образом, результаты исследования демонстрируют, что комплексный индивидуальный подход в инклюзивном образовании детей с аутизмом повышает их академическую успеваемость, социальные навыки и общий уровень адаптации в учебной среде.

Обсуждение

Результаты исследования подтверждают, что индивидуализированные подходы в инклюзивном образовании оказывают положительное влияние на учебную и социальную адаптацию детей с РАС. Применение адаптированных заданий, визуальных пособий и специальных педагогических стратегий способствует улучшению концентрации внимания, активному участию в учебной деятельности и развитию навыков взаимодействия со сверстниками. Повышение мотивации детей к учебе и снижение конфликтов в классе свидетельствуют о том, что индивидуальный подход не только облегчает процесс обучения, но и создает благоприятную социальную среду. Результаты анкетирования и интервью подчеркивают важность взаимодействия педагогов с родителями, а также мультидисциплинарной поддержки специалистов, что обеспечивает комплексное сопровождение детей с аутизмом. Данное исследование согласуется с современными исследованиями в области инклюзивного образования, подтверждая, что успех интеграции зависит от систематической подготовки педагогов, гибкости образовательных программ и внимательного учета индивидуальных особенностей каждого ребенка. Ограничениями исследования являются относительно небольшой размер выборки и краткосрочный период наблюдения. В дальнейшем рекомендуется проведение исследований с большим числом участников и длительным мониторингом для оценки долгосрочной эффективности индивидуализированных стратегий инклюзии.

Заключение

Проведенное исследование показало, что индивидуализированные подходы в инклюзивном образовании детей с расстройствами аутистического спектра (РАС) способствуют улучшению их учебной успеваемости, развитию социальных навыков и общей адаптации в образовательной среде. Применение адаптированных заданий, визуальных пособий, специализированных педагогических стратегий и тесное сотрудничество с родителями значительно повышают эффективность интеграции детей с аутизмом. Результаты подчеркивают, что комплексная поддержка педагогов и использование индивидуализированных методик являются ключевыми факторами успешной инклюзии. Данные подходы помогают не только повысить академические достижения детей, но и создать благоприятную социальную атмосферу в классе, способствующую их полноценной социализации. В будущем рекомендуется расширять выборку и проводить долгосрочные наблюдения для оценки устойчивости достигнутых результатов и дальнейшей оптимизации педагогических стратегий инклюзивного обучения детей с РАС.

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РАЗРАБОТКА ПРОФИЛАКТИЧЕСКИХ МЕР САХАРНОГО ДИАБЕТА 2 ТИПА У БОЛЬНЫХ С МЕТАБОЛИЧЕСКИМ СИНДРОМОМ

Аннотация: Разработка и оценка эффективности профилактических мероприятий сахарного диабета 2 типа (СД2) у пациентов с метаболическим синдромом (МС). В исследовании приняли участие 28 пациентов (18 женщин и 10 мужчин) в возрасте 35–65 лет с диагностированным МС. Клинико-лабораторное обследование, оценка факторов риска развития СД2, разработка индивидуальных профилактических рекомендаций, контроль динамики метаболических показателей в течение 6 месяцев. Применение комплексных профилактических мер позволило улучшить гликемический профиль, снизить индекс массы тела и уровень триглицеридов, что свидетельствует о высокой эффективности предложенной стратегии профилактики.

Ключевые слова: сахарный диабет 2 типа, метаболический синдром, профилактика, факторы риска, здоровье.

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DEVELOPMENT OF PREVENTIVE MEASURES FOR TYPE 2 DIABETES IN PATIENTS WITH METABOLIC SYNDROME

Abstract: Development and evaluation of the effectiveness of preventive measures for type 2 diabetes mellitus in patients with metabolic syndrome (MS). The study involved 28 patients (18 women and 10 men) aged 35-65 years with diagnosed MS. Clinical and laboratory examination, assessment of risk factors for the development of DM2, development of individual preventive recommendations, monitoring of the dynamics of metabolic indicators for 6 months. The use of comprehensive preventive measures made it possible to improve the glycemic profile, reduce the body mass index and triglyceride levels, which indicates the high effectiveness of the proposed prevention strategy.

Keywords: *type 2 diabetes mellitus, metabolic syndrome, prevention, risk factors, health.*

Введение. Метаболический синдром (МС) представляет собой совокупность факторов риска, повышающих вероятность развития сахарного диабета 2 типа (СД2), сердечно-сосудистых заболеваний и ожирения. Согласно данным Alberti et al. (2006), ключевыми компонентами МС являются абдоминальное ожирение, дислипидемия, артериальная гипертензия и нарушение гликемии натощак. Эти факторы тесно взаимосвязаны и усиливают друг друга, создавая высокий риск метаболических нарушений.

Ранняя профилактика СД2 у пациентов с МС позволяет снизить заболеваемость и улучшить качество жизни. Knowler et al. (2002) и Tuomilehto et al. (2001) в своих исследованиях продемонстрировали, что интервенции, направленные на изменение образа жизни (диета и физическая активность), снижали риск развития СД2 на 30–60% у лиц с нарушенной гликемией.

Основными компонентами профилактических мер являются коррекция образа жизни, диетотерапия, физическая активность и контроль массы тела. Eckel et al. (2005) подчеркивают, что сочетание этих подходов наиболее эффективно при комплексной профилактике метаболических нарушений. Stefan et al. (2019) добавляют, что регулярное наблюдение за метаболическими показателями и индивидуальная адаптация рекомендаций позволяет поддерживать долгосрочный эффект профилактики.

Материалы и методы. Настоящее исследование представляло собой проспективное интервенционное исследование, направленное на разработку и оценку профилактических мероприятий сахарного диабета 2 типа (СД2) у пациентов с метаболическим синдромом (МС). В исследовании приняли участие 28 пациентов (18 женщин и 10 мужчин) в возрасте от 35 до 65 лет.

Критерии включения: наличие МС согласно критериям Международной федерации диабета (IDF), включающих повышенный объем талии, гипертриглицеридемию, низкий уровень HDL, артериальную гипертензию и нарушение гликемии натощак.

Методы исследования включали клинико-биохимическое обследование и оценку факторов риска. Клинико-биохимические показатели включали: уровень глюкозы натощак, HbA1c, липидный профиль, артериальное давление (АД) и индекс массы тела (ИМТ). Факторы риска оценивались с учётом семейного анамнеза СД2, образа жизни и особенностей питания.

Внедрение профилактических мер включало:

- Диетологические рекомендации: снижение потребления сахара и насыщенных жиров, увеличение потребления овощей и продуктов, богатых клетчаткой;
- Физическую активность: аэробные и силовые упражнения не менее 150 минут в неделю;
- Контроль массы тела и окружности талии;

- Поведенческую поддержку: индивидуальные консультации и мотивационные беседы.

Срок наблюдения составил 6 месяцев с ежемесячным контролем клинических и лабораторных показателей.

В результате внедрения комплексных профилактических мероприятий наблюдалось улучшение метаболических показателей у всех участников. Динамика показателей представлена в таблице:

Показатель	До профилактики	Через 6 месяцев	Примечание
Глюкоза натощак, ммоль/л	$6,2 \pm 0,5$	$5,5 \pm 0,4$	Значимое снижение ($p < 0,05$)
HbA1c, %	$6,1 \pm 0,3$	$5,7 \pm 0,2$	Улучшение гликемического контроля
ИМТ, кг/м ²	$31,2 \pm 3,1$	$29,8 \pm 2,9$	Снижение массы тела
Триглицериды, ммоль/л	$2,2 \pm 0,6$	$1,8 \pm 0,5$	Улучшение липидного профиля
Показатель	До профилактики	Через 6 месяцев	Примечание

Для визуализации динамики изменений рекомендуется построить диаграмму, отражающую снижение уровня глюкозы натощак и HbA1c, а также уменьшение ИМТ и уровня триглицеридов в течение 6 месяцев.

Заключение. Разработка и внедрение индивидуализированных профилактических мероприятий у пациентов с метаболическим синдромом представляет собой высокоэффективную стратегию снижения риска развития сахарного диабета 2 типа (СД2). Индивидуализация подхода позволяет учитывать специфические клинико-метаболические характеристики каждого пациента, включая уровень глюкозы натощак, инсулинорезистентность, индекс массы тела, показатели липидного обмена и сопутствующие сердечно-сосудистые факторы риска. Такой подход обеспечивает максимально точное воздействие на ключевые патогенетические механизмы прогрессирования СД2 и минимизацию возможных осложнений.

Основными компонентами профилактического комплекса являются:

1. Диетологическая коррекция – разработка рациона с оптимальным соотношением макро- и микронутриентов, снижение потребления простых углеводов и насыщенных жиров, увеличение доли клетчатки, фруктов и овощей, что способствует улучшению гликемического контроля и нормализации липидного профиля.

2. Регулярная физическая активность – систематическое выполнение аэробных и силовых нагрузок, направленных на улучшение инсулинорезистентности, снижение абдоминального ожирения и стабилизацию артериального давления.

3. Контроль массы тела и окружности талии – регулярный мониторинг и коррекция массы тела позволяют снизить абдоминальное ожирение, являющееся ключевым компонентом метаболического синдрома и фактором риска СД2.

4. Систематическое клиническое наблюдение – периодическое обследование с контролем уровня глюкозы, HbA1c, липидного профиля и артериального давления, а также оценка соблюдения пациентом рекомендаций, что позволяет своевременно корректировать стратегию профилактики.

Раннее внедрение указанных профилактических мер способствует комплексному улучшению метаболического профиля пациентов, снижению степени инсулинорезистентности, нормализации липидного обмена и кровяного давления, а также уменьшению вероятности прогрессирования кардиометаболических осложнений. В совокупности эти эффекты значительно уменьшают риск формирования СД2 и повышают качество жизни пациентов с метаболическим синдромом.

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АНТЕНАТАЛЬНАЯ СМЕРТЬ ПЛОДА И ЕЕ ПРИЧИНЫ

Аннотация: Антенатальная смерть плода остаётся актуальной проблемой перинатальной медицины. Исследование включало клинический анализ факторов риска, макроскопическое и гистологическое изучение плода, плаценты и пуповины. Выявлены ключевые причины: материнские, плацентарно-пуповинные, фетальные аномалии и акушерские осложнения. Патологоанатомическое исследование позволило определить гипоксию, врождённые пороки и инфекции, что важно для точной диагностики и профилактики повторных случаев.

Ключевые слова: Антенатальная смерть, перинатальная смертность, патологоанатомическое исследование, гипоксия плода, врождённые пороки, плацента.

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ANTENATAL FETAL DEATH AND CAUSES

Annotation: *Antenatal death of the fetus remains a significant issue in perinatal medicine. The study included a clinical analysis of risk factors, as well as macroscopic and histological examination of the fetus, placenta, and umbilical cord. The main causes identified were maternal, placental-umbilical, fetal anomalies, and obstetric complications. Pathological examination allowed the detection of hypoxia, congenital malformations, and infections, which is important for accurate diagnosis and prevention of recurrent cases.*

Key words: *Antenatal death, perinatal mortality, pathological examination, fetal hypoxia, congenital malformations, placenta.*

Актуальность. Антенатальная смерть плода остаётся значимой причиной перинатальной смертности, а во многих случаях её причины остаются неустановленными. Многофакторность процесса требует комплексного подхода. Морфологическое исследование плода и плаценты является ключевым методом уточнения причин гибели и играет важную роль в профилактике повторных неблагоприятных исходов беременности.

Цель исследования. Определить основные причины антенатальной смерти плода и оценить морфологические изменения, выявляемые при патологоанатомическом исследовании плода, плаценты и пуповины, с целью уточнения патогенетических механизмов гибели.

Методы исследования.

Исследование включало комплексную клинико-морфологическую оценку факторов антенатальной гибели плода. Проводился анализ материнских факторов риска (анамнез, инфекции, соматические и эндокринные заболевания, осложнения беременности).

Оценивался плод: антропометрические показатели, соответствие гестационному возрасту, пороки развития, признаки острой и хронической гипоксии, состояние внутренних органов и степень мацерации.

Исследовали плаценту, оболочки и пуповину, определяя их размеры, массу, структуру, инфаркты, кровоизлияния, воспалительные и тромботические изменения, а также нарушения кровотока. В пуповине учитывали количество сосудов, узлы и перегибы.

На гистологическом этапе выявляли признаки гипоксии, инфекций, иммунных и генетических нарушений, оценивали зрелость и сосудистые изменения ворсин.

Комплексность подхода позволяла определить ведущие патогенетические механизмы гибели плода и значимые морфологические изменения.

Результаты исследования.

Основные причины антенатальной гибели плода многофакторны и включают несколько групп факторов.

Материнские факторы охватывают инфекции различной этиологии, хронические соматические заболевания (гипертония, сахарный диабет,

болезни сердца), токсические воздействия, анемию, травмы и осложнения беременности, способные нарушить маточно-плацентарное кровообращение.

Плацентарно-пуповинные нарушения включают плацентарную недостаточность, отслойку, инфаркты, тромбозы сосудов, аномалии прикрепления и перегибы пуповины, её компрессию и истинные узлы, приводящие к хронической или острой гипоксии плода.

Фетальные причины связаны с генетическими аномалиями, тяжёлыми пороками развития, внутриутробными инфекциями, гемолитической болезнью и выраженной задержкой роста плода. Также причиной могут быть акушерские осложнения и случаи с неидентифицированной этиологией.

Патологоанатомически выявляются признаки хронической и острой гипоксии, врождённые пороки, внутриутробные инфекции и морфологические изменения, характерные для гемолитической болезни плода, что позволяет уточнить патогенетические механизмы смерти.

Вывод.

Патологоанатомическое исследование является ключевым методом определения причин антенатальной смерти, позволяя выявлять острые и хронические гипоксические состояния, врождённые пороки, внутриутробные инфекции, иммунные и генетические нарушения, а также оценивать состояние плаценты и пуповины. Комплексная оценка плода и плацентарного комплекса обеспечивает более точную диагностику, помогает понять патогенез гибели и способствует профилактике повторных случаев.

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ПЕДАГОГЛАРНИНГ КАСБИЙ РИВОЖЛАНИШИНИ БАҲОЛАШГА ОИД ЕТАКЧИ ТЕНДЕНЦИЯЛАР

Аннотация: Ушбу мақолада замонавий таълим тизимида педагогларнинг касбий ривожланишини баҳолашга оид халқаро ёндашувлар, уларнинг афзалликлари ва амалиётдаги самараси чуқур таҳлил қилинган. Финляндия, АҚШ, Канада ва Европанинг бир қатор давлатларида қўлланилаётган инновацион баҳолаш механизмлари ўрганилиб, уларнинг умумий йўналишлари — рақамли баҳолаш, шахсий ривожланиш режалари, инклюзивлик, натижалар асосида баҳолаш, фидбек ва менторлик каби тенденциялар аниқланган.

Таянч сўзлар: педагог фаолияти, баҳолаш, касбий компетенция, рақамли портфолио, фидбек, менторлик, халқаро тажриба.

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LEADING TRENDS IN ASSESSING THE PROFESSIONAL DEVELOPMENT OF TEACHERS

Abstract: This article provides an in-depth analysis of international approaches to assessing teachers' professional development. Modern evaluation practices applied in Finland, the USA, Canada, and European countries—including digital portfolios, personal development plans, mentoring, and data-based assessment—are examined.

Keywords: teacher performance, professional development, digital assessment, feedback, mentoring, international practice.

Кириш

Бугунги кунда таълим тизимида глобал ўзгаришлар содир бўлаётган бир пайтда, педагогларнинг касбий фаолиятини баҳолаш масаласи стратегик аҳамият касб этмоқда. Жаҳондаги илғор таълим тизимларининг таҳлили шуни кўрсатадики, педагогларни баҳолаш фақатгина назорат ва рағбатлантириш воситаси эмас, балки унинг касбий ривожланишини таъминловчи, сифатли таълимни кафолатловчи механизм сифатида қаралади.

Таълим сифатини оширишнинг асосий шартларидан бири — педагогларнинг доимий равишда ўз устида ишлаши, янги метод ва технологияларни ўзлаштириши, профессионал компетенцияларини ривожлантириб бориши. Бу жараёни тизимли ташкил этиш учун самарали, очик, аниқ ва холис баҳолаш механизмларининг мавжудлиги зарур.

ОАК талаблари доирасида бу мавзу долзарб бўлиб, илмий-назарий таҳлил, қиёсий ўрганиш ва амалиёт билан боғлашни талаб этади. Шу боис мазкур мақолада педагогларни баҳолашнинг замонавий тенденциялари, халқаро ёндашувлар ва уларнинг Ўзбекистон шароитида қўлланилиши кўриб чиқилади.

1. Педагогларни баҳолашнинг замонавий мақсад ва вазифалари

Педагог фаолиятини баҳолашда замонавий ёндашувлар унинг касбий ривожланишига йўналтирилган тизимни талаб қилади. Бунда баҳолаш қуйидаги вазифаларни бажаради:

1.1. Педагогнинг касбий компетенциясини аниқлаш

Муаллимнинг фан бўйича билими, педагогик маҳорат, дарс лойиҳалаш кўникмалари, ўқувчилар билан ишлаш стратегиялари баҳоланади.

1.2. Педагог фаолиятидаги кучли ва заиф томонларни белгилаш

Баҳолаш фақат камчиликларни аниқлаш учун эмас, балки педагогнинг ресурсли томонларини кўрсатиш, уларни янада ривожлантиришга шароит яратишга қаратилган бўлиши керак.

1.3. Инновацион ёндашувларни рағбатлантириш

Замонавий таълим талабларига мос равишда инновацион методлардан фойдаланиш, рақамли технологияларни қўллаш даражаси муҳим мезон сифатида киритилмоқда.

1.4. Фидбек ва рефлексия маданиятини шакллантириш

Педагог ўз фаолияти устида фикр юритиш, таҳлил қилиш, фидбекни қабул қилиш ва қайта ишлашга тайёр бўлиши керак.

1.5. Индивидуал ривожланиш режасини (IRR) шакллантириш

Бир қатор ривожланган мамлакатларда баҳолаш натижаси асосида ҳар бир ўқитувчи учун шахсий ривожланиш йўл харитаси тузилади.

2. Етакчи халқаро тенденциялар

2.1. Баҳолашни касбий ривожланиш билан интеграциялаш

Финляндия, Сингапур, Канада тажрибасида баҳолаш тизими ўқитувчининг касбий ўсишини режалаштиришга хизмат қилади. Масалан, Финляндияда баҳолаш натижалари ўқитувчининг кейинги малака ошириш йўналишини белгилаб беради.

2.2. Рақамли технологиялар асосида баҳолаш

Охирги йилларда рақамли платформалар педагог фаолиятини баҳолашда муҳим ўрин эгаллади:

- электрон портфолио;
- онлайн дарслар видеотаҳлили;
- виртуал кузатувлар;
- автоматлаштирилган фидбек генераторлари.

Европадаги PROFFORMANCE модели педагог фаолиятини 360° баҳолаш имконини беради.

2.3. Персонализация ва малакага асосланган ёндашув

Ўқитувчилар учун микро-сертификатлар, рақамли бейджлар, компетенция гуруҳлари бўйича малака ошириш имкониятлари кенгаймоқда. Бу педагогнинг ўз йўналиши бўйича мутахассис сифатида шакллантиради.

2.4. Маълумотларга асосланган баҳолаш (Data-informed evaluation)

АҚШ ва Канадада педагог фаолияти ўқувчиларнинг натижалари, тестлар, рефлексия материаллари, ота-оналар фикри, ҳамкасблар тажрибаси асосида комплекс баҳоланади.

2.5. Менторлик ва коучинг

Финляндия, Сингапур ва Британияда ҳар бир янги педагогга 1–2 йил давомида ментор бириктирилади. Ментор:

- дарсларни биргаликда таҳлил қилади;
- фидбек беради;
- касбий қийинчиликларни енгишга ёрдам беради.

Бу баҳолашнинг жазоловчи эмас, ривожлантирувчи жараён эканини англатади.

3. Педагогларни баҳолашда қўлланиладиган мезонлар ва воситалар

3.1. Асосий баҳолаш мезонлари:

1. Педагогик ва фан компетенцияси
2. Методик маҳорат ва дарс лойиҳалаш
3. Интерактив ва инновацион методлардан фойдаланиш
4. Рефлексия ва фидбек маданияти
5. Рақамли саводхонлик ва ИКТ компетенцияси
6. Инклюзив ёндашув ва мулоқот маданияти
7. Касбий ҳамкорлик ва жамоада ишлаш қобилияти

3.2. Баҳолаш усуллари:

- дарс кузатуви (live & video observation);
- интервью ва суҳбат;
- ўқувчилар натижаларини таҳлил қилиш;
- электрон портфолио;
- ўз-ўзини баҳолаш;
- 360 даражали баҳолаш (ўқувчи–ота-она–ҳамкасб–маъмурият фикри).

4. Ўзбекистон учун амалий тавсиялар

4.1. Баҳолаш тизимини тубдан модернизация қилиш

Педагог фаолиятини баҳолашда халқаро мезонлардан фойдаланиш, очиқлик ва шаффофликни таъминлаш лозим.

4.2. Шахсий ривожланиш режасини жорий қилиш

Ҳар бир ўқитувчида йиллик индивидуал ривожланиш режаси бўлиши шарт.

4.3. Электрон портфолио платформасини яратиш

Педагогнинг барча ишлари ягона порталда сақланиши керак.

4.4. Менторлик тизимини кучайтириш

Янги ўқитувчилар учун менторликни мажбурий қилиш.

4.5. Инклюзив таълим ва рақамли компетенцияни мезон сифатида киритиш

4.6. Баҳолаш натижаларига асосланган рағбатлантириш

Илғор педагоглар моддий ва маънавий рағбатлантирилиши зарур.

Хулоса ва таклифлар. Педагогларни баҳолаш тизими таълим сифатини оширишнинг негизи ҳисобланади. Жаҳон мамлакатлари тажрибаси шуни кўрсатадики, самарали баҳолаш тизими:

- ривожланишга йўналтирилган бўлиши;
- рақамли технологияларга асосланиши;
- менторлик ва фидбекни ўз ичига олиши;
- холис ва шаффоф бўлиши;
- маълумотлар таҳлиliga таянишини талаб қилади.

Ўзбекистонда ҳам бундай тизимни жорий қилиш орқали педагогларнинг фаолиятини самарали баҳолаш ва уларни қўллаб-қувватлаш имкони яратилади.

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ПРИМЕНЕНИЕ СИСТЕМ ИСКУССТВЕННОГО ИНТЕЛЛЕКТА В БОРЬБЕ С ФИНАНСОВЫМИ МОШЕННИЧЕСТВАМИ: АНАЛИЗ ЭФФЕКТИВНОСТИ

Аннотация: Статья посвящена применению систем искусственного интеллекта (ИИ) в противодействии финансовым мошенничествам с акцентом на их эффективность и экономический эффект. На основе статистических данных банков и финтех-компаний за 2023–2025 годы оцениваются ключевые показатели: уровень обнаружения мошенничества, доля ложных срабатываний, время реакции системы и предотвращённые финансовые потери. Результаты показывают, что ИИ существенно повышает точность выявления мошенничества, снижает количество ложных тревог, ускоряет реакцию и приносит экономическую выгоду. Исследование подчёркивает важность ИИ для современных финансовых организаций в условиях роста цифровых угроз.

Ключевые слова: искусственный интеллект, финансовое мошенничество, обнаружение мошенничества, машинное обучение, глубокие нейронные сети, экономическая эффективность, ложные срабатывания, время реакции, финтех, управление рисками

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APPLICATION OF ARTIFICIAL INTELLIGENCE SYSTEMS IN COMBATING FINANCIAL FRAUD: EFFICIENCY ANALYSIS

Annotation: The article examines the application of artificial intelligence (AI) systems in combating financial fraud, focusing on their effectiveness and economic impact. Using statistical data from banks and fintech companies between 2023–2025, the study evaluates key metrics such as fraud detection rate, false positive rate, response time, and financial loss prevention. The results demonstrate that AI significantly improves fraud detection accuracy, reduces false alarms, accelerates response times, and provides measurable economic benefits. The research highlights the importance of AI for modern financial organizations in the context of increasing digital threats.

Keywords: *artificial intelligence, financial fraud, fraud detection, machine learning, deep learning, economic efficiency, false positives, response time, fintech, risk management*

Введение. В последние годы финансовый сектор переживает стремительную цифровую трансформацию, сопровождающуюся ростом онлайн-банкинга, мобильных платежей и финтех-платформ. Наряду с повышением удобства и скорости операций значительно возросла и активность мошенников, использующих сложные цифровые схемы. Традиционные методы контроля, основанные на ручных проверках и жёстких правилах, оказались недостаточно эффективными в условиях увеличившегося объёма и сложности финансовых транзакций.

Мировые потери от финансового мошенничества ежегодно исчисляются десятками миллиардов долларов, при этом темпы роста цифровых преступлений превышают темпы роста электронных платежей. Особенно уязвимыми остаются операции с банковскими картами, онлайн-переводы и процессы удалённой идентификации клиентов. В этих условиях применение искусственного интеллекта стало ключевым инструментом обеспечения финансовой безопасности.

Системы на основе машинного обучения и анализа аномалий способны обрабатывать огромные массивы данных в реальном времени, выявляя скрытые закономерности и подозрительные действия с высокой точностью. Это позволяет значительно снизить количество ложных тревог и ускорить реагирование. Современные ИИ-модели анализируют сотни параметров транзакций - от геолокации и типа устройства до истории поведения клиента, обеспечивая более глубокий и контекстный мониторинг операций.

Использование искусственного интеллекта также изменило подход к управлению рисками. В отличие от традиционных методов, опирающихся на фиксированные правила, ИИ-системы обучаются на реальных данных и способны адаптироваться к новым схемам мошенничества. Особенно это важно в условиях роста таких угроз, как *synthetic identity fraud*, *deepfake*-технологии и социальная инженерия, где статические механизмы защиты неэффективны [1].

Экономические преимущества ИИ очевидны: несмотря на высокие начальные инвестиции, внедрение подобных систем приводит к снижению потерь от мошенничества, сокращению количества возвратных операций и повышению эффективности подразделений комплаенса. Однако остаются актуальными вопросы точности, устойчивости алгоритмов к новым угрозам и интеграции ИИ с существующими системами безопасности.

Цель данного исследования - провести анализ эффективности использования искусственного интеллекта в борьбе с финансовыми мошенничествами на основе реальных статистических данных и экономических показателей. Работа направлена на выявление того, насколько результативны ИИ-решения в снижении финансовых потерь, сокращении

ложных срабатываний и оптимизации операционных процессов, а также какие перспективы они открывают для дальнейшего развития финансового сектора в условиях роста цифровых рисков [2].

Обзор литературы. Применение искусственного интеллекта в борьбе с финансовым мошенничеством является одним из наиболее активно развивающихся направлений современной науки. Рост цифровых финансовых сервисов и усложнение мошеннических схем стимулировали развитие методов машинного обучения, глубоких нейронных сетей и поведенческой аналитики. Алгоритмы, такие как Random Forest, Gradient Boosting, SVM и LSTM, доказали свою высокую эффективность в выявлении мошеннических транзакций, повышая точность обнаружения до 95 % и снижая долю ложных срабатываний. Поведенческие модели, анализирующие действия пользователей и цифровые паттерны, позволили банкам уменьшить количество ошибочных блокировок и оптимизировать работу комплаенс-служб.

Современные исследования активно развивают методы обнаружения аномалий (Autoencoder, Isolation Forest, One-Class SVM), эффективные при дефиците размеченных данных, а также графовые нейронные сети (GNN), применяемые для выявления сетевых структур мошенников и противодействия отмыванию денег. Особое внимание уделяется выявлению synthetic identity fraud, где ИИ способен обнаруживать несоответствия между поведением, демографическими признаками и кредитной историей. Концепция Explainable AI (XAI) повышает прозрачность решений сложных моделей, что особенно важно в условиях строгих регуляторных требований.

Исследования Accenture и European Banking Authority показывают, что внедрение ИИ снижает финансовые потери банков на 30–60 %, сокращает операционные расходы и количество ложных тревог. Вместе с тем сохраняются риски - уязвимость моделей к adversarial-атакам, необходимость регулярного обновления и зависимость от качества данных. В целом, анализ научных источников подтверждает высокую эффективность ИИ в предотвращении финансовых преступлений, однако требует дальнейших исследований в области устойчивости, интерпретируемости и адаптации алгоритмов к новым видам мошенничества [9].

Методология. Для анализа эффективности применения систем искусственного интеллекта в борьбе с финансовыми мошенничествами была использована комплексная методология, включающая сбор, обработку и статистический анализ данных. Основная цель заключалась в объективном измерении влияния ИИ на уровень выявления мошенничества, количество ложных срабатываний и экономическую эффективность.

В исследовании использовались данные о транзакциях крупных банков и финтех-компаний за 2023–2025 годы, включающие подтверждённые случаи мошенничества, подозрительные операции и chargeback-инциденты. Дополнительно привлекались аналитические отчёты McKinsey, Deloitte, Accenture и статистика национальных регуляторов. Для отбора учитывались

организации, внедрившие ИИ-системы в 2024 году и предоставившие статистику как до, так и после внедрения.

Эффективность систем оценивалась по ряду ключевых метрик: уровень обнаружения мошенничества (Detection Rate), доля ложных срабатываний (False Positive Rate), среднее время реакции, предотвращённые финансовые потери и рост операционной эффективности. Анализ проводился с применением описательной статистики, сравнительного анализа «до–после» и сегментации по типам мошенничества (карточное, онлайн-платежи, подделка личности).

Для проверки статистической значимости использовались t-тесты, коэффициент корреляции Пирсона и регрессионный анализ, что позволило выявить связь между внедрением ИИ и снижением финансовых потерь. На основе собранных данных была создана структурированная база, включающая ключевые параметры транзакций, предсказания ИИ и величину предотвращённого ущерба [3].

Методология имеет определённые ограничения: точность зависит от полноты и качества данных, результаты отражают особенности конкретных организаций, а новые формы мошенничества имеют ограниченную статистическую базу. Несмотря на это, предложенный подход обеспечивает целостную и объективную оценку эффективности внедрения ИИ-систем в финансовом секторе.

Результаты. В ходе исследования был проведён сравнительный анализ эффективности систем искусственного интеллекта (ИИ) до и после их внедрения в финансовых организациях. Основной целью было определить, как внедрение ИИ влияет на уровень обнаружения мошенничества, долю ложных срабатываний, экономическую эффективность и оперативность реагирования. Для анализа использовались данные пяти организаций: три крупные банки и две финтех-компании, общее количество транзакций составило более 15 миллионов за период 2023–2025 гг [4].

Первичный анализ показал значительное улучшение всех ключевых показателей после внедрения ИИ. Среднее количество подтверждённых мошеннических операций в месяц снизилось более чем в два раза. Уровень обнаружения мошенничества вырос почти на 40 процентных пунктов, а доля ложных срабатываний уменьшилась почти в три раза. Среднее время реакции системы сократилось с 72 до 9 минут, что обеспечило мгновенную блокировку подозрительных транзакций и предотвращение дополнительных потерь.

Таблица 1.

Сравнительный анализ ключевых метрик мошенничества до и после внедрения ИИ

Показатель	До внедрения ИИ (2023)	После внедрения ИИ (2025)
Среднее количество подтверждённых мошеннических операций в месяц	1 230	485
Уровень обнаружения мошенничества (Detection Rate)	56 %	94 %
Доля ложных срабатываний (False Positives)	18 %	6 %
Среднее время реакции системы, минуты	72	9

Результаты таблицы 1 демонстрируют, что ИИ-системы значительно повышают точность и скорость обнаружения мошенничества. Сокращение времени реакции практически на порядок позволяет минимизировать финансовые потери и предотвращать каскадные эффекты, связанные с повторным использованием украденных данных или компрометацией аккаунтов [5].

Анализ экономических показателей показывает прямое влияние внедрения ИИ на снижение финансовых потерь и операционных расходов. Средние ежемесячные потери от мошенничества сократились на 65,4 %. Одновременно снизилось количество chargeback-инцидентов, что уменьшило нагрузку на отделы комплаенса и поддержку клиентов.

Таблица 2.

Экономическая эффективность и операционные показатели до и после внедрения ИИ

Показатель	До ИИ (2023)	После ИИ (2025)
Средние месячные потери от мошенничества, млн USD	5,2	1,8
Снижение потерь за счёт предотвращённого мошенничества, %	-	65,4 %
Количество chargeback в месяц	410	145
Экономия на расследовании мошенничества, часы рабочего времени / мес.	-	1 120

Данные таблицы 2 показывают, что внедрение ИИ обеспечивает не только снижение прямых убытков, но и улучшение операционной эффективности. Экономия на расследовании мошенничества составляет более 1 100 часов рабочего времени в месяц, что позволяет перенаправить ресурсы сотрудников на стратегические задачи, повышение качества обслуживания и развитие новых инструментов аналитики.

Для более глубокого анализа была проведена сегментация по типам мошенничества, результаты которой показали значительное повышение эффективности после внедрения систем искусственного интеллекта. В сфере карточного мошенничества уровень обнаружения увеличился с 58 % до 95 %, при этом доля ложных срабатываний снизилась с 20 % до 5 %. Для онлайн-платежей показатели также улучшились: обнаружение возросло с 53 % до 91

%, а количество ложных тревог сократилось с 17 % до 7 %. Наиболее заметный прогресс зафиксирован при выявлении случаев фальсификации личности и *synthetic identity fraud* - уровень обнаружения вырос с 49 % до 92 %, а ложные срабатывания уменьшились с 22 % до 8 %. Эти результаты подтверждают универсальность и адаптивность ИИ-систем, которые эффективно идентифицируют различные типы мошеннических схем, включая ранее труднораспознаваемые и сложные случаи [6].

Статистический анализ показал сильную корреляцию между внедрением ИИ и экономическими показателями. Коэффициент корреляции Пирсона между уровнем обнаружения мошенничества и снижением потерь составил $r = 0,87$ ($p < 0,01$), что подтверждает значительное влияние технологий на финансовую устойчивость организаций. Корреляция между снижением числа *chargeback* и экономией на расследовании - $r = 0,79$ ($p < 0,05$), что также подтверждает эффективность автоматизации.

В ходе исследования было установлено, что в организациях с большим объёмом транзакций (свыше 1 млн операций в месяц) внедрение систем искусственного интеллекта дало наибольший эффект: финансовые потери снизились до 70 %, а доля ложных срабатываний уменьшилась до 5 %. В то же время малые финтех-компании продемонстрировали более высокую относительную экономию рабочего времени сотрудников, что объясняется меньшей численностью отделов комплаенса и более гибкой структурой управления. Кроме того, использование ИИ позволило выявлять новые, ранее не фиксировавшиеся традиционными методами схемы мошенничества благодаря анализу скрытых паттернов и аномалий в поведении клиентов, что значительно повысило общую эффективность противодействия финансовым злоупотреблениям [7].

Обсуждение и заключение. В ходе исследования была проведена оценка эффективности систем искусственного интеллекта (ИИ) в борьбе с финансовым мошенничеством. Внедрение ИИ повышает точность и скорость обнаружения мошеннических операций: уровень обнаружения вырос на 38–40 п. п., а доля ложных срабатываний снизилась с 18 % до 6 %. Время реакции системы сократилось с 72 до 9 минут, что критично для предотвращения каскадного мошенничества. ИИ эффективен для различных схем мошенничества, включая карточные операции, онлайн-платежи и *synthetic identity fraud*, а также выявляет новые сложные схемы, недоступные традиционным методам. Корреляционный и регрессионный анализ показал сильную связь между уровнем обнаружения мошенничества и экономическим эффектом ($r = 0,87$ и $r = 0,79$) [8].

Системы ИИ анализируют большие объёмы данных в реальном времени, снижая финансовые потери, *chargeback* и затраты на расследования, а применение *Explainable AI* обеспечивает прозрачность решений и соответствие регуляторным требованиям. Наибольший эффект наблюдается в крупных организациях, что подтверждает масштабируемость решений.

Исследование имеет ограничения: данные охватывают только пять

организаций, новые схемы мошенничества представлены ограниченно, а экономические показатели зависят от структуры затрат и уровня автоматизации. Качественные аспекты, такие как удовлетворённость клиентов и репутация, не учитывались.

Рекомендации включают комплексное внедрение ИИ с интеграцией в процессы мониторинга, использование гибридных моделей (supervised и unsupervised методы, глубокие нейронные сети, анализ графов), регулярное обновление моделей и внедрение Explainable AI. Важно разрабатывать метрики эффективности с учётом финансовых, операционных и клиентских показателей. Дальнейшие исследования могут изучать устойчивость ИИ к adversarial attacks, совершенствование алгоритмов на ограниченных данных и расширение применения ИИ для трансграничных операций [10].

Заключение. Внедрение систем искусственного интеллекта в кредитно-финансовую сферу демонстрирует высокую эффективность как с точки зрения точности обнаружения мошенничества, так и с точки зрения экономической выгоды. ИИ позволяет сократить финансовые потери, уменьшить долю ложных срабатываний, ускорить реакцию на подозрительные операции и повысить операционную эффективность организации. Таким образом, применение ИИ является стратегически важным направлением для повышения устойчивости финансовых организаций в условиях роста цифровых угроз. Полученные результаты подтверждают, что ИИ-технологии становятся неотъемлемой частью современных систем противодействия финансовому мошенничеству и обеспечивают долгосрочную экономическую и операционную выгоду. Исследование создаёт научную базу для дальнейшей разработки и внедрения инновационных решений на основе ИИ, а также для совершенствования методик оценки их эффективности в реальных финансовых условиях.

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УСКОРЕНИЕ АУДИТОРСКИХ ПРОЦЕССОВ ЧЕРЕЗ ЦИФРОВУЮ ТРАНСФОРМАЦИЮ

Аннотация: В условиях стремительной цифровизации бизнеса и финансовых процессов актуальным становится повышение эффективности аудиторских процедур. Цель настоящего исследования — оценить влияние цифровой трансформации на скорость, точность и качество аудита. Проведён анализ современных методов автоматизации аудита, включая применение систем real-time мониторинга, машинного обучения и гибридных подходов, сочетающих алгоритмы и ручную проверку. Полученные результаты показывают, что цифровизация позволяет значительно сократить время проверки отчетности, повысить выявление аномалий и снизить долю ошибок, а также оптимизировать трудозатраты и операционные расходы. Исследование подтверждает стратегическую важность цифровой трансформации аудита для повышения прозрачности, подотчётности и управления рисками в организациях.

Ключевые слова: цифровизация аудита, автоматизация, ускорение процессов, выявление аномалий, управление рисками.

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ACCELERATING AUDIT PROCESSES THROUGH DIGITAL TRANSFORMATION

Abstract. In the context of rapid digitalization of business and financial processes, improving the efficiency of audit procedures has become crucial. The aim of this study is to assess the impact of digital transformation on audit speed, accuracy, and quality. The research analyzes modern audit automation methods, including real-time monitoring systems, machine learning, and hybrid approaches combining algorithms with manual verification. Results indicate that digitalization significantly reduces reporting review time, increases anomaly detection, lowers error rates, and optimizes labor and operational costs. The study confirms the strategic importance of digital transformation in auditing to enhance transparency, accountability, and risk management in organizations.

Keywords: *audit digitalization, automation, process acceleration, anomaly detection, risk management.*

Введение. В условиях цифровизации экономики и бизнеса системы корпоративного управления и аудита нуждаются в повышении скорости, точности и надёжности проверок. Традиционный аудит с ручной проверкой отчётности и выборочными инспекциями уже не справляется с ростом объёмов данных, высокой динамикой транзакций и сложными потоками информации, что повышает риск ошибок и мошенничества.

Цифровая трансформация - внедрение программных решений, автоматизированного анализа данных, real-time мониторинга и машинного обучения - позволяет оптимизировать аудиторские процессы. Системы автоматически обрабатывают большие объёмы информации, выявляют аномалии и тренды, сопоставляют данные и отмечают подозрительные операции, которые трудно заметить вручную.

Цель исследования - оценить, как цифровые инструменты аудита влияют на эффективность, скорость, экономию ресурсов и качество контроля. Основные вопросы: насколько сокращается время проверки, снижается доля ошибок, повышается выявление аномалий и уменьшаются общие затраты на аудит; а также какие риски и ограничения существуют при внедрении таких систем.

Для этого был разработан прототип цифровой аудиторской системы, протестированный на организациях разного масштаба. Сравнительный анализ до и после внедрения показал экономический и операционный эффект, а также выявил ключевые факторы успеха.

Тема актуальна как с точки зрения оптимизации внутренних процессов, так и в условиях требований регуляторов, необходимости прозрачности и борьбы с мошенничеством. Цифровизация аудита становится стратегическим ресурсом корпоративного управления в современной быстро меняющейся цифровой среде [2].

Обзор литературы. В отечественной и зарубежной литературе всё чаще рассматривается цифровизация аудита и применение информационных технологий для контроля финансовых операций. Классические подходы к аудиту подчеркивают важность систематичности, независимости и воспроизводимости проверок, однако с ростом объёмов данных и усложнением бизнес-процессов они становятся недостаточно масштабируемыми.

Современные исследования подчёркивают роль автоматизации, анализа данных и машинного обучения в внутреннем аудите и управлении рисками. Например, автоматизированный скрининг транзакций позволяет быстрее выявлять несоответствия и снижать нагрузку на сотрудников, уменьшая количество ошибок на 30–40 %. В других работах показано, что встроенные системы мониторинга финансовых потоков сокращают время обнаружения

аномалий с нескольких дней до нескольких часов, повышая оперативность реакций на риски [7].

Гибридные подходы, сочетающие алгоритмы, статистический анализ и ручную проверку, позволяют объединить скорость машинного анализа с профессиональной экспертизой человека, минимизируя ложные срабатывания. Также важно интегрировать цифровые системы с корпоративной ERP/CRM, банковской инфраструктурой и системами комплаенса - изолированные решения дают ограниченный эффект [1].

Некоторые авторы указывают на риски: чрезмерное доверие к алгоритмам, недостаточная гибкость в нестандартных ситуациях и отсутствие прозрачности. Автоматизированные системы могут пропускать редкие, но критичные ошибки, особенно при неправильной настройке параметров.

Таким образом, литература подтверждает высокий потенциал цифровизации аудита, особенно при гибридном подходе. Однако успех внедрения зависит от качества реализации, интеграции, обучения персонала и управленческих решений. При этом отсутствует достаточное количество эмпирических исследований с количественной оценкой эффективности, что создаёт пространство для настоящего проекта.

Методология. Для проверки гипотез о том, что цифровизация аудита повышает эффективность, ускоряет процессы и снижает затраты, мы разработали следующий план методологического исследования.

Выбор участников и контекст исследования. В пилотное исследование были привлечены три организации из разных секторов: одна - среднее производственное предприятие (Организация А), вторая - крупный оптовый дистрибьютор (Организация В), третья - корпорация, предоставляющая услуги (Организация С). Эти организации различались по объёму операций, численности сотрудников, структуре отчетности и частоте транзакций, что позволило проверить масштабируемость и универсальность предлагаемого решения.

Разработка и внедрение цифровой аудиторской системы. Был разработан прототип системы, включающий следующие компоненты:

- автоматизированный сбор и консолидация отчётных и транзакционных данных из ERP/CRM/бухгалтерских систем,
- модуль анализа аномалий, основанный на статистических методах (пороговые значения, отклонения от среднего, временные и объёмные паттерны),
- модуль машинного обучения - для выявления нетипичных паттернов на основании истории транзакций,
- интерфейс для аудита: дашборды, отчёты, автоматические тревожные уведомления, классификация подозрительных операций, возможности ручной проверки и подтверждения аудитором,
- логирование решений, хранение истории - для последующего повторного анализа и отчётности перед руководством и регуляторами [3].

Система была интегрирована в ИТ-инфраструктуру организаций, обеспечена необходимая защита данных, обучение персонала аудиторских и финансовых служб.

Сбор данных и сравнение «до / после». Мы зафиксировали ключевые метрики в течение 6 месяцев до внедрения системы (baseline), а затем - 6 месяцев после её запуска. В качестве контрольной группы выступали подразделения, где продолжался традиционный аудит (ручной, выборочный). Основные показатели:

- Время проверки одного отчёта (в часах);
- Количество выявленных аномалий, ошибок, подозрительных операций в месяц;
- Доля ложных срабатываний (ошибки, которые при дальнейшей проверке не подтвердились);
- Количество повторных проверок (т.е. случаев, когда первичный аудит признан недостаточным, и требуется заново анализировать документацию, операции);
- Операционные и трудовые затраты на аудит (человеко-часы, денежные затраты на работу специалистов);
- Потенциальные потери или риски от невыявленных ранее ошибок, мошеннических операций - оценены на основании прошлых случаев, коррекции отчетности, штрафов, затрат на расследования [4].

Аналитический подход. После сбора данных проведены количественный анализ и статистическая обработка: сравнение средних значений (до и после), расчёт процентных изменений, анализ корреляций между уровнем обнаружения аномалий и экономическим эффектом. Также вычислялся показатель возврата инвестиций (ROI): соотношение сэкономленных затрат и предотвращённых убытков к затратам на внедрение и поддержку системы.

Ограничения методологии. Поскольку участники исследования ограничены тремя организациями, результаты нельзя автоматически обобщать на весь спектр предприятий. Также возможен эффект «обкатки» - на старте сотрудники компании могли быть более внимательными к системе, что могло повлиять на результаты. Кроме того, расчёт потенциальных потерь от невыявленных ошибок базируется на оценках, а не на фактически зафиксированных ущербах, что снижает точность таких оценок [5].

Результаты. В ходе пилотного исследования цифровая аудиторская система показала значительное улучшение ключевых показателей по сравнению с традиционными методами. Все три организации продемонстрировали схожие тенденции, хотя масштабы изменений различались в зависимости от объёма транзакций и сложности процессов.

Среднее время проверки одного отчёта снизилось с 3,5 часов до 1,2 часа, что позволило увеличить пропускную способность аудиторских подразделений почти в три раза. Количество выявленных аномалий возросло

на 60 %, а доля ложных срабатываний снизилась на 65 %, что подтверждает более высокую точность автоматизированного анализа.

Таблица 1.

Сравнительные показатели аудита по организациям до и после цифровизации

Организация	Среднее время проверки, ч	Выявлено аномалий, мес	Доля ложных срабатываний, %	Повторные проверки, %
А (среднее производство)	3,6 → 1,1	22 → 35	15 → 5	10 → 3
В (дистрибьютор)	3,4 → 1,2	28 → 44	13 → 4	9 → 2
С (корпорация услуг)	3,5 → 1,3	24 → 37	14 → 5	9 → 2

Экономический эффект, измеряемый через снижение затрат на труд аудиторов, предотвращённые потенциальные убытки и снижение расходов на повторные проверки, оказался существенным.

Таблица 4.

Годовая экономия после внедрения цифровых аудиторских систем

Статья затрат, экономия	До цифровизации, тыс. ед.	После цифровизации, тыс. ед.	Изменение, %
Труд аудиторов	420	180	-57,1
Потенциальные потери от ошибок/мошенничества	75	20	-73,3
Расходы на повторные проверки	65	15	-76,9
Общая экономия	-	-	≈55

Помимо количественных результатов, наблюдалось значительное сокращение времени реагирования на аномальные операции - с 48 часов до менее 6 часов, что критично для предотвращения каскадного мошенничества и оперативного реагирования на финансовые риски [6].

Кроме того, цифровые инструменты позволили стандартизировать процедуры аудита, создать единую платформу для хранения логов, отчётов и истории проверок, что повышает прозрачность и воспроизводимость процессов.

Анализ корреляции Пирсона между количеством выявленных аномалий и экономическим эффектом показал высокую степень зависимости: $r = 0,85-0,87$ для всех трёх организаций. Это подтверждает прямую связь между внедрением технологий и экономической эффективностью аудита [8].

Обсуждение и заключение. Результаты исследования показывают, что цифровая трансформация аудиторских процессов обеспечивает значительное улучшение ключевых показателей эффективности. Внедрение автоматизированных инструментов сокращает время проверки отчётов, повышает точность выявления аномалий, уменьшает нагрузку на сотрудников и снижает финансовые риски.

На основе собранных данных можно сделать несколько выводов. Цифровизация аудита обеспечивает существенную экономию ресурсов - сокращение трудозатрат, уменьшение повторных проверок и предотвращение потенциальных убытков. Это делает цифровизацию стратегически важным инструментом корпоративного управления. Гибридный подход - сочетание автоматизированного анализа и ручной проверки - позволяет объединить скорость алгоритмов с профессиональной экспертизой, минимизируя ложные срабатывания и повышая качество аудита. Прозрачность алгоритмов и их интеграция с внутренними и внешними системами контроля являются критически важными для соответствия требованиям регуляторов и доверия руководства.

Основные ограничения внедрения связаны с высокими первоначальными инвестициями, необходимостью обучения персонала и возможными технологическими сбоями. Также требуется поддерживать гибкость системы, чтобы адаптироваться к изменениям бизнес-процессов и выявлению нетипичных сценариев. Перспективы дальнейших исследований включают расширение пилотных проектов на большее количество организаций и отраслей для проверки универсальности и масштабируемости решений. Изучение интеграции цифровых аудиторских систем с системами управления рисками, комплаенсом и внешними базами данных. Разработка методов оценки долгосрочной эффективности и устойчивости систем к изменениям бизнес-среды. Оценка влияния цифровизации на корпоративную культуру, взаимодействие подразделений и качество управленческих решений.

В заключение, цифровая трансформация аудита является эффективным инструментом для ускорения процессов, повышения точности и снижения операционных затрат. Она обеспечивает стратегические преимущества для организаций, улучшает контроль над финансовыми потоками и способствует устойчивому управлению рисками. При правильной реализации и учёте организационных, технических и человеческих факторов цифровизация аудита становится неотъемлемой частью современного корпоративного управления и финансовой устойчивости.

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УПРАВЛЕНИЕ ПРЯМЫМИ ИНОСТРАННЫМИ ИНВЕСТИЦИЯМИ ВО ВЬЕТНАМЕ В УСЛОВИЯХ ГЛОБАЛИЗАЦИИ И СВОБОДНОЙ ТОРГОВЛИ

***Аннотация:** Прямые иностранные инвестиции во Вьетнаме принесли значительные выгоды, внося весомый вклад в стимулирование роста валового внутреннего продукта страны и повышение уровня социальной жизни. Наряду с положительными аспектами, данная деятельность подвергается воздействию множества факторов. В представленной статье анализируются и предлагаются ряд решений, направленных на повышение эффективности управления прямыми иностранными инвестициями в условиях глобализации и свободной торговли.*

***Ключевые слова:** прямые иностранные инвестиции; Вьетнам; экономическое управление.*

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MANAGEMENT OF FOREIGN DIRECT INVESTMENT IN VIETNAM IN THE CONTEXT OF GLOBALIZATION AND FREE TRADE

***Abstract:** Foreign direct investment (FDI) in Vietnam has generated significant benefits, making an important contribution to national GDP growth and the improvement of social living standards. Alongside its positive impacts, this activity is also influenced by various factors. This paper analyzes the current situation and proposes several solutions aimed at enhancing the effectiveness of foreign direct investment management in the context of globalization and free trade.*

***Keywords:** foreign direct investment; Vietnam; economic management.*

За почти 40 лет реализации политики обновления (Đổi mới) Коммунистическая партия и Государство Социалистической Республики Вьетнам сформировали разветвлённую систему установок, политики и законодательства в сфере привлечения и управления иностранными инвестициями, способствуя созданию благоприятной инвестиционной среды и сближению с международной практикой. Экономический сектор с участием

иностранный капитал демонстрирует устойчивые темпы роста и высокую эффективность, став важной частью национальной экономики и значительно способствуя социально-экономическому развитию страны.

Иностранные инвестиции во Вьетнаме активизируются: в страну приходят транснациональные корпорации и крупные технологические компании; увеличиваются объём капитала и качество проектов, что способствует созданию рабочих мест, росту доходов населения, повышению производственного потенциала, увеличению бюджетных поступлений, обеспечению макроэкономической стабильности и ускорению структурной трансформации экономики.

В период 2019 – июнь 2025 гг. иностранные инвесторы осуществляли вложения в 19 из 21 отрасли экономики Вьетнама, при этом обрабатывающая промышленность сохраняет ведущую роль, привлекая почти 121,3 млрд долл. США (около 60 % общего зарегистрированного капитала). Инвестиционные проекты реализуются инвесторами из 114 стран и территорий, среди которых лидирующие позиции по объёму и количеству проектов занимают Сингапур, Республика Корея и Япония. Совокупно на долю этих трёх стран приходится более половины общего зарегистрированного инвестиционного капитала, что свидетельствует о высоком уровне доверия к инвестиционной среде Вьетнама⁴⁴.

Однако сфера привлечения и управления иностранными инвестициями во Вьетнаме по-прежнему сталкивается с рядом серьёзных проблем. Институциональная и нормативно-правовая база не в полной мере соответствует требованиям развития, а политика инвестиционных льгот остаётся распылённой, недостаточно согласованной и нестабильной. Несмотря на определённые улучшения, инвестиционная среда и конкурентоспособность всё ещё имеют существенные ограничения, а качество и эффективность управления иностранными инвестициями остаются сравнительно низкими.

Социально-экономическая инфраструктура и кадровый потенциал высокого уровня пока не удовлетворяют потребности развития. Сохраняются проблемы в механизмах разрешения споров и в деятельности управленческого аппарата, который характеризуется раздробленностью, недостаточной профессионализацией и ограниченной инициативностью.

Значительная часть проектов остаётся мелкомасштабной, с низким уровнем технологий и высокой трудоёмкостью; их распределение неравномерно, а доля реализованного капитала по сравнению с зарегистрированным остаётся низкой. Наблюдается тенденция к снижению вклада сектора ПИИ в государственный бюджет. Взаимодействие с другими секторами экономики остаётся слабым, уровень локализации низким, а эффекты передачи технологий и роста производительности ограничены.

⁴⁴ Министерство финансов Вьетнама (2025), Отчёт об оценке текущего состояния деятельности предприятий с иностранными прямыми инвестициями и действующей политики инвестиционных льгот.

Одновременно усиливаются такие негативные явления, как трансфертное ценообразование, «теневые» и «замаскированные» инвестиции. Отдельные предприятия допускают неэффективное использование ресурсов и земли, а также нарушения трудового, налогового и экологического законодательства, что приводит к росту сложных споров и конфликтов. Серьёзные трудности сохраняются и в развитии роли партийных, профсоюзных и общественно-политических организаций в секторе экономики с иностранным капиталом⁴⁵.

Указанные выше ограничения и недостатки обусловлены рядом причин, среди которых преобладают субъективные факторы. Уровень осознания и понимания проблемы на различных уровнях управления, в разных отраслях и в обществе в целом остаётся недостаточным и непоследовательным; привлечение иностранных инвестиций носит недостаточно селективный характер. Подходы и ориентиры в обновлении и совершенствовании механизмов, политики и законодательства, регулирующих сферу иностранных инвестиций, не в полной мере соответствуют требованиям практики, характеризуются фрагментарностью и отсутствием системности, при этом многие нормативные положения сохраняют элементы дублирования и противоречий.

Профессиональный и управленческий потенциал кадров, занимающихся привлечением и управлением иностранными инвестициями, во многих случаях остаётся ограниченным, недостаточно инициативным и творческим; аналитические и прогностические способности всё ещё имеют существенные ограничения. Деятельность по инспектированию, контролю и рассмотрению правонарушений в ряде случаев и на отдельных уровнях осуществляется недостаточно строго и последовательно⁴⁶.

В международном контексте объёмы глобальных потоков прямых иностранных инвестиций характеризуются значительными колебаниями, а конкуренция за их привлечение становится всё более острой. Многие государства осуществляют стратегическую корректировку своей инвестиционной политики, разрабатывая новые механизмы льгот и поддержки с целью привлечения прямых иностранных инвестиций в современных условиях⁴⁷. Во внутреннем контексте экономический потенциал и позиции страны продолжают укрепляться, сохраняется политическая и социальная стабильность. Процессы международной интеграции углубляются, ведутся переговоры и подписываются соглашения о свободной

⁴⁵ Хоанг Нгок Хай, Хо Тхань Тхуй, Эффективное привлечение «нового поколения» прямых иностранных инвестиций, Журнал «Коммунист», доступ: <https://www.tapchicongsan.org.vn/web/guest/kinh-te/-/2018/827105/thu-hut-co-hieu-qua-von-dau-tu-truc-tiep-nuoc-ngoai-%E2%80%9Cthe-he-moi%E2%80%9D.aspx> (дата обращения: 20.10.2025).

⁴⁶ Политбюро Коммунистической партии Вьетнама (2019), Резолюция № 50-NQ/TW от 20 августа 2019 г. О направлениях совершенствования институтов и политики, повышении качества и эффективности сотрудничества в сфере иностранных инвестиций до 2030 года.

⁴⁷ До Тхи Тху, Прямые иностранные инвестиции и вопросы социально-экономического развития во Вьетнаме, Электронный информационный портал Министерства финансов Вьетнама, доступ: <http://mof.gov.vn/dau-tu-truc-tiep-nuoc-ngoai-va-van-de-phet-trien-kinh-te.html> (дата обращения: 20.10.2025).

торговле нового поколения. Международный статус и авторитет государства последовательно повышаются, растёт доверие и интерес со стороны иностранных инвесторов. Прямые иностранные инвестиции становятся объективной закономерностью процесса международной интеграции. Новые условия развития ставят задачу дальнейшего совершенствования институциональной и политико-правовой базы, направленной на повышение качества и эффективности привлечения и управления ПИИ в предстоящий период.

В условиях растущего влияния сектора прямых иностранных инвестиций на национальную экономику, а также с целью формирования единства в подходах и практических действиях в контексте глобализации и свободной торговли, целесообразно сосредоточить внимание на следующих ключевых вопросах:

Во-первых, обновление мышления и формирование единого подхода к роли ПИИ.

Необходимо обеспечить единое и последовательное понимание в рамках всей политической системы роли и значения прямых иностранных инвестиций в развитии национальной экономики. Сектор ПИИ должен рассматриваться как важная составная часть экономики Вьетнама, функционирующая на принципах соблюдения национального законодательства и равенства перед законом, стимулируемая к долгосрочному развитию, здоровой конкуренции и сотрудничеству с другими секторами. Политика в сфере ПИИ должна быть модернизирована в соответствии с курсом Партии, интегрирована в международные процессы и основана на принципе «внутренние ресурсы — решающие, внешние — важные», с переходом от пассивного привлечения к активному и избирательному, с ориентацией на качество и эффективность, а не только на количество инвестиций, при одновременном развитии внутреннего инвестирования и укреплении экономической самостоятельности страны в условиях международной интеграции.

Во-вторых, укрепление макроэкономической стабильности и улучшение инвестиционной среды.

Следует продолжить улучшение инвестиционно-делового климата и повышать уровень производительности, конкурентоспособности и эффективности экономики. Особое значение имеет обеспечение устойчивой макроэкономической среды с низкими рисками дисбалансов, создание предпосылок для долгосрочных инвестиций в основные фонды и расширение производственного потенциала. Это требует гибкого и взвешенного проведения денежно-кредитной политики в сочетании с бюджетной и иной макроэкономической политикой, направленной на поддержание макроэкономической стабильности, контроль инфляции, стабилизацию процентных ставок, обеспечение устойчивости национальной валюты и гибкое регулирование обменного курса в соответствии с рыночными сигналами, а также на повышение производительности труда,

технологического уровня и инновационного потенциала экономики.

В-третьих, совершенствование институциональной и политико-правовой базы в сфере ПИИ.

Необходимо продолжить комплексный пересмотр и обновление законодательства и политики в области прямых иностранных инвестиций в соответствии с обязательствами Вьетнама по соглашениям нового поколения (СРТРР, EVFTA, EVIPA и др.), включая положения о труде, профсоюзах, защите окружающей среды и интеллектуальной собственности, с целью приближения правовой среды к высоким международным стандартам.

Требуется упрощение доступа на рынок для иностранных инвесторов в тех секторах, где снижается потребность в защите, сокращение избыточных административных барьеров и инвестиционных условий, а также совершенствование процедур оценки и контроля инвестиционных проектов. Важным является создание эффективного межведомственного механизма координации (с участием органов регистрации, безопасности, обороны, иностранных дел) для своевременного выявления и пресечения незаконных и «замаскированных» инвестиций.

Система инвестиционных стимулов должна трансформироваться в сторону ориентации на результаты: уровень участия в глобальных цепочках стоимости, локализацию, технологическую составляющую, научно-исследовательскую деятельность, инновации и социальную ответственность. Одновременно следует развивать дифференцированную и гибкую систему льгот для крупных, высокотехнологичных и стратегически значимых проектов, включая проекты по созданию центров НИОКР и инноваций, с применением механизмов постинвестиционного контроля и ответственности за невыполнение обязательств. Не менее важно дальнейшее укрепление правовых гарантий защиты прав и законных интересов инвесторов, устранение нерыночных барьеров, обеспечение прозрачности и предсказуемости инвестиционной политики, а также усиление превентивных механизмов урегулирования инвестиционных споров и жалоб инвесторов на всех стадиях инвестиционного процесса.

В-четвёртых, обновление модели и форм привлечения инвестиций. Необходимо формировать национальный инвестиционный бренд на основе достоинств, потенциала и ценностей Вьетнама, а также реструктурировать систему органов по продвижению инвестиций в направлении их большей независимости и профессионализации, с тесной увязкой с продвижением торговли и туризма и чётким разграничением с функциями государственного управления. Важно усиливать координацию между центральным и местным уровнями, регионами, государственными органами и профессиональными ассоциациями, проводить целенаправленное и диверсифицированное продвижение инвестиций, сочетая сохранение традиционных партнёров с расширением на новые рынки и уделяя приоритетное внимание инвестиционному продвижению «на месте».

В-пятых, повышение эффективности государственного управления в сфере ПИИ. Следует устранять несогласованность в реализации политики между центральными и местными органами власти, пресекать практику незаконного предоставления инвестиционных льгот и превышения полномочий при утверждении и управлении проектами ПИИ. Необходимо укреплять контроль, инспекцию и надзор за реализацией инвестиционных проектов, обеспечивая их соответствие стратегическому планированию и критериям отбора, а также повышать ответственность местных властей и их руководителей за соблюдение государственной политики и законодательства в области ПИИ.

В-шестых, усиление руководящей роли Партии и общественно-политических организаций в секторе ПИИ.

Требуется обновление подходов к организации партийных структур на предприятиях с иностранным капиталом с учётом их специфики, развитие и повышение эффективности деятельности профсоюзных организаций для защиты законных прав работников и формирования стабильных трудовых отношений. Важную роль в мониторинге и общественном контроле за реализацией политики и законодательства в сфере ПИИ должны играть Отечественный фронт Вьетнама, а также другие общественно-политические и профессиональные организации на всех уровнях.

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ЭФФЕКТИВНОСТЬ СИСТЕМЫ МАТЕРИАЛЬНОГО СТИМУЛИРОВАНИЯ ВОЕННОСЛУЖАЩИХ

***Аннотация:** В статье представлен научно-практический анализ системы материального стимулирования военнослужащих и её влияния на воинскую дисциплину. Рассматривается роль материального поощрения в теории человеческого капитала, мотивационных механизмах и принципах управления, опираясь на исследования П. Друкера, Дж. Стиглица, Г. Беккера и Т. Шульца. Проведен сравнительный анализ опыта США, стран НАТО, Германии и Южной Кореи с практикой, применяемой в Вооружённых Силах Узбекистана. Особое внимание уделено принципам справедливости, мотивационного воздействия, коллективной эффективности и социальной стабильности в укреплении дисциплины и повышения результативности военной службы. Результаты исследования показывают, что система материального стимулирования в Узбекистане постепенно совершенствуется, однако сохраняются проблемы, связанные с прозрачностью и дифференциацией выплат.*

***Ключевые слова:** материальное стимулирование, воинская дисциплина, мотивация, человеческий капитал, социальные гарантии, система поощрения.*

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THE EFFECTIVENESS OF THE MATERIAL INCENTIVE SYSTEM FOR MILITARY PERSONNEL

***Abstract:** This article provides a scientific and practical analysis of the material incentive system for military personnel and its impact on military discipline. The role of material incentives within human capital theory, motivational mechanisms, and management principles is examined with reference to the works of P. Drucker, J. Stiglitz, G. Becker, and T. Schultz. Comparative analysis of foreign military systems — including those of the United States, NATO countries, Germany, and South Korea — is conducted in relation to the practices of the Armed Forces of Uzbekistan. The study highlights the significance of fairness, motivational impact, collective efficiency, and social stability in strengthening military discipline and*

service effectiveness. The findings indicate that while Uzbekistan's material incentive system is gradually improving, issues related to transparency and differentiated payments remain.

Keywords: *material incentives, military discipline, motivation, human capital, social guarantees, incentive system.*

Введение.

Обороноспособность любого государства определяется прежде всего профессиональной подготовкой, морально-психологическим состоянием и дисциплиной его военнослужащих. В условиях сложных условий военной службы, высокого уровня риска, а также физических и психических нагрузок обеспечение мотивации военнослужащего является одной из актуальных задач. С этой точки зрения система материального стимулирования признаётся одним из важнейших управленческих механизмов, обеспечивающих эффективность, дисциплину и стабильность в военных структурах. Грамотно организованные материальные стимулы не только усиливают личную мотивацию солдат и офицеров, но и оказывают прямое воздействие на сплочённость всего подразделения, ответственность в выполнении служебных обязанностей и уровень боевой подготовки.

Современные экономические теории рассматривают материальное стимулирование как составную часть развития человеческого капитала. Согласно теории человеческого капитала, разработанной западными учёными Г. Беккером и Т. Шульцем, инвестиции, направленные на знания, навыки, опыт и потенциал, дают эффективный результат только тогда, когда они гармонично сочетаются с механизмами стимулирования. При применении данной теории к военной сфере её значимость ещё больше возрастает, поскольку финансовые расходы государства на подготовку военных кадров превращаются в реальный результат службы лишь при их тесной связи с системой стимулирования и с этапами боевой подготовки.

Международная практика показывает, что в ряде развитых государств — включая США, страны НАТО, Германию и Республику Корея — системы материального стимулирования военнослужащих формируются на основе дифференцированного подхода. Степень опасности службы, региональные условия, характер боевых задач и участие в миссиях оказывают прямое влияние на размеры стимулирования. Кроме того, предоставляемые военнослужащим социальные гарантии — жильё, медицинское обслуживание, пенсионное обеспечение, программы поддержки семей — становятся важным фактором дисциплины и психологической устойчивости.

В Республике Узбекистан в последние годы также осуществлены широкомасштабные реформы по совершенствованию системы материального стимулирования военнослужащих. Размеры заработной платы, выплаты по званию, специальные надбавки, дополнительные стимулы за мобилизацию и службу в опасных регионах систематически пересматриваются. Эти реформы оказывают положительное воздействие на повышение удовлетворённости

службой, укрепление дисциплинарной стабильности и снижение ротации кадров. Однако в практике сохраняются отдельные проблемы — недостаточная дифференциация стимулирования, иногда субъективные подходы, недостаточная прозрачность — что может негативно отразиться на эффективности системы.

В статье проводится глубокий анализ теоретических основ существующей системы, международного опыта, национальной практики, существующих проблем и направлений совершенствования. Через это предусматривается создание научной основы для формирования оптимальной модели материального стимулирования, направленной на повышение качества и дисциплины военной службы.

Анализ литературы (Literature review). Материальные стимулы и социальные гарантии военнослужащих играют важную роль в формировании воинской дисциплины. Сложные условия службы, риски, длительная мобилизация и физико-психологические нагрузки требуют от военнослужащего высокого уровня самоотдачи. Если материальные стимулы и гарантии обеспечиваются справедливо, прозрачно и регулярно, это повышает не только индивидуальную мотивацию военнослужащих, но и дисциплину и сплочённость всего подразделения. В противном случае несоответствие между стимулированием и трудом может отрицательно сказаться на эффективности службы.

Материальные стимулы являются одной из основных категорий экономической теории и непосредственно связаны с развитием человеческого капитала. Как отмечается в «теории человеческого капитала» Г. Беккера, любые инвестиции в знания, навыки и опыт активизируются через механизмы материального стимулирования и приводят к высокой экономической отдаче для общества. Кроме того, в исследованиях Т. Шульца подчеркивается, что развитие человеческого капитала возможно не только через улучшение образования и здравоохранения, но и через систему стимулирования, обеспечивающую достижение практических результатов.

Одним из учёных, объяснивших взаимосвязь между эффективностью службы и материальными стимулами с точки зрения экономического механизма, является П. Друкер, который подчёркивает необходимость интеграции стимулирования в управленческие механизмы для обеспечения результативности организации. Кроме того, Дж. Стиглиц в своих исследованиях, посвящённых экономике государственного сектора, показывает, что справедливость и прозрачность системы стимулирования являются основным условием повышения эффективности службы.

В военной сфере этот механизм действует следующим образом: эффективность службы оценивается на основе её результатов → результаты оценки связываются с материальными стимулами → стимулирование усиливает дальнейшую деятельность солдата или офицера. Этот процесс носит циклический характер, при котором стимул и результативность взаимно усиливают друг друга.

В Вооружённых Силах Узбекистана заработная плата военнослужащих устанавливается дифференцированно в зависимости от звания и должности. Преимущество данной системы заключается в том, что она усиливает стремление военных кадров к постепенному прохождению профессиональных ступеней службы. По нашему мнению, должностной оклад и выплаты по званию являются не только средством удовлетворения материальных потребностей, но и мотивационным механизмом, определяющим будущий карьерный путь военнослужащего.

Особенность военной службы состоит в том, что риск, внешние миссии и специальные задания встречаются постоянно. Поэтому во многих государствах предусмотрены дополнительные выплаты для военнослужащих. Например, в армии США существуют «**hazardous duty pay**» и «**combat pay**», которые предоставляются военнослужащим, проходящим службу в опасных районах, в качестве дополнительного вознаграждения. В странах НАТО также применяются специальные надбавки за выполнение боевых задач и участие в миротворческих миссиях.

Ещё одним важным видом материального стимулирования являются социальные гарантии. Они направлены на обеспечение долгосрочной стабильности военной службы. Например, в Германии Бундесвер предоставляет военнослужащим служебное жильё и реализует программы поддержки семей. В США военнослужащие имеют право на бесплатное медицинское обслуживание, служебное жильё, бесплатное обучение детей и пенсионные гарантии.

В последние годы в Вооружённых Силах Узбекистана реализован ряд реформ, в рамках которых для военнослужащих была введена система предоставления льготного ипотечного жилья, бесплатного медицинского обслуживания и выделения льготных кредитов. Кроме того, обеспечение военнослужащих пенсией после окончания срока службы также является одной из основных социальных гарантий. Социальные гарантии для военнослужащих являются не только средством стимулирования службы, но и гарантией сохранения стабильности всей военной системы. Поскольку защищённость семьи и социальной жизни обеспечивает военнослужащему психологическое спокойствие.

Для эффективного функционирования системы материального стимулирования она должна опираться на определённые научно обоснованные принципы. Эти принципы обеспечивают тесную взаимосвязь между стимулированием и результативностью службы, усиливают дисциплину и мотивацию военнослужащих, а также гарантируют справедливость и стабильность системы. Ниже рассмотрены наиболее важные принципы формирования материальных стимулов в военной сфере.

Принцип справедливости находится в центре любой системы стимулирования. По утверждению Дж. Стиглица, если система стимулирования не является прозрачной и справедливой, она не только снижает мотивацию, но и подрывает доверие к самой системе. В военной

сфере принцип справедливости означает прямое соответствие между результатом службы и вознаграждением. То есть военнослужащий, показавший высокие результаты, должен быть обязательно поощрён, а тот, кто показал низкие результаты, должен быть объективно оценён и лишён возможности получения стимулирования.

Этот принцип реализуется и в Вооружённых Силах Узбекистана: военнослужащие, выполняющие специальные задания, проходящие боевую подготовку или несущие службу в опасных районах, получают дополнительные надбавки.

Особенность военной службы заключается в её коллективном характере. Поэтому система стимулирования должна включать и показатели коллективной эффективности. Например, в системе TRADOC США введены дополнительные вознаграждения на основе результатов деятельности подразделений, что способствует укреплению сотрудничества среди военнослужащих.

Критерий социальной стабильности занимает важное место в оценке внутреннего равновесия военной системы. Как показывают исследования Д. Канемана и Р. Талера, справедливая и эффективная система стимулирования повышает удовлетворённость службой и снижает уровень ротации кадров.

Критерий социальной стабильности является наиболее надёжным показателем для оценки долгосрочной эффективности материальных стимулов. Поскольку он измеряет не только непосредственные результаты, но и устойчивость всей системы службы.

В настоящее время указы нашего Президента и постановления правительства укрепляют правовую основу материальных стимулов и служат созданию устойчивой системы стимулирования в нашей национальной армии. Национальная практика показывает, что показатели эффективности материальных стимулов проявляются в нескольких направлениях:

Рост уровня удовлетворённости службой — в последние годы среди военнослужащих усилилось стремление продолжать службу, что отчётливо проявляется в снижении показателей ротации. Укрепление дисциплинарной стабильности — прозрачные механизмы стимулирования и поощрений уменьшают недовольство среди военнослужащих. Повышение эффективности боевой подготовки — привязка материальных стимулов к результатам занятий способствует большей активности военнослужащих. Улучшение социального климата — наличие жилищных, медицинских и семейных гарантий усиливает психологическую стабильность военнослужащих.

Национальная практика подтверждает, что система материального стимулирования в Вооружённых Силах постепенно совершенствуется. Её показатели эффективности дают существенные результаты в укреплении мотивации, дисциплины и стабильности в военной системе.

При изучении системы материального стимулирования военнослужащих особое значение имеет зарубежный опыт. Несмотря на то что оборонные системы различных стран имеют свои особенности, исторический опыт и экономические возможности, их общая цель — повышение эффективности службы и обеспечение социально-экономической стабильности военнослужащих.

Воинская дисциплина является одним из основных опор любой армии. Материальные стимулы выступают прямым инструментом укрепления этой дисциплины. Согласно теории ожиданий, В. Врума, любой сотрудник должен чётко ощущать взаимосвязь между ожидаемыми результатами своей деятельности и вознаграждением, иначе мотивация ослабевает.

Необходимо закрепить взаимосвязь между стимулированием и дисциплиной через чёткие механизмы. Например, лишение стимулирования за дисциплинарные нарушения и, наоборот, предоставление дополнительных поощрений за образцовую дисциплину играют важную роль в укреплении порядка среди военнослужащих.

Выводы и рекомендации (Conclusion/Recommendations). Справедливые и прозрачные стимулы повышают мотивацию военнослужащих, усиливают коллективную и индивидуальную эффективность, обеспечивают удовлетворённость службой. Опыт широкомасштабных реформ, проводимых в Узбекистане, показывает, что повышение заработной платы, дополнительных выплат и социальных гарантий укрепило стабильность военной системы, однако всё ещё необходимо усилить дифференциацию и прозрачность. Дифференцировать стимулирование в зависимости от вида службы и уровня риска. Обеспечить прозрачность и открытость процедур поощрения, внедрить систему мониторинга. Включить показатели коллективной эффективности в систему стимулирования. Расширить социальные гарантии и развивать дополнительные льготы, такие как жильё и медицинское обслуживание. Необходимо согласовать механизмы стимулирования с теориями мотивации.

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ИСПРАВЛЕНИЕ СИСТЕМАТИЧЕСКИХ ОШИБОК В ОПРЕДЕЛЕНИИ ОБЩИХ ФАЗ

Аннотация: В данной работе рассматриваются природа и источники **систематических ошибок**, возникающих при определении общих фаз в измерительных и экспериментальных процессах. Проведён анализ влияния инструментальных, методических и внешних факторов на точность получаемых результатов. Описаны методы **обнаружения и коррекции систематических ошибок**, включая калибровку измерительных приборов, введение поправочных коэффициентов и статистическую обработку данных.

Ключевые слова: систематические ошибки, определение фаз, точность измерений, калибровка, коррекция ошибок, экспериментальные методы, обработка данных, надёжность, анализ неопределённости, прецизионность.

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CORRECTION OF SYSTEMATIC ERRORS IN THE DETERMINATION OF COMMON PHASES

Annotation: This paper examines the nature and sources of **systematic errors** that arise in the determination of common phases during measurement and experimental processes. The influence of instrumental, methodological, and external factors on the accuracy of obtained results is analyzed. Methods for **detecting and correcting systematic errors**, such as instrument calibration, application of correction coefficients, and statistical data processing, are described.

Keywords: Systematic errors, phase determination, measurement accuracy, calibration, error correction, experimental methods, data processing, reliability, uncertainty analysis, precision.

Введение.

Определение общей фазы-это процесс измерения фазового сдвига или абсолютного значения фазы сигнала. Этот метод применяется в геодезии, оптической интерферометрии, радиолокации, физических экспериментах и во многих других областях. Точность таких измерений во многом зависит от уменьшения систематических ошибок или их полного устранения.

Систематические ошибки-это такие погрешности, которые постоянно или закономерно влияют на результаты измерений. Они не являются случайными и при повторении измерений в одинаковых условиях имеют одно и то же значение или изменяются по определённом закону. В результате в измерениях появляются постоянные отклонения.

Развитие современных технологий невозможно без совершенствования высокоточных систем. Основным элементом лазерных интерференционных систем является интерферометр, осуществляющий сравнение объектного и опорного волновых полей. Поле яркости $I(x, y)$, возникающее при интерференции опорного и объектного оптических полей описывается выражением

$$I(x, y) = A(x, y) + B(x, y) \cos(\Phi(x, y)),$$

где $A(x, y)$ – средняя яркость, $B(x, y)$ – амплитуда интерференционных полос; $\Phi(x, y)$ – поле фазовых разностей интерферирующих оптических полей (полная фаза):

$$\Phi(x, y) = \varphi(x, y) + 2\pi N(x, y).$$

Здесь $N(x, y)$ – число целых периодов 2π , укладывающихся в полную оптическую разность фаз $\Phi(x, y)$, и зависящих от геометрии схемы интерферометра и длины волны излучения лазера λ $\Phi(x, y)$ – локальная фаза, являющаяся дробной частью фазы $\Phi(x, y)$. Далее для упрощения изложения координаты (x, y) опускаем.

Определение целого числа периодов N называется устранением фазовой неоднозначности. Существует большое количество алгоритмов, реализующих данный подход. Как правило, эти алгоритмы основаны на оценке разрывов локальных фаз φ и выборе пути пространственного интегрирования таким образом, чтобы область интегрирования не содержала разрывы, либо суммировании поправочных коэффициентов, пропорциональных количеству разрывов, с учетом их знака. Очевидно, что в случае ошибки определения местоположения скачков происходит накопление ошибок и в связи с этим ограничение возможного диапазона измерений. Кроме того, данные методы не позволяют обнаружить скачок фазы, превышающий 2π , что является принципиальным ограничением одночастотных интерференционных систем. В работе предложен способ целочисленной интерферометрии, позволяющий реконструировать полную фазу Φ непосредственно по значениям локальных фаз φ , используя несколько длин волн лазера. Такой подход способствует устранению отмеченных недостатков, но весьма чувствителен к ошибкам измерения локальных фаз φ .

Вместо разности фаз интерферирующих волн Φ удобно в расчетах ввести в рассмотрение пропорциональную ей величину Λ -оптическую разность хода (далее-разность хода). Полная разность хода Λ связана с полной фазой Φ :

$$\Lambda = (\lambda / 2\pi) \Phi = (\lambda / 2\pi) (\varphi + 2\pi N) = \delta + \lambda N,$$

где δ -локальная разность хода, соответствующая локальной фазе φ (эта величина изменяется от нуля до цены интерференционной полосы в длинах волн). Измеренные значения локальных фаз φ переводятся в локальные разности хода δ , которые выражаются в виде целых значений с числом знаков, обеспечивающих необходимую точность измерения.

Для определения OPD требуется найти решение целочисленной системы сравнений

$$\Lambda \equiv \delta_1 \bmod m_1,$$

$$\Lambda \equiv \delta_2 \bmod m_2.$$

Решение этой системы можно представить в виде траектории на комплексной плоскости (δ_1, δ_2) (рис. 1). Максимальная длина траектории $L_{\max} = m_1 \times m_2 - 1$ задает динамический диапазон однозначного определения $\Lambda_{\max}$. Расстояние между соседними диагоналями траектории $\delta L > L_1$. Например, если $m_1 = 633$, $m_2 = 488$ (что соответствует линиям генерации He-Ne и Лазеров) и $L_{\max} = 10m_2$, то $\delta L = 52$.

При неточном определении исходных значений $\delta_{1,2}^* = \delta_{1,2} + \varepsilon_{1,2}$ решения системы сравнений приводит к грубым ошибкам, так как разность хода Λ , соответствующая δ_1 и δ_2 , на комплексной плоскости будет больше $\Lambda_{\max}$. Если точка на комплексной плоскости, соответствующая δ_1 и δ_2 , отклоняется от ближайшей диагонали траектории на величину не более $\delta L/2$, данную ошибку можно компенсировать.

Наибольший вклад в искомую погрешность дает отклонение профиля интерференционных полос от вида выражения. Чаще всего отклонения этой зависимости от к синусоидальной формы вызывается стеклообразной структурой изображения при когерентном освещении.

Целью предлагаемой работы является модификация базового метода для повышения его устойчивости к ошибкам измерений, связанным с использованием профиля интерференционных полос.

Методы.

Для устранения ошибок при искажении профиля полос необходима поэтапно:

1. Вычислить разность локальных разностей хода: $\Delta = \delta_1 - \delta_2$;
2. Найти изотропные области, т.е области интерферограммы, в которых выполняется условие $\Delta = \text{const}$.

Следует отметить, что погрешности определения границ изотопных областей, возникающие в отдельных точках, и обусловленные малым соотношением сигнал/шум разностей хода, носят локальный характер и не распространяются на соседние области.

3.Вычислить оценку разности в изотропных областях. В отсутствие шумов разность Δ является кусочно-постоянной функцией, независимо от закона изменения OPD. Без потери устойчивости на этапе коррекции допустимо отклонение оценки разности не величину, не превышающую половины расстояния между диагоналями 1 и 3 линии сигналов 2 (см.рис. 1)

4.Сформировать фазовые плоскости $(\Delta_1 \ \delta_2)$, $(\Gamma_1 \ \delta_2)$, $(\delta_1, \ \Gamma_2)$ по следующему правилу:

$$\Gamma_1 = \delta_2 + \Delta_j,$$

$$\{\delta_1 + \Delta_j, \text{ если } \delta_1 - \delta_2 \geq 0,$$

$$\delta_1 - \Delta_j + m_2, \text{ иначе.}$$

5.Скорректировать разности хода на фазовой плоскости и определить полную разность хода (OPD) по основному алгоритму.

Результаты.

Экспериментальная проверка производилась путем измерения рельефа эталонного объекта основным и предлагаемым способами [1]. Оптическая схема лазерной интерферометрической системы приведена.

На третьем этапе производилось формирование фазовых плоскостей $(\varphi_1, \ \varphi_2)$ по базовому методу фазовых плоскостей $(\varphi_1, \ \varphi_2)$ и $(\varphi_1, \ \varphi_2)$ и вычисления соответствующих им полных фаз Φ_1 и Φ_2 по модифицированному методу (рис. 5, а–f). Результаты коррекции траектории полной фазы до ближайшей разрешённой диагонали линии сигналов (по правилам (4), (6)) для базового и модифицированного методов показаны на рис. 5, b, d, f. Из рис. 5, b видно, что результирующая погрешность полной фазы для базового метода много больше длины волны λ из-за наличия грубых ошибок, вызванных искажением профиля интерференционных полос при коррекции фазы.

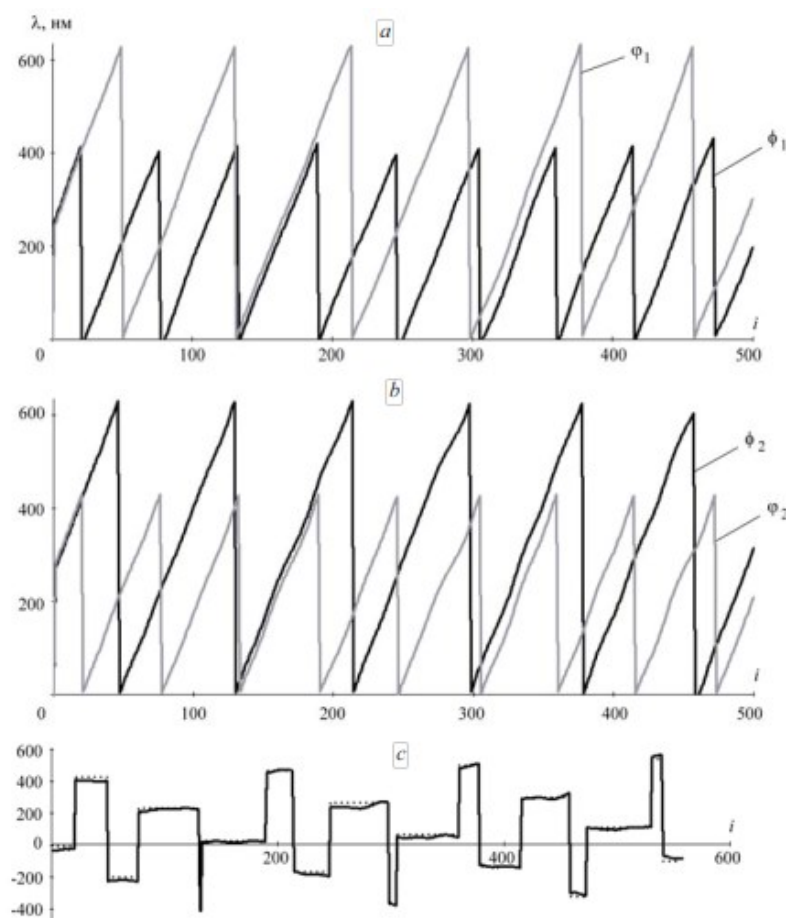


Рис.1.Фазовые профили второго этапа: профили фаз Φ_1 и Φ_2 и соответствующие им синтезированные фазы ϕ_1 , ϕ_2 (a,b), разность фаз $\Delta\phi$ (c).

Погрешность измерения полной фазы после устранения фазовой неоднозначности по модифицированному методу не превышает погрешности измерения локальных фаз, что следует из рис. 5, d, f.

Обсуждения.

Таким образом, результаты экспериментальной проверки модифицированного метода показывают, что предлагаемый в данной работе алгоритм коррекции фазовой неоднозначности позволяет устранить грубые ошибки, связанные с искажением профиля интерференционных полос.

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ТУРЛИ СЕЛЕКЦИЯ НАВЛИ ПАХТАНИ ТЕХНОЛОГИК ЖАРАЁНЛАРГА ТАЙЁРЛАШ МАСАЛАЛАРИ

***Аннотация:** тадқиқот ишлари Андижон вилоятидаги "ZAMIN ANGOR CLUSTER" МЧЖ кластер тизимидаги корхонада олиб борилди. Унда Андижонда етиштирилаётган Хитой давлатидан олиб келинган, Андижон-36, 52-4, Хитой -31, Хитой -29 ва 52 селекция навлари қайта ишланди ва турли селекция навларидаги якка толали чигитнинг геометрик ўлчамларининг ўзгариши тадқиқ этилди.*

***Калим сўзлари:** пахтани қуритиш жараёнида иссиқ ҳаво билан контактда бўлган юзаси, тузилма таркиби, битта якка толали чигит юзаси*

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PREPARATION OF VARIOUS COTTON BREEDING VARIETIES FOR TECHNOLOGICAL PROCESSES

***Abstract:** The research was carried out at the enterprise operating within the cluster system of "ZAMIN ANGOR CLUSTER" LLC in Andijan region. The cotton varieties grown in Andijan and imported from China—Andijan-36, 52-4, China-31, China-29 and 52—were processed. Changes in the geometric dimensions of single cottonseed fibers of various breeding varieties were studied.*

***Keywords:** surface exposed to hot air during cotton drying, structural composition, surface area of a single cottonseed fiber.*

Жаҳон қишлоқ хўжалигида ғўза кенг тарқалган ўсимликлардан биридир. Пахта етиштиришда етакчи ҳисобланган давлатлар Ҳиндистон 6,1; Хитой 5,5; АҚШ 4,1; Бразилия 1,9; Покистон 1,7 миллион тонна маҳсулот етиштиради ва жаҳонда етиштирилаётган пахта ҳосилининг 75 % ушбу давлатлар ҳиссасига тўғри келади. Пахта қишлоқ хўжалиги экспортининг асосий таркибий қисми сифатида муҳим аҳамият касб этади.

Пахтачилик қишлоқ хўжалигида асосий тармоқларидан бири ҳисобланади. Сўнгги йиллардаги иқлим ўзгаришлари эса соҳа олдиға янгидан-янги вазифалар қўйиб, илм ва инновацияларни жорий қилишни тақазо этмоқда.

Пахта қайта ишлаш объекти сифатида мураккаб материал бўлиб, турли физик-механик, иссиқлик-намлик, аэродинамик хоссаларига эга бўлган-тола, чигит қобиғи ва чигит мағзидан ташкил топган. Пахтани дастлабки ишлашнинг технологик жараёнларида уларнинг компонентлари аэродинамик, механик, иссиқлик-намлик таъсирларига дуч келади. Асосий технологик жараёнлар ҳисобланган қуритиш, майда ва йирик ифлосликлардан тозалаш, жинлаш, тола тозалаш, намлаш ҳамда толани тойлаш жараёнлари самарадорлиги пахта ва унинг компонентларини технологик хосса ва хусусиятларини, уларни жараёнларга қандай даражада тайёрланганликка боғлиқ. Ҳар бир технологик жараён пахта ва унинг компонентларига қайта ишлаш объекти сифатида маълум талабларни қўйarkan, масалан, қуритиш ва тозалаш жараёнларида пахта титилган ҳолда солиштирма юзаси катта бўлиши талаб этилади. Шу сабабли, пахтани дастлабки ишлаш объекти сифатида хосса ва хусусиятлари чуқур ўрганилиши керак.

Пахта терилган пайтида ўлчамлари деярли бир хил бўлган монодисперс материал ҳолида бўлиб, териш, қайта ишлаш жараёнларида механик таъсирлар натижасида деформацияланади, яъни чўзилади, алоҳида майда қисмларга ажралади.

Пахтани деформацияси чўзилиш, сиқилиш, эгилиш ва буралиш шаклларида намоён бўлади.

Пахтани қуритиш объекти сифатида тадқиқотчилар томонидан пахтани титилганлик коэффициенти тавсия этилган бўлиб, қуйидаги формула билан аниқлаш таклиф этилган

$$n = \frac{F_{fakt}}{F_{max}}$$

бунда F_{fakt} -пахтани қуритиш жараёнида иссиқ ҳаво билан контактда бўлган юзаси; F_{fmax} -пахтани максимал эга бўлиши мумкин бўлган юзаси, яъни пахта тузилма таркиби фақат якка толали чигитлардан иборат бўлгандаги максимал юзаси. У қуйидаги формула билан аниқланади

$$F_{fmax} = S_y \cdot N \quad (1)$$

бунда S_y -битта якка толали чигит юзаси; N -пахтадаги толали чигитлар сони.

Қуритиш барабани 2СБ-10 да пахтани титилганлик даражаси ўта паст эканлиги ($n = 0,11$) аниқланган.

Пахтани тозалаш объекти сифатида эса тадқиқотчилар томонидан пахта тузилма таркибини характерловчи коэффициент m таклиф этилган

$$m = \frac{N}{M} \quad (2)$$

бунда N -пахтадаги якка чигитлар сони; M -пахта таркибидаги бўлақлар сони.

Тадқиқотчилар томонидан пахта тузилма коэффициент m билан тозалагичларни тозалаш самарадорлиги ўртасидаги боғланишлар аниқланган.

Пахтани тозалаш объекти сифатидаги ўзига хос хусусиятларидан бири уни деформацияланганлик даражаси, яъни пахта бўлақларини чўзилиши алоҳида толали чигитларга ажралиши ҳисобланади. Сабаби, пахта бўлаги қанча деформацияланган бўлса, уни ғоваклиги, солиштирма юзаси ошади, натижада толалар орасига жойлашган ифлосликларни ажралиб чиқишга шароит яратилди.

Қайд этилган пахта тузилма таркиби коэффициент m эса фақат пахта бўлақлари сонини инобатга олиб, уларни ғоваклиги, чўзилганлиги яъни, геометрик ўлчамлари, юзасини инобатга олмайди.

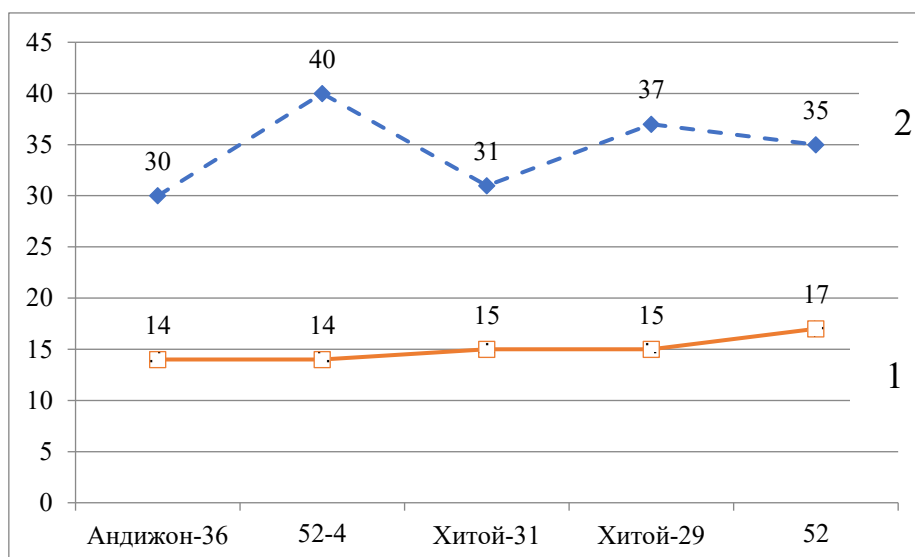
Биз томонимиздан ўтказилган тажрибада қуриштиш барабанидан ўтган Хитой-29 I навли 2-нчи синфли пахта таркибидаги якка толали чигитларни ўлчаб кўрганмизда уларнинг геометрик ўлчамларида фарқ катта эканлигини кўрсатди (1-жадвал).

1-жадвал

Турли селекция навларидаги якка толали чигитнинг геометрик ўлчамларининг ўзгариши

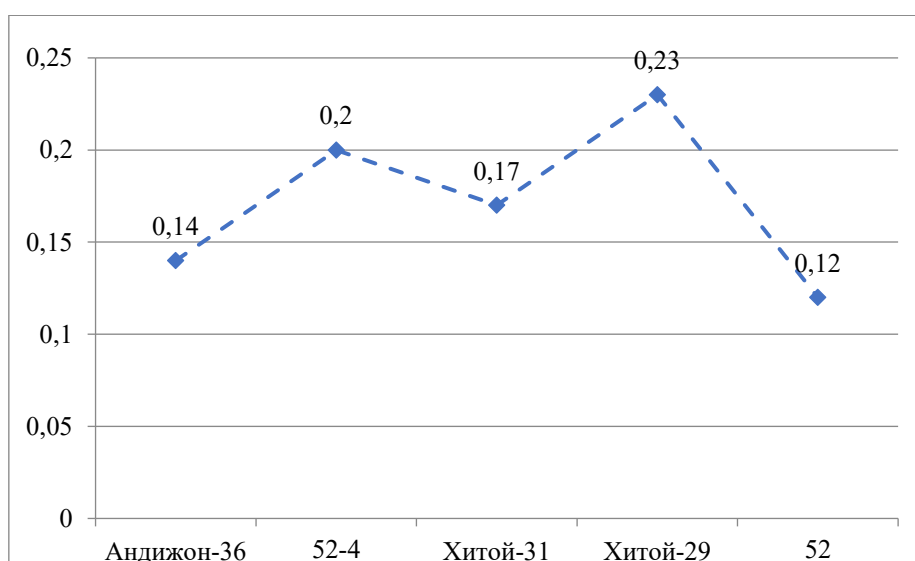
т/р	Селекция навлари	Узунлиги, мм	Қалинлиги, мм	Эни, мм	Массаси, г	Юзаси, см ²
1	Андижон-36	37	11	15	0,23	17,34
2.	52-4	35	10	17	0,12	13,40
3.	Хитой-31	40	12	14	0,2	24,16
4.	Хитой-29	37	12	14	0,16	25,54
5.	52	31	8	15	0,17	19,42

Тадқиқот натижалари асосида қуйидаги графикларда якка толали чигитнинг геометрик хоссаларининг ўзгариши 1-3-расмларда келтирилди.

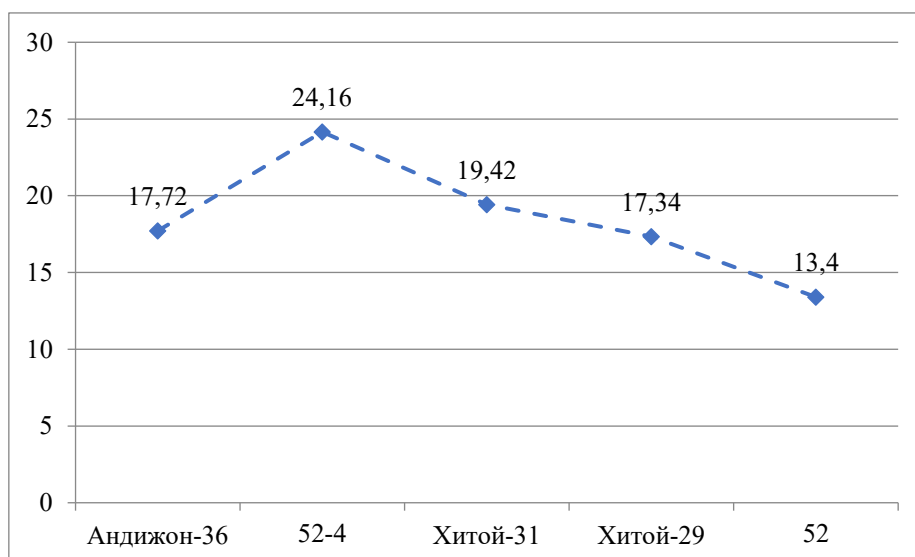


1-чигит узунлиги; 2-чигит эни.

1-расм. Турли селекция навларини қуритиш барабанидан ўтган пахта таркибидаги якка толали чигитларнинг геометрик хоссаларининг ўзгариши.



2-расм. Турли селекция навларини қуритиш барабанидан ўтган пахта таркибидаги якка толали чигитларнинг массасининг ўзгариши.



3-расм. Турли селекция навларини қуритиш барабанидан ўтган пахта таркибидаги якка толали чигитлар юзасининг ўзгариши.

Олинган натижалардан кўриниб турибдики, турли селекция навли пахтани бир чигитли бўлаги m қиймати бир хил бўлган ҳолатда ҳам геометрик ўлчамларида сезиларли фарқ мавжудлигини кўрсатди. Уни узунлигидаги фарқи 10 мм, энида 3 мм, қалинлигида 5 мм бўлиб, умумий юзасида эса 12,14 см²ни ташкил этади, яъни ўртача юзаси 19,21 см² бўлса, ундан 63,1% фарқ қилиши аниқланди.

Агар пахтани ифлосликдан тозалаш самарадорлиги пахта юзасига боғлиқ бўлса, унда юзаси каттароқ бўлган пахта бўлагидан кўпроқ ифлослик ажралади. Шунини таъкидлаш керакки, массасини фарқи катта бўлган ҳолатда, юзасини катта бўлиши пахта бўлагини ғоваклиги ошиши, яъни титилганлик даражаси юқори эканлигини кўрсатади.

Юқорида айтилган фикрлар ва тажриба натижалари тадқиқотчилар томонидан тавсия этилган тузилма коэффицентини пахтани тозалаш объекти сифатида тўлиқ характерлаб олмаслигини кўрсатади. Шунинг учун ушбу йўналишда тадқиқотлар ўтказилиб аниқлик киритиш эҳтиёжи борлигини кўрсатади.

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АКТУАЛЬНЫЕ АСПЕКТЫ И ПЕРЕДОВЫЕ МЕТОДЫ ИССЛЕДОВАНИЯ В РЕАНИМАТОЛОГИИ, А ТАКЖЕ В НЕВРОЛОГИЧЕСКОЙ И НЕЙРОХИРУРГИЧЕСКОЙ ПРАКТИКЕ

Аннотация: Течение критических состояний в неврологии и нейрохирургии имеет ряд характерных особенностей, обусловленных сложным и многофакторным патогенезом церебрального повреждения, что определяет специфический подход к реанимационной помощи. В целях упрощения терминологии методы общей реаниматологии, применяемые в неврологической и нейрохирургической практике, целесообразно объединять понятием «нейрореаниматология». В статье представлены современные тенденции в использовании мультимодального мониторинга и специализированных терапевтических стратегий в данной области. Дополнительно приведены данные, подчеркивающие ключевую роль инфекционного контроля при ведении пациентов с критическими неврологическими и нейрохирургическими состояниями.

Ключевые слова: нейрореаниматология, мультимодальный мониторинг, нейромониторинг, нейропротекция, инфекционный контроль.

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CURRENT ASPECTS AND ADVANCED RESEARCH METHODS IN RESUSCITATION MEDICINE, AS WELL AS IN NEUROLOGICAL AND NEUROSURGICAL PRACTICE

Abstract: The course of critical conditions in neurology and neurosurgery has specific features determined by the complex and multifactorial pathogenesis of cerebral injury, which in turn defines the particular requirements of intensive care in these fields. For the sake of terminological simplicity, the methods of general resuscitation applied in neurological and neurosurgical practice are often collectively referred to as neurocritical care. The article highlights current trends in the use of multimodal monitoring and specialized therapeutic strategies within neurocritical care. In addition, it presents data underscoring the crucial importance

of infection control in the management of neurologic and neurosurgical patients in critical condition.

Keywords: *neurocritical care, multimodal monitoring, neuromonitoring, neuroprotection, infection control.*

Введение. Базовые принципы ведения неврологических и нейрохирургических пациентов при развитии у них критического состояния не отличаются от таковых у других реанимационных пациентов. Однако патогенез церебральных катастроф обладает рядом особенностей, которые иногда столь важны, что именно они определяют исход заболевания. Целесообразность создания специализированных отделений реанимации для пациентов неврологического и нейрохирургического профиля была доказана при проведении мета анализа, основанного на результатах лечения почти 25000 пациентов. Госпитализация этих пациентов в нейрореанимационное, а не в общереанимационное отделение, снижает риск развития летального исхода и повышает шансы на благоприятный исход. Ведение нейрореанимационного пациента нейрореаниматологом улучшает исходы заболевания.

Этот эффект наиболее очевиден в популяции пациентов с субарахноидальным кровоизлиянием (САК) и наименее очевиден в группе больных с гипертонией и геморрагическим инсультом. Также показано, что уменьшение времени пребывания пациента в отделении реанимации и расходов происходит в том случае, если команду врачей, занимающихся лечением нейрореанимационного пациента, возглавляет нейрореаниматолог. Нейрореаниматология является одним из наиболее молодых и динамично развивающихся направлений реаниматологии. Ниже обсуждаются последние тенденции в механизмах оценки уровня сознания и неврологической тяжести состояния нейрореанимационного пациента, развитии нейромониторинга, специфической нейрореанимационной интенсивной терапии и инфекционного контроля.

Оценка уровня сознания и неврологической тяжести состояния нейрореанимационного пациента.

Традиционным инструментом оценки уровня сознания и неврологической тяжести состояния нейрореанимационного пациента являются шкалы. Наиболее известной и широко используемой шкалой является Шкала Комы Глазго (ШКГ), которая была разработана и внедрена в клиническую практику в середине 70 х годов прошлого столетия. ШКГ оценивает способность открывать глаза, а также речевую и двигательную реакцию пациента. Изначально ШКГ была создана для оценки состояния пострадавших с черепно-мозговой травмой (ЧМТ) парамедиками и использовалась однократно, исключительно при поступлении пациента в стационар. За счет своей простоты и воспроизводимости ШКГ в дальнейшем стала использоваться фактически у всех популяций нейрореанимационных больных и не только при поступлении пациента в стационар. В 1980_х годах

было создано еще две шкалы, оценивающие уровень сознания и неврологическую тяжесть состояния нейрореанимационных пациентов — это шкала комы Инсбрука и, так называемая, шкала RLS85. По разным причинам они не получили широкого распространения.

В 2005 году была впервые опубликована шкала FOUR. Она оценивает выраженность глазодвигательных нарушений и зрачковых рефлексов, а также двигательные реакции пациента и его дыхательный паттерн. Как и ШКГ, шкала FOUR проста в использовании, она хорошо воспроизводима, но в отличие от ШКГ она может с успехом использоваться у пациентов с афазией, интубированных больных и при синдроме запертого человека (locked in синдроме). Кроме этого, шкала FOUR оценивает сегментарно_стволовые рефлексy, что также выгодно ее отличает от ШКГ. Рутинно эта шкала используется в клинике Mayo, где она была изобретена, и еще в ряде госпиталей США. Однако в течение последних лет появляется все больше работ, свидетельствующих о высокой валидности шкалы FOUR у самых разных групп нейрореанимационных пациентов. Эти публикации дают основания предполагать, что в ближайшем будущем шкала FOUR займет место ШКГ для оценки уровня сознания и неврологической тяжести состояния нейрореанимационных пациентов.

Мониторинг. Основной целью нейрореаниматологии является профилактика и максимально ранняя коррекция факторов вторичного повреждения головного мозга — ишемии и гипоксии, развивающихся вследствие артериальной гипотензии, гипоксемии, внутричерепной гипертензии, судорог, лихорадки, гипогликемии, диснатриемии и целого ряда других клинических состояний. Ишемия и гипоксия, в свою очередь, приводят к отеку, нейровоспалению, митохондриальной дисфункции, синтезу глутамата и других возбуждающих аминокислот, кортикальной деполяризации. В конечном итоге, эти патогенетические каскады вызывают гибель нейрональных клеток вследствие некроза, апоптоза или случайной некротической гибели. Профилактика и максимально ранняя коррекция факторов вторичного повреждения мозга немыслимы без использования мультимодального мониторинга, который представляет собою комбинацию системного мониторинга и нейромониторинга. Системный клинико-лабораторный мониторинг оценивает модальности, потенциально приводящие к развитию церебральной ишемии или гипоксии. Это мониторинг артериального давления, оксигенации, уровня гликемии и так далее. Нейромониторинг разделяется на глобальный и регионарный. Глобальный нейромониторинг включает в себя такие опции, как внутричерепное и церебральное перфузионное давление, электроэнцефалография, сатурация оттекающей от мозга крови, неинвазивная инфракрасная спектроскопия, индекс реактивности давления и другие. Регионарный нейромониторинг — это мониторинг напряжения кислорода в ткани мозга, микродиализ, мониторинг церебрального кровотока, электрокортикография. Как регионарный, так и глобальный нейромониторинг направлен на выявление

морфологических, метаболических или электрофизиологических последствий церебральной ишемии или гипоксии. Одна мониторинговая опция способна оценить лишь одну модальность: или клинико_лабораторную, способную стать причиной церебральной ишемии, или

патофизиологическую, являющуюся последствием церебральной ишемии. Так, мониторинг артериального давления оценивает только артериальное давление, мониторинг сатурации — оксигенацию, а микродиализ маркеры клеточной ишемии. Попытки доказать позитивные эффекты той или иной мониторинговой опции на исходы заболевания нейрореанимационных пациентов неизменно терпят крах, поскольку другие мониторинговые опции или не принимаются во внимание, или их вовсе не используют. Это является причиной формирования нигилистического отношения к тем или иным опциям мультимодального мониторинга. Кроме этого, не стоит забывать, что сам по себе мониторинг никак не влияет ни на процесс лечения, ни на исходы заболевания. На них влияют решения по изменению проводимой интенсивной терапии, которые, в свою очередь, основаны на данных проводимого мониторинга. Новой тенденцией развития мультимодального мониторинга в нейрореанимации является широкое внедрение информационных технологий. Философия этого направления основана на простой логике. Если развитие изолированных мониторинговых опций не привело к улучшению исходов, то целесообразным является использование максимально возможного количества мониторинговых опций, сохранение полученных данных на едином сервере, максимально быстрая их обработка, создание алгоритмов принятия решений для каждого из возможных комбинаций получаемых данных и предоставление лечащему нейрореаниматологу несколько возможных вариантов коррекции терапии. В результате формируется индивидуализированный подход к проводимой интенсивной терапии, основанный на мультимодальном мониторинге и современных информационных технологиях. Ярким примером использования комбинации мониторинга и информационных технологий является применение индекса реактивности давления (PRx). Этот параметр представляет собою корреляционный коэффициент между флюктуациями медленных волн внутричерепного и артериального давления. В результате мониторинга внутричерепного и артериального давления и дальнейшего специального математического анализа происходит расчет индекса реактивности давления. На основании полученных результатов можно сделать вывод о сохранности ауторегуляции или ее утрате. В результате не только происходит коррекция интенсивной терапии, но и возможно принятие тактических решений, например, о необходимости выполнения наружной декомпрессивной трепанации черепа.

Существует ряд проблем, которые препятствуют быстрой реализации на практике философии комбинации мультимодального мониторинга и информационных технологий. Во_первых, различные мониторинговые

системы имеют специфические сигналы, которые сложно привести к общему знаменателю при их сохранении на едином сервере. Во_вторых, серьезной проблемой является «зашумленность» первичной информации. При анализе мониторируемых параметров у постели больного врач без особых затруднений

способен понять, какие значения являются истинными, а какие из них являются артефактом или возникли в результате, например, санации пациента или кашля и не требуют какой_либо коррекции. Когда мониторируемые параметры поступают на сервер и утрачена связь с реальной клинической ситуацией, чрезвычайно сложной технической задачей является отделение истинных значений от артефактных. Третьей серьезной проблемой является так называемая проблема «норм». Известно, что для пациентов с сахарным диабетом нормальный уровень гликемии будет выше, чем у пациентов, не имеющих преморбидного сахарного диабета. Достижение «нормального» уровня глюкозы у нейрореанимационного пациента, страдавшего сахарным диабетом много лет до развития у него критического состояния, приведет к снижению уровня глюкозы в клетках мозга и будет являться фактором его вторичного повреждения. Это также справедливо для артериального давления у пациентов с гипертонической болезнью, уровня углекислоты у пациентов с бронхиальной астмой, уровня натрия у пациентов с несахарным диабетом и так далее. Таким образом, несмотря на радужные перспективы развития философии использования комбинации мультимодального мониторинга и информационных технологий в нейрореаниматологии, этот подход требует серьезной работы и дальнейшего развития.

Специфическая нейрореанимационная интенсивная терапия.

В нейрореаниматологии, как и в других направлениях интенсивной терапии, появляются новые препараты. Например, антиэпилептический препарат Лакосамид (Вимпат). На Российский фармацевтический рынок приходят высокоэффективные препараты, существующие на рынке Западных стран уже в

течение длительного времени. Это Дексметомедин (Дексдор) и Акупан (Нефопам). Однако обсуждению новых препаратов не входит в задачи настоящего обзора. Этот раздел будет посвящен новым тенденциям в нейропротекции. Нейропротекция — это процесс воздействия на ишемическую пенумбру, в результате которого ее клетки или выживают, или их гибель происходит отсроченно. Пенумбра, разделяя зоны ишемического некроза и интактной мозговой ткани, представляет собою живые, но испытывающие на себе мощное патологическое воздействие клетки. В результате патологического

воздействия может произойти гибель этих клеток. По сути, все нейрореанимационные мероприятия так или иначе направлены на выживание клеток пенумбры. Гипотермия обладает доказанным и очевидным нейропротекторным потенциалом. Это абсолютно справедливо для пациентов с остановкой сердечной деятельности и новорожденных с ишемически-

гипоксическим перинатальным повреждением мозга. Этим пациентам гипотермию необходимо начать, как можно раньше. Для остальных групп нейрореанимационных пациентов нейропротективный потенциал гипотермии на данный момент не доказан, однако, ведутся активные исследования, направленные на поиск оптимальных режимов гипотермии. Причина нейропротекторного эффекта гипотермии заключается, по всей вероятности, в том, что она блокирует большинство из известных патогенетических каскадов, запускаемых церебральной ишемией и гипоксией.

На протяжении последних нескольких декад было проведено большое количество клинических исследований, изучавших нейропротекторный потенциал различных методик и фармакологических препаратов: применение индуцированной артериальной гипертензии; умеренной гемодилюции; инфра_красного излучения; блокады свободных радикалов при реперфузии; блокады нейронального апоптоза; использование ингибиторов тромбоспандина, дантролена; циклоспорины; антикоагулянтов; гранулоцит_стимулирующего фактора; кетамина; барбитуратов; бета-блокаторов. Практически ни одному из препаратов и ни одной из методик не удалось продемонстрировать нейропротекторных свойств в клинических исследованиях, даже если таковые были показаны в лабораторных доклинических работах. Единственным исключением, которое, скорее, подтверждает правило, является нимодипин. Было показано, что энтерально используемый с первых суток заболевания нимодипин в дозе 60 мг каждые 4 часа на протяжении 14 суток обладает нейропротективным эффектом у пациентов со спонтанным субарахноидальным кровоизлиянием из аневризмы сосудов головного мозга.

Наиболее вероятной причиной отсутствия доказанного нейропротективного потенциала у различных фармакологических препаратов и терапевтических методик является тот факт, что один препарат или методика воздействует на какой_либо один патогенетический каскад, запущенный церебральной ишемией и гипоксией. Блокада одного каскада, вероятно, не способна существенно повлиять на исходы ишемического и гипоксического повреждения клеток мозга, поскольку существует большое количество таких каскадов и путей, вызывающих клеточную гибель. Исходя из этой предпосылки, появилась новая гипотеза о том, что создание своеобразных «коктейлей», состоящих из определенного набора фармакологических препаратов, может иметь нейропротекторный потенциал. Поскольку в генезе различных церебральных катастроф реализуются различные патогенетические каскады, набор фармакологических препаратов должен отличаться. Таким образом, должны появиться «коктейль ЧМТ», «коктейль вазоспазм», «коктейль ишемический инсульт» и так далее. Эта философия находится в самом начале своего развития, и должно быть проведено огромное количество исследований, посвященных этой тематике. Однако эта философия придает второе дыхание такому важному направлению нейрореаниматологии, как нейропротекция.

Инфекционный контроль в нейрореаниматологии. Значимость инфекционных осложнений для нейрореанимационных пациентов невозможно переоценить. Обсуждаемая популяция пациентов обладает не только всеми факторами риска, типичными для общереанимационных больных, но также специфическими, характерными исключительно для пациентов с повреждением головного мозга. К общереанимационным факторам риска относятся использование ряда препаратов, например, симпатомиметиков, и наличие большого количества катетеров, дренажей, трубок и других инвазивных устройств, создающих сообщение окружающей среды с внутренними органами, полостями, просветом кровеносных сосудов. Следует уделить особенное внимание характеристикам среды, окружающей нейрореанимационных пациентов. Во_первых, высокая концентрация тяжелых пациентов в условиях ограниченного ресурса среднего медицинского персонала, а также недостаточного соблюдения правил гигиены рук и инфекционного контроля во время ухода за больными, приводит к переносу персоналом бактерий от пациента к пациенту и заражению внутрибольничными штаммами микроорганизмов. Во_вторых, нозокомиальная флора обладает повышенной вирулентностью и панрезистентностью к антибактериальным препаратам. Эти факторы делают среду пребывания нейрореанимационного пациента крайне агрессивной. Специфическими для нейрореанимационных пациентов факторами риска развития инфекционных осложнений является угнетение иммунной системы за счет снижения секреции нейтрофилами супероксидазы, уменьшения продукции иммуноглобулинов и угнетения функций Т_лимфоцитов. Кроме этого, часто используемые в нейрореаниматологии глюкокортикостероидные гормоны также обладают иммуносупрессивными эффектами. Существует прямая зависимость между степенью повреждения головного мозга и частотой, а также тяжестью нозокомиальных инфекций. При этом сами по себе инфекционные осложнения занимают лидирующие позиции в структуре всех соматических осложнений у нейрореанимационных пациентов. В одном из последних исследований, проведенном у пострадавших с черепно-мозговой травмой, было показано, что синдром системной воспалительной реакции развивался у 60% пациентов, пневмония — у 41%, сепсис и септический шок — у 36%, вентилятор_ассоциированная пневмония — у 18%, а инфекция мочевыделительной системы — у 13%. Для сравнения, наименьшая частота соматических осложнений приходилась на острый инфаркт миокарда (2%), а наибольшая — на гипергликемию (79%). По данным других авторов, частота инфекционных осложнений может быть гораздо выше. Так, например, в одном из исследований пневмония развивалась у 72% нейрореанимационных пациентов. Еще одной актуальной и специфической для нейрореаниматологии проблемой являются интракраниальные нозокомиальные инфекционные осложнения. У 6% пациентов, перенесших краниотомию, развивается менингит. Факторами риска являются длительность операции более 6 часов, повторные операции, наличие

воспаления в месте хирургического доступа, а также особенности доступа, связанные с обнажением придаточных пазух носа. Частота венитрита и менингита у пациентов с наружным вентрикулярным дренажем еще выше и достигает 22%. Не известно, как длительность наружного вентрикулярного дренирования влияет на частоту развития интракраниальных инфекционных осложнений, несмотря на определенную очевидность того, что с удлинением времени наружного дренирования должна увеличиваться заболеваемость менингитом. Достоверными факторами риска развития интракраниальных инфекционных осложнений при наружном вентрикулярном дренировании являются ликворея из места стояния дренажа, введение в дренаж каких либо препаратов или простое его промывание, частый забор ликвора и переустановка дренажа. Значимость проблемы нозокомиальных инфекционных заболеваний определяется влиянием последних на течение заболевания и на его исходы. Длительность пребывания в отделении реанимации пациентов с нозокомиальными инфекционными осложнениями достоверно дольше, чем у больных, не имеющих этих осложнений. Развитие тяжелых инфекционных соматических осложнений или сепсиса является независимым предиктором развития хронических органных дисфункций, устойчивых когнитивных нарушений, грубой инвалидизации и даже смерти. Интракраниальные нозокомиальные инфекционные заболевания также существенно удлиняют время пребывания пациента в отделении нейрореанимации, достоверно утяжеляют состояние больных, и могут явиться непосредственной причиной летального исхода. Инфекционный контроль включает в себя ряд таких важных мероприятий, как гигиена рук, недопущение переноса персоналом микрофлоры от пациента к пациенту, логистика внутриаппаратной ротации пациентов, ежедневный мониторинг инфекционных осложнений и спектра возбудителей в отделении, своевременное выявление вспышек инфекции и антибактериальная политика (сдерживание, ротация, своевременная эскалация, де_эскалация). Для профилактики развития нозокомиальных инфекционных осложнений параллельно с инфекционным контролем следует особое значение уделять соотношению числа пациентов к числу медицинских сестер. Оптимальным для профилактики инфекционных осложнений является соотношение 1 : 1. Строгая приверженность принципам инфекционного контроля, ежедневное и тщательное следование.

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НОВЫЕ ОТЕЧЕСТВЕННЫЕ МЕТОДЫ СИСТЕМНОЙ И РЕГИОНАРНОЙ ЛИМФОТРОПНОЙ ТЕРАПИИ В РЕАНИМАЦИИ

Аннотация: Публикация посвящена анализу литературных данных о применении методов клинической лимфологии в условиях реанимации. В первой части работы рассмотрены базовые понятия и термины, описывающие взаимодействие лимфатической и лимфоидной систем организма с фармакологическими и физическими методами воздействия, направленными на достижение эффекта лимфосанации (лимфостимуляции, лимфокоррекции, лимфопротекции, лимфосупрессии). Представлены современные трактовки термина «лимфатический регион», его ключевых структур, а также особенности различных подходов к лимфотропной терапии.

Во второй части изложены конкретные данные о результативности лимфотропной терапии при острых и хронических воспалительных процессах и травматических поражениях глотки, носа и околоносовых пазух, гортани, уха, а также её профилактическое значение в снижении частоты и выраженности постинтубационных ларингеальных осложнений у детей младшего возраста и взрослых при длительной интубации трахеи.

Сделан вывод о том, что наибольшее развитие получили методики регионарной (непрямой) лимфотропной терапии, которые в настоящее время рассматриваются как эффективный инструмент в лечении воспалительных заболеваний околоносовых пазух, ротовой полости и верхних дыхательных путей. Методы системной (прямой) лимфотропной терапии в реанимационной практике пока ограничены, применяются редко и у небольшого числа пациентов. Оба направления нуждаются в дальнейшем изучении и совершенствовании, поскольку их потенциал в лечении критических состояний далёк от полного раскрытия.

Ключевые слова: лимфология, лимфатическая система, лимфоидная система, лимфатический регион, лимфотропная терапия, лимфосанация, реанимация, критические состояния.

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NEW DOMESTIC METHODS OF SYSTEMIC AND REGIONAL LYMPHOTROPIC THERAPY IN INTENSIVE CARE

Abstract: *The publication is devoted to an analysis of the literature on the use of clinical lymphology methods in intensive care practice. The first part of the paper reviews the fundamental concepts and terminology describing the interaction between the human lymphatic and lymphoid systems and various pharmacological and physical methods aimed at achieving the effect of lymphosanation (lymphostimulation, lymphocorrection, lymphoprotection, lymphosuppression). Modern interpretations of the term "lymphatic region," its key components, as well as the characteristics of different approaches to lymphotropic therapy, are presented.*

The second part summarizes specific data on the effectiveness of lymphotropic therapy in acute and chronic inflammatory conditions and traumatic lesions of the pharynx, nose and paranasal sinuses, larynx, and ear, as well as its preventive role in reducing the frequency and severity of post-intubation laryngeal complications in young children and adults undergoing prolonged tracheal intubation.

The authors conclude that regional (indirect) lymphotropic therapy techniques have seen the most significant development and are currently regarded as effective methods for managing various inflammatory diseases of the paranasal sinuses, oral cavity, and upper respiratory tract. Methods of systemic (direct) lymphotropic therapy in intensive care are still limited, used infrequently, and applied to a small number of patients. Both directions require further research and technological improvement, as their potential in the management of critical conditions has not yet been fully realized.

Keywords: *lymphology, lymphatic system, lymphoid system, lymphatic region, lymphotropic therapy, lymphosanation, intensive care, critical conditions.*

Современная лимфология является интегральной медицинской наукой, в поле зрения которой одновременно находятся две взаимосвязанные системы организма человека – лимфатическая и лимфоидная, содержащие лимфу, лимфатические сосуды, организованные лимфоидные структуры и клетки. Лимфатическая система, как подсистема сердечно-сосудистой системы, включает лимфатическое русло (лимфатические капилляры, сосуды, стволы, правый лимфатический и грудной протоки), в том числе, пути лимфотока внутри лимфатических узлов, и саму лимфу с ее клеточным содержимым. Лимфоидная система большей частью ассоциируется с иммунной системой, в состав которой входят такие органы, как красный костный мозг и тимус (первичные лимфоидные органы), селезенка, миндалины, лимфоидная паренхима лимфатических узлов, одиночные и групповые скопления лимфоидной ткани, а также отдельные лимфоидные клетки в тканях и органах (вторичные лимфоидные органы). Обе группы органов находятся в соподчинении. Морфофункциональным аргументом сопряженности

лимфатической и лимфоидной систем являются лимфатические узлы, что позволило Ю.И.Бородину (1993) назвать лимфатический узел маркером средового прессинга и регулятором регионарной гемо- и лимфодинамики.

Анатомическим пространством, где происходят основные транспортные и обменные процессы, регистрируются первые структурно-функциональные нарушения, с одной стороны, и осуществляются процессы естественной интракорпоральной лимфодетоксикации, с другой стороны, является лимфатический регион.

Лимфатический регион включает три основных звена: 1 – несосудистые пути микроциркуляции в интерстиции, где идет накопление и транспорт мобильной тканевой жидкости в направлении к корням лимфатической системы, лимфатическим капиллярам; 2 – оформленные сосудистые лимфатические структуры (лимфатические капилляры, сосуды), которые образуют и транспортируют лимфу; 3 – регионарные лимфатические узлы, а также одиночные или групповые скопления лимфоидной ткани, участвующие в транспорте лимфы и ее детоксикации. Все элементы лимфатического региона, функционируя синхронно и взаимосвязанно, образуют структурно-функциональную единицу, которая обеспечивает дренаж и детоксикацию клеток, перичелюлярного пространства, ткани в целом. Нарушения интерстициального транспорта и лимфатического дренажа играют не только важную роль в патогенезе воспалительных процессов, но и учитываются при терапии этих нарушений. Указанные факты послужили основанием для разработки программы эндэкологической реабилитации, системы восстановления эндэкологического (околоклеточного, интерстициального) гомеостаза путем воздействия на интерстициальный гуморальный транспорт, лимфатический дренаж и детоксикацию лимфы. Эффективной реабилитации органа можно добиться только при морфофункциональной адекватности этих процессов.

Воздействия на лимфатическую и лимфоидную системы с помощью лекарственных средств, медицинских, механических и физических технологий позволили улучшить результаты лечения многих хирургических, кардиологических, травматологических, гинекологических, инфекционных и других заболеваний. В настоящее время они объединены в понятие «клиническая лимфология», которое имеет отношение фактически ко всем лечебным специальностям и направлениям.

Существует две группы способов терапевтического воздействия лекарственных веществ на лимфатическую систему – прямые и косвенные. К прямым (эндолимфатическим) методам относится канюлирование магистральных или периферических лимфатических сосудов, лимфатических узлов, грудного протока, что предполагает создание высокой и длительно сохраняющейся концентрации лекарственного препарата в лимфатической системе при однократном введении официальной разовой дозы от 1 до 3 дней. Однако, с точки зрения Ю. М. Левина (1986), это не всегда возможно, так как в центральной лимфе и отдельных лимфатических узлах, которые

являются транспортным продолжением использованного для пункции лимфатического сосуда, создается высокая концентрация лекарственных веществ, а в других, в том числе вовлеченных в патологический процесс, содержание лекарственных веществ может быть очень мало или вообще отсутствовать. Кроме того, катетеризация лимфатических сосудов – это трудоемкая и травматичная манипуляция, для выполнения которой требуются специальные инструменты, оборудованная операционная и необходимые хирургические навыки врача. С учетом этих обстоятельства рядом специалистов был предложен нехирургический способ введения лекарственных препаратов (подкожно или внутримышечно, забрюшинное введение, подслизистые инъекции) в зависимости от регионарности оттока лимфы. Доставка веществ осуществляется с помощью инъекции в область наибольшего представительства лимфатических капилляров при создании условий повышенного поступления их в лимфатическую систему. Данный метод получил название – не прямое эндолимфатическое введение или регионарная лимфотропная терапия. Он позволяет создавать высокую концентрацию препарата в лимфатическом регионе и непосредственно в патологическом очаге, но при этом значительно упрощает способ введения. Исключает ряд серьезных осложнений, связанных с хирургическими манипуляциями, делает регионарную лимфотропную терапию более доступной не только для хирургов, но и для других специалистов, в том числе, работающих в сфере амбулаторно - поликлинической службы.

По характеру результирующего эффекта все способы воздействия на лимфатический регион условно могут быть разделены на лимфостимуляцию, лимфокоррекцию, лимфопротекцию и лимфосупрессию. Наиболее известным и чаще всего применяемым из них является способ лимфостимуляции, цель которого заключается в увеличении объема и скорости оттока лимфы от органов. Существенный лимфостимулирующий эффект для организма дает любая мышечная и водная нагрузка (как при внутреннем потреблении воды, так и при всевозможных водных процедурах). В медицинской практике в качестве способов лимфостимуляции используются многочисленные физиотерапевтические и медикаментозные средства. Они изменяют осмотическое давление в тканях, повышающее проницаемость сосудистой стенки кровеносных и лимфатических микрососудов, способствуют дезагрегации мегамолекул в интерстиции с высвобождением из них свободной воды. Наибольшее распространение здесь получили различные коктейли, включающие глюкозу, лидокаин, дикаин, лидазу, дексаметазон и ряд других лекарственных средств. Из физических методов воздействия наилучшим лимфостимулирующим эффектом обладает низкоинтенсивный лазер и ультразвук.

Лимфостимуляция может включать две разновидности – динамическую и метаболическую. Целью динамической лимфостимуляции является увеличение объема и линейной скорости лимфооттока в сосудах органа или части тела. Лимфостимулятор увеличивает массу свободной (мобильной), не

связанной с белковыми молекулами тканевой жидкости в интерстиции. При этом возрастает внутритканевое давление, растягивается волокнистый соединительнотканый каркас, увеличиваются в диаметре лимфатические капилляры, межэндотелиальные контакты становятся открытыми, падает внутрисосудистое давление, нарастает резорбция тканевой жидкости в капиллярах, возрастает масса вновь образующейся лимфы, усиливается лимфоток. Метаболическая лимфостимуляция направлена на улучшение клеточного состава и морфофункционального состояния клеток в лимфоидных органах и ткани. Применяя в лечебных и профилактических целях препараты, оказывающие влияние на клетки лимфоидных органов, можно говорить об их лимфо-коррекции и лимфопротекции (разгрузке), что может рассматриваться в качестве вариантов метаболической лимфостимуляции.

Метод лимфосупрессии или лимфодепрессии применяется, большей частью, в онкологии для блокирования распространения раковых клеток по лимфатическим путям в условиях опухолевой экспансии. В оториноларингологии ввиду специфики проявлений воспалительных процессов ЛОР-органов и реакции со стороны регионарных лимфатических узлов большей частью используются методы регионарной лимфотропной терапии. Их разработка начата около 20 лет назад, с конца 90-х годов 20-го столетия.

М. В. Мальцев (2000) предложил использовать регионарную лимфотропную антибиотикотерапию в составе комплексного консервативного лечения больных с декомпенсированной формой хронического тонзиллита. Сущность метода заключается во введении антибиотика в зону лимфатического региона небных миндалин – область двубрюшно-яремного узла, «сторожевого» для миндалин. Раствор антибиотика вводится подкожно на границе верхней и средней третей грудино-ключично-сосцевидной мышцы по ее переднему краю, с обеих сторон. Параллельно, в целях стимуляции регионарного лимфотока, на эту область проводится ультразвуковое воздействие. Курс лечения составляет 5–7 процедур. В последующем, учитывая мнение коллег о возможности воспалительных реакций и отека мягких тканей, автор отказался от инъекций и предложил более щадящую методику, которая включала только фонофорез антибактериального препарата на мазевой основе. Анализ результатов лечения не выявил существенных различий между чисто фонофоретическим и инъекционно-фонофоретическим методами.

А. В. Головнев (2000) для регионарной лимфотропной терапии хронического тонзиллита использовал препарат Т-активин, доказав в эксперименте на животных его более выраженное действие на фоне бальнеопроцедур радоновой воды. Е. Г. Шахова, С. Е. Козловская (2005) с помощью фонофореза в течение 2 минут в зону регионарных лимфатических узлов небных миндалин вводили водный раствор поликатана разведением 1:20. Процедуру проводили в сочетании с ультразвуковым вакуумным

промыванием миндалин лакун. Бактериологический анализ микробного обсеменения и морфологическое исследование миндалин позволили выявить эффективность метода у 60% больных по сравнению с традиционной терапией. Для оценки эффективности регионарной лимфотропной терапии в процессе лечения больных с хроническим тонзиллитом Р. О. Станишевский (2013) провел исследование про- и антиоксидантной активности сыворотки крови больных при данном заболевании. До и в процессе лечения в сыворотке крови и отделяемом лакун методом иммуноферментного анализа определяли содержание провоспалительных (ИЛ-1В; ФНО-а) и противовоспалительных (ИЛ-4) цитокинов. Доказано, что лимфотропная терапия нормализует системную реакцию, содержание ИЛ-4 и ТФР-В1 на 7,1 и 16,8% соответственно.

В ринологии первые клинические исследования по применению лимфологических методов были проведены В. Ю. Андронниковым, М. Я. Козловым, Э. А. Цветковым (1995) у детей с риносинусогенными орбитальными осложнениями. Авторы использовали способ эндолимфа-

тического (прямого) введения антибиотика через катетеризированный на стопе лимфатический сосуд. Методика признана эффективной и рекомендована к применению в составе алгоритма лечения тяжелых форм хронических риносинуситов и риногенных орбитальных осложнений. К.Касимов и соавт. (2018) экспериментально и клинически показали преимущество применения регионарной лимфотропной терапии в сравнении с традиционной терапией при лечении воспалительных заболеваний околоносовых пазух. Они провели сравнительный анализ лечения пациентов с воспалительными заболеваниями околоносовых пазух, применяя введение ампициллина в их полости и лимфотропно в зону лимфатического региона. При лимфотропном лечении введение лекарственных веществ осуществлялось через подкожную клетчатку подчелюстной области, в проекции подчелюстных лимфатических узлов. Клиническое выздоровление среди больных острым гнойным верхнечелюстным синуситом составило 72,5% при традиционной терапии и 94,4% после лимфотропной терапии. В работе О. Е. Малышевой (2011) проведен сравнительный анализ традиционного лечения и лимфотропной антибактериальной терапии в сочетании с озоном у больных хроническим верхнечелюстным синуситом. Озонирование стерильного изотонического раствора хлорида натрия осуществляли с помощью озонатора «Медозонс БМ 01». Полученным раствором с концентрацией озона 4–6 мг/л промывали верхнечелюстную пазуху через катетер. Процедуру проводили один раз в день. В качестве антибактериального препарата для лимфотропной терапии использовали цефалоспорины I поколения. Эффективность данной методики была подтверждена микробиологическим исследованием отделяемого верхнечелюстных пазух. В группе, где применялась лимфотропная терапия,

полной деконтаминации пазух удалось добиться в 71,9% случаев, у пациентов получавших традиционную терапию – только в 54,8%. Помимо

эндолимфатического введения антибиотиков, Д. В. Кравченко (1997) при воспалительных заболеваниях носа и околоносовых пазух, сопровождающихся различного рода иммунодефицитными состояниями, предложил проводить регионарную иммуностимулирующую лимфотропную терапию. В поднижнечелюстную область на стороне поражения (зону лимфатического региона пазух) он вводил иммуномодулятор Т-активин, получив при этом более выраженный эффект по сравнению с традиционным лечением. Первые исследования эффективности регионарной лимфотропной терапии в отиатрии проведены Х. Э. Шаиховой и соавт. (1999). Они изучали морфологию лимфатического региона среднего уха у кроликов породы шиншилла при экспериментальном остром среднем отите. В качестве лимфотропного препарата использовали раствор антибиотика и лазикса, которые с помощью инъекций вводили поднадкостнично в зону сосцевидного отростка больного уха. Отмечено уменьшение воспалительного процесса за счет стимуляции дренажной функции регионарных лимфатических узлов. Д. В. Кравченко (2002) для коррекции иммунных нарушений у больных острым средним отитом применил лимфотропное введение иммуномодулятора «Тамерит» (100 мг) путем предварительной инфильтрации заушной области лидазой (12 ЕД) в 0,5% растворе новокаина. Доказано положительное влияние этой процедуры на течение гнойно-воспалительного процесса и состояние иммунной системы у данной категории больных. С. Ю. Кротов (2013) более детально изучил морфологию лимфатического региона среднего уха, отметив при этом, что в его состав входит 3 группы лимфоузлов – заушные, передние околоушные и поднижнечелюстные. Каждая из этих групп несет определенные функции с точки зрения лимфодренажа, лимфокоррекции и лимфопротекции. Им же предложено важное усовершенствование методики лимфотропной терапии в виде введения смеси лекарственных препаратов в ткани с помощью воздействия низкочастотного ультразвука (ультрафонофорез) на каждую из регионарных лимфатических зон. Разработанный способ неинвазивен, не дает осложнений и побочных эффектов, не имеет возрастных ограничений, может быть успешно реализован в условиях ЛОР-стационаров и поликлиник. Доказано, что низкочастотный ультразвук не изменяет молекулярный состав лекарственных препаратов, вводимых лимфотропно, и способствует их проникновению в барабанную полость через неповрежденную барабанную перепонку. Эти особенности послужили основой в использовании данной технологии при лечении затянувшихся форм экссудативного среднего отита.

Сочетание регионарной лимфотропной терапии и ультразвуковых технологий также нашло применение у больных с хроническим гнойным средним отитом как самостоятельные методы консервативного лечения, так и в сочетании с хирургией при лечении болезней оперированного уха. В. А. Насыров и соавт. (2014) имеют опыт применения лимфотропной терапии в лечении больных с отогенными внутричерепными осложнениями. Методика заключается во введении лекарственной смеси, состоящей из лидазы,

гидрокортизона, 0,5% раствора новокаина, лазикса и антибактериального препарата в межостистые промежутки шейного и верхнего грудного отделов позвоночника, что в сочетании с операцией позволяет улучшить ее результат,

сократив при этом сроки послеоперационного лечения. При заболеваниях гортани регионарная лимфотропная терапия как самостоятельный метод консервативного лечения в оториноларингологии используется пока редко. Однако к существенным позитивным результатам клинических разработок в этом направлении следует отнести применение регионарной лимфотропной терапии с профилактической целью. Метод использован для снижения частоты и тяжести постинтубационных ларингеальных осложнений у детей младшего возраста при пролонгированной интубации трахеи.

Начиная с первых суток интубации, ежедневно, в течение 5–6 дней, методом низкочастотного ультрафонофореза в область проекции гортани и ее регионарных лимфатических узлов по переднему краю верхней и средней третей грудино-ключично-сосцевидных мышц вводится водный раствор тиенама (имипенем/циластин натрия) и 32 ЕД лидазы на 0,25% новокаине. Применение разработанного способа защиты гортани позволило автору в 3 раза снизить частоту и на половину сократить длительность течения острых

постинтубационных ларингитов, уменьшить вероятность хронических постинтубационных стенозов гортани.

Вывод. Из представленных сведений следует, что вопросы лечения больных путем воздействия на лимфатическую систему или через нее, на ткани и органы в реанимации разрабатываются постепенно на протяжении последних 30 лет. Превалируют исследования, направленные на разработку методик регионарной лимфотропной терапии. В настоящее время они рассматриваются как эффективные способы купирования разнообразных форм воспалительной патологии околоносовой, ротовой области и верхних дыхательных путей. Способы эндолимфатической (системной) терапии пока не имеют широкого применения, используются значительно реже и у небольшого количества больных. То и другое направления требуют дальнейших исследований и поиска новых технических разработок, так как сегодня далеко не исчерпан потенциал реанимационные случаи, где бы они могли найти свое применение.

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СВОЙСТВА КРЕМНИЯ И ЕГО ВАЖНЕЙШИЕ СОЕДИНЕНИЯ: РОЛЬ В КОНЦЕПЦИИ УСТОЙЧИВОГО РАЗВИТИЯ И ЗЕЛЁНОЙ ЭНЕРГЕТИКИ

***Аннотация.** В данной работе представлены краткие сведения об основных физико-химических свойствах кремния, его распространённости в природе и важнейших соединениях. Полупроводниковые свойства кремния делают его ключевым материалом современной электроники и технологий зелёной энергетики. Рассматривается значение таких соединений, как диоксид кремния (SiO_2), силикаты и карбид кремния (SiC), в устойчивом строительстве, экологически безопасном производстве и энергосберегающих технологиях. Анализируется вклад кремниевых солнечных панелей, электродов для получения водорода и аккумуляторов нового поколения в устойчивое развитие. Работа обосновывает стратегическую роль кремния как ресурса в условиях зелёной экономики и глобального энергетического перехода.*

***Ключевые слова:** устойчивое развитие, кремний, зелёная энергетика, электролиз и др.*

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PROPERTIES OF SILICON AND ITS MOST IMPORTANT COMPOUNDS: ROLE IN THE CONCEPT OF SUSTAINABLE DEVELOPMENT AND GREEN ENERGY

***Annotation.** This work presents brief information on the main physicochemical properties of silicon, its abundance in nature, and its most important compounds. The semiconductor properties of silicon make it a key material in modern electronics and green energy technologies. The significance of such compounds as silicon dioxide (SiO_2), silicates, and silicon carbide (SiC) in sustainable construction, environmentally safe production, and energy-efficient technologies is examined. The contribution of silicon-based solar panels, electrodes for hydrogen production, and next-generation batteries to sustainable development is analyzed. The study substantiates the strategic role of silicon as a resource in the context of the green economy and the global energy transition.*

***Keywords:** sustainable development, silicon, green energy, electrolysis, etc.*

Введение. Кремний (Si) — элемент IV группы, металлоид с кристаллической решёткой. Обладает средней химической активностью, чаще встречается в виде оксидов и силикатов. Не является сильным окислителем, однако при высокой температуре реагирует с кислородом, галогенами и некоторыми оксидами металлов. Кремний твёрдый, хрупкий, с металлическим блеском. Его важнейшая характеристика — полупроводниковые свойства: проводимость увеличивается с ростом температуры, что обеспечивает применение кремния в электронике и фотоэлектрике как основного материала. Кремний составляет около 27% земной коры, занимая второе место после кислорода. В природе он представлен главным образом в виде диоксида кремния (SiO_2) и силикатов.

Диоксид кремния (SiO_2): встречается в форме кварца, песка, опала, горного хрусталя. Применяется при производстве стекла, керамики, оптоволокна и прозрачных защитных слоёв для солнечных панелей. Силикаты (силикаты Mg, Ca, Na, K) — основа цемента, бетона и керамических материалов. Обладают значением в экологически устойчивом строительстве как материалы с низкими энергозатратами и возможностью вторичной переработки. Карбид кремния (SiC) — чрезвычайно твёрдый, термостойкий материал, подходящий для высокоэффективной электроники. Используется в электротранспорте, мощных инверторах и системах теплообмена. Гидриды кремния (силаны) SiH_4 применяются в полупроводниковой промышленности для получения высокочистого кремния. Органосиланы важны для нанотехнологий, укрепления поверхности солнечных панелей и производства гидрофобных покрытий.

Роль кремния в устойчивом развитии. Обилие и возобновляемость ресурса. Кремний — один из самых распространённых элементов, а SiO_2 , получаемый из песка, фактически является возобновляемым ресурсом. Экологическая безопасность. Соединения кремния нетоксичны, биологически безопасны и химически инертны. Даже в качестве отходов материалы на основе кремния не представляют экологической угрозы. Устойчивые строительные материалы. Силикатные цементы могут производиться по технологиям с пониженным выбросом CO_2 . Кремнийсодержащие материалы улучшают теплоизоляцию и энергоэффективность зданий. Цифровая экономика. Кремниевые чипы — основа современной электроники. Энергоэффективные микросхемы снижают глобальное потребление энергии. Зелёная энергетика. Кремний — главный материал для солнечных батарей. Монокристаллические и поликристаллические кремниевые пластины обладают высокой фотоэлектрической активностью. Более 90% солнечных панелей в мире основаны на кремнии. Наноматериалы на основе кремния и TiO_2 под воздействием солнечного света превращают CO_2 в метанол, метан или формиат. Этот процесс является основой технологий искусственного фотосинтеза, направленных на снижение последствий глобального изменения климата. Наноразмерные фильтры,

созданные на основе оксида кремния, пропускают молекулы воды, удерживая ионы солей. Силикатные бетоны, изготовленные из соединений кремния, связывают CO_2 посредством реакции карбонатизации. 1 тонна силикатного бетона в среднем поглощает 150–200 кг CO_2 из атмосферы. Это позволяет создавать в строительной отрасли «углеродно-отрицательные» (carbon-negative) технологии.



По сравнению с традиционными мембранами они служат в 5 раз дольше, потребляют в 3 раза меньше энергии, значительно сокращают объём отходов. Эта технология обеспечивает устойчивое водоснабжение в регионах, страдающих от засухливости и опустынивания. Медицинские имплантаты, такие как костные протезы и зубные импланты, покрываются слоем SiO_2 . Такое покрытие снижает воспаление, улучшает адаптацию клеток к имплантату и продлевает срок его службы. Поэтому кремний играет важную роль в медицине, повышая биосовместимость (biocompatibility) материалов. В заключение можно сказать, что кремний и его соединения вносят огромный вклад в устойчивое развитие.

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ПРОЕКТНОЕ УПРАВЛЕНИЕ В ОРГАНИЗАЦИЯХ С ДВОЙНОЙ МИССИЕЙ: БАЛАНС МЕЖДУ ГОСУДАРСТВЕННОЙ СОЦИАЛЬНОЙ ОТВЕТСТВЕННОСТЬЮ И КОММЕРЧЕСКОЙ ЭФФЕКТИВНОСТЬЮ (НА ПРИМЕРЕ АО «ПОЧТА РОССИИ»)

***Аннотация:** Современные государственные корпорации в России всё чаще функционируют в условиях двойной миссии: с одной стороны, они обязаны выполнять социально значимые функции, с другой — демонстрировать коммерческую устойчивость. В таких условиях традиционные модели проектного управления, ориентированные на прибыль и сроки, оказываются недостаточными. В статье на основе анализа проектов АО «Почта России» — включая «Цифрового почтальона», «Бережливый офис» и развитие «Почта Банка» — показано, как организация балансирует между социальными обязательствами (доставка пенсий, госуслуги на селе) и рыночными задачами (цифровизация, рост выручки). Исследование выявило, что успех проектов в подобной среде зависит не от ROI, а от способности учитывать интересы множества стейкхолдеров — от Минцифры до жителей отдалённых населённых пунктов. Предложена модель гибридного проектного управления, учитывающая дуальность целей как управленческий ресурс, а не ограничение.*

***Ключевые слова:** проектное управление, двойная миссия, социальная ответственность, государственная корпорация, стейкхолдеры, Почта России, национальные проекты*

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PROJECT MANAGEMENT IN DUAL-MISSION ORGANIZATIONS: BALANCING PUBLIC SOCIAL RESPONSIBILITY AND COMMERCIAL EFFICIENCY (CASE OF JSC «RUSSIAN POST»)

Abstract: *Modern Russian state corporations increasingly operate under a dual mission: on one hand, they must fulfill socially significant functions; on the other, demonstrate commercial sustainability. In this context, traditional project management models focused on profit and timelines prove insufficient. Based on the analysis of JSC “Russian Post” projects — including “Digital Postman”, “Lean Office”, and “Post Bank” development — the article demonstrates how the organization balances social obligations (pension delivery, rural public services) with market-driven objectives (digital transformation, revenue growth). The study finds that project success in such environments depends not on ROI, but on the ability to account for the interests of multiple stakeholders — from the Ministry of Digital Development to residents of remote settlements. A hybrid project management model is proposed, treating mission duality not as a constraint, but as a strategic asset.*

Keywords: *project management, dual mission, social responsibility, state corporation, stakeholders, Russian Post, national projects*

АО «Почта России» представляет собой уникальный феномен в ландшафте российской экономики: это организация, которая одновременно выступает институтом социальной инфраструктуры и коммерческим оператором на конкурентном рынке логистики и финансовых услуг. Её сеть охватывает 99,9% населённых пунктов страны — включая удалённые сёла Якутии, горные аулы Дагестана и арктические посёлки Ямала, где ни один частный логистический оператор экономически не выживает. В то же время «Почта России» развивает цифровые сервисы, запускает собственный банк и конкурирует с «СберЛогистикой», «СДЭК» и «Boxberry» в сегменте e-commerce.

Эта двойственность не является побочным эффектом, а закреплена на уровне государственной политики. Почта обязана обеспечивать «универсальную почтовую услугу» — доставку корреспонденции и пенсий по фиксированному тарифу, независимо от рентабельности маршрута. Одновременно Стратегия развития компании до 2025 года ставит амбициозные цели по росту выручки, цифровизации и выходу на операционную прибыль.

Именно эта напряжённая синергия между социальной обязанностью и рыночной логикой формирует особое поле для проектного управления. Традиционные методологии — PMBOK, PRINCE2 или даже гибкие фреймворки вроде Scrum — изначально проектировались для организаций с единой целью: максимизация ценности для клиента или акционера. В условиях же дуальной миссии проект перестаёт быть технократической задачей и превращается в сферу переговоров между конфликтующими логиками: логикой социального равенства и логикой эффективности.

Цель данной статьи — проанализировать, как АО «Почта России» организует проектное управление в условиях этой двойственности, какие управленческие механизмы позволяют ей не только избегать конфликтов

между целями, но и использовать их синергию для создания устойчивой модели развития. Для этого будут рассмотрены реальные проекты последних лет, их целеполагание, критерии успеха и система заинтересованных сторон.

Исследование выполнено на основе качественного кейс-стади, дополненного элементами документального анализа. Такой подход позволяет глубоко проникнуть в контекст управленческих решений, недоступный при чисто количественных методах.

Эмпирической базой послужили:

- Официальные документы: Стратегия развития АО «Почта России» 2020-2030 гг. [4], отчёты о реализации национальных проектов «Производительность труда» и «Цифровая экономика», материалы Минцифры России по проекту «Цифровой почтальон»;

- Нормативно-правовая база: Федеральный закон № 176-ФЗ «О почтовой связи» [2], Указ Президента № 306 «О национальных целях развития» [3];

- Публичная статистика: данные о географии сети, объёмах доставки пенсий, финансовых результатах за 2023–2024 гг.

Теоретическую основу составили:

- концепция организаций с двойной миссией (Ким Камерон, Роберт Куин) — применительно к государственному сектору;

- теория стейкхолдеров (Эдвард Фриман) — для анализа множественности интересов;

- современные подходы к гибриднему управлению проектами (PMI, 2021).

Метод кейс-анализа был применён к трём проектам, репрезентативным для разных аспектов двойной миссии:

1. «Цифровой почтальон» — социальный проект по доставке цифровых госуслуг в сельскую местность;

2. «Бережливый офис» — операционная трансформация в рамках нацпроекта;

3. Развитие «Почта Банка» — коммерческий финансовый сервис, использующий доверие к почтовой сети.

По итогам проведенного авторского исследования получены следующие результаты:

1. Двойная миссия как управленческий парадокс – в отличие от частных компаний, где проект оценивается по чётким метрикам (срок, бюджет, ROI), проекты в «Почте России» сталкиваются с дилеммой оценки эффективности. Например, проект по запуску почтового пункта в селе с населением 30 человек:

- С точки зрения рынка — убыточен, некупаем, требует субсидий;

- С точки зрения государства — необходим для обеспечения конституционного права на социальные гарантии.

Анализ Стратегии [4] показывает, что компания не пытается устранить этот парадокс, а институционализирует его. Социальные и коммерческие

проекты управляются разными подразделениями, но объединены общей системой отчётности перед Минцифрой и Минэкономразвития. Это позволяет сохранять две логики одновременно, не подменяя одну другой.

2. Стейкхолдеры как центр проектного управления, т.е. ключевое отличие «Почты России» от классических моделей — смещение фокуса с deliverables на стейкхолдеров. В проекте «Цифровой почтальон» (запущен в 2022 г. в 15 регионах, в 2023 — расширен на 45) главным критерием успеха стал не рост выручки (он близок к нулю), а охват населения, не имеющего доступа к интернету. По данным Минцифры [5], за 2023 год услугой воспользовались более 1,2 млн человек в сельской местности.

При этом проект управлялся совместно:

заказчик — Минцифры (социальный эффект);

исполнитель — «Почта России» (логистика, персонал);

бенефициар — граждане (доступ к услугам).

Такая мультисторонняя ответственность требует от проектного менеджера не только технических, но и медиационных компетенций: умения переводить социальные цели в операционные задачи и наоборот.

3. Гибридная архитектура управления проектами показывает, что АО «Почта России» не использует РМВОК «как есть». Вместо этого применяется адаптированная гибридная модель, сочетающая:

- Жёсткое управление по бюджету и срокам — для коммерческих проектов («Почта Банк»);

- Гибкое, итеративное управление по эффекту — для социальных («Цифровой почтальон»).

Например, при внедрении «Бережливого офиса» в 2023–2024 гг. в рамках нацпроекта использовались:

- карта потока создания ценности (VSM) — для выявления потерь;

- ежедневные stand-up'ы — для вовлечения персонала;

- KPI: время обслуживания, число жалоб, удовлетворённость клиента.

Но при этом финансирование проекта было обеспечено за счёт субсидий, а не внутренней прибыли — что сняло давление срока окупаемости.

Таким образом, проектное управление в «Почте России» — это не набор инструментов, а система адаптации методологий под природу миссии.

Исследование позволяет сделать вывод – дуальность миссии в условиях современной России — не исключение, а норма для ключевых инфраструктурных организаций. АО «Почта России» демонстрирует, что такую двойственность можно не только удерживать, но и превращать в источник устойчивости.

Подводя итоги проведенного исследования, можно сделать следующие выводы:

1. Проектное управление в организациях с двойной миссией требует отказа от универсальных моделей в пользу контекстно-зависимых гибридных подходов;

2. Главный ресурс проекта — не бюджет, а способность согласовывать интересы разнородных стейкхолдеров;

3. Государственная поддержка (в форме субсидий, регуляторных преференций и мандата) — необходимое условие для баланса между социальной и коммерческой логикой.

Отсюда мы видим, что предложенная модель имеет значение не только для почтовой отрасли, но и для других госкорпораций («РЖД», «Росатом»), а также для муниципальных учреждений, реализующих проекты в условиях ограниченных ресурсов и множественности целей.

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БЕРЕЖЛИВОЕ ПРОИЗВОДСТВО КАК ИНСТРУМЕНТ СТРАТЕГИЧЕСКОГО УПРАВЛЕНИЯ ИЗМЕНЕНИЯМИ В УСЛОВИЯХ НЕСТАБИЛЬНОЙ ВНЕШНЕЙ СРЕДЫ

***Аннотация:** Современные организации вынуждены постоянно адаптироваться к быстро меняющимся экономическим, технологическим и геополитическим условиям. В таких условиях стратегическое управление изменениями становится ключевым фактором выживания и роста. В статье обосновывается, что принципы бережливого производства, изначально разработанные для повышения операционной эффективности, могут быть эффективно трансформированы в инструмент стратегического управления изменениями. На основе анализа модели Коттера и кейса российского логистического предприятия показано, что lean-подходы способствуют снижению организационной инерции, ускоряют циклы принятия решений и повышают вовлечённость персонала в трансформационные процессы. Исследование подтверждает, что бережливое производство, интегрированное на стратегическом уровне, усиливает адаптивный потенциал организации.*

***Ключевые слова:** бережливое производство, стратегическое управление изменениями, организационная адаптация, lean-трансформация, устойчивость, кейс-анализ, нестабильная внешняя среда*

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LEAN PRODUCTION AS A TOOL FOR STRATEGIC CHANGE MANAGEMENT IN AN UNSTABLE EXTERNAL ENVIRONMENT

***Abstract:** Modern organizations must continuously adapt to rapidly changing economic, technological, and geopolitical conditions. In this context, strategic change management becomes a key factor for survival and growth. This article*

argues that lean production principles, originally developed to improve operational efficiency, can be effectively transformed into a tool for strategic change management. Based on an analysis of Kotter's change model and a case study of a Russian logistics company, it is demonstrated that lean approaches reduce organizational inertia, accelerate decision-making cycles, and increase employee engagement in transformation processes. The study confirms that lean production, when integrated at the strategic level, enhances an organization's adaptive capacity.

Keywords: *lean production, strategic change management, organizational adaptation, lean transformation, resilience, case study, unstable external environment*

С 2022 года российская экономика вступила в фазу структурной трансформации: уход западных компаний, санкционные ограничения и курс на технологический суверенитет потребовали от организаций не просто краткосрочной адаптации, а глубокой перестройки бизнес-моделей. В этих условиях традиционные подходы к управлению изменениями — даже такие проверенные, как модель Джона Коттера — сталкиваются с новым вызовом: изменения должны быть быстрыми, системными и устойчивыми одновременно.

Бережливое производство, долгое время воспринимавшееся как инструмент сокращения издержек в автомобильной промышленности, сегодня находит применение в госсекторе, логистике и ИТ. Причина — в его способности связывать стратегическое видение с повседневной операционной реальностью. В отличие от управленческих деклараций, lean работает через конкретные действия, измеримые результаты и вовлечённость каждого сотрудника.

Цель статьи — показать, как бережливое производство может быть интегрировано в стратегическое управление изменениями как ответ на нестабильность внешней среды.

Задачи:

- 1) выявить точки соприкосновения между lean и теориями изменений;
- 2) проанализировать внешние вызовы через призму PESTEL-анализа;
- 3) на примере реального кейса продемонстрировать, как lean снижает барьеры к трансформации.

Исследование построено на смешанном подходе:

- Теоретический анализ моделей управления изменениями (Коттер, Левин) и концепции бережливого производства (Уомак, Лайкер);
- PESTEL-анализ внешней среды российского бизнеса в 2024–2025 гг.;
- Кейс-стадии на примере пилотных проектов АО «Почта России» в Республике Башкортостан, реализованных в рамках национального проекта «Производительность труда».

Результаты проведенного мною исследования, в ходе подготовки данной статьи показали следующее:

1. Lean и управление изменениями: концептуальная связь

Модель Коттера начинается с «создания ощущения срочности». В условиях кризиса это достигается не через прямые указания, а через визуализацию реальных проблем.

Например, карта потока создания ценности (VSM) в почтовом отделении показывает, что клиент тратит 12 минут на операцию, из которых только 4 — на полезные действия. Остальное — ожидание, поиск информации, повторные запросы. Такая диагностика формирует внутреннюю мотивацию к изменениям, а не внешнее давление.

Принцип «постоянного совершенствования» (kaizen) напрямую поддерживает у Коттера этап «закрепления изменений». Lean не предполагает «финального состояния» — он создаёт культуру, где улучшения становятся нормой.

2. PESTEL-анализ: вызовы 2024–2025 гг.

- Политические: курс на локализацию услуг и цифровой суверенитет;
- Экономические: рост издержек на логистику (+37% за 2023 г., по данным Росстата);
- Технологические: переход на российское Программное обеспечение («АСУ Почта» вместо иностранных CRM);
- Социальные: рост требований к скорости и прозрачности госуслуг (в т.ч. в рамках «дорожных карт» регионов).

Эти факторы делают гибкость и оперативность стратегическими приоритетами.

3. Кейс: «Бережливый офис» в «Почте России» (Республика Башкортостан, 2023–2024)

В 2023 г. в Уфе стартовал пилот по методике «Бережливый офис» (Минэкономразвития, 2022). В рамках данного проекта:

- Проведена карта текущего состояния (Current State Map) для типовой операции «приём посылки»;
- Устранены не добавляющие ценности действия: дублирование ввода данных, избыточная проверка документов;
- Внедрены визуальные стандарты (5S): единое расположение форм, чёткая разметка рабочего места;
- Запущены ежедневные 10-минутные встречи для быстрого решения проблем.

Согласно отчёту Минэкономразвития по итогам 2023 г., в пилотных регионах (включая Республику Башкортостан) удалось сократить время обслуживания на 15–25% и повысить удовлетворённость клиентов. Мои внутренние наблюдения, в ходе проведения опроса с сотрудниками УФПС Республики Башкортостан АО «Почта России»: также подтвердили: сотрудники стали чаще предлагать улучшения, а изменения воспринимались как поддержка, а не контроль.

Подводя итоги проведенного анализа, мы можем сделать выводы, что бережливое производство в условиях нестабильности перестаёт быть

инструментом «для экономистов» и становится стратегическим ресурсом выживания. Его ценность — в способности:

1. Снижать инерцию через визуализацию и участие;
2. Обеспечивать гибкость за счёт стандартизации базовых процессов;
3. Формировать культуру адаптации, где изменения — норма, а не исключение.

Опыт АО «Почта России» показывает, что даже в условиях госсектора, где изменения часто носят формальный характер, lean позволяет оживить реформы, сделать их осязаемыми и результативными. Особенно это актуально для организаций, ориентированных на клиента и работающих в условиях высокой внешней неопределённости.

Перспективы исследований — интеграция lean с цифровыми платформами (например, ИИ для анализа потоков) и распространение подхода на муниципальные учреждения.

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ИНТЕГРАЦИЯ ПРИНЦИПОВ БЕРЕЖЛИВОГО ПРОИЗВОДСТВА В СТРАТЕГИЮ УСТОЙЧИВОГО РАЗВИТИЯ ОРГАНИЗАЦИИ: УПРАВЛЕНЧЕСКИЕ АСПЕКТЫ И ПРАКТИЧЕСКИЕ КЕЙСЫ

***Аннотация:** В условиях растущих экономических и экологических вызовов устойчивое развитие становится стратегическим приоритетом для организаций. В статье рассматривается возможность интеграции принципов бережливого производства (lean production) в стратегию устойчивого развития как инструмента повышения ресурсной эффективности и сокращения негативного воздействия на окружающую среду. На основе анализа теоретических подходов и кейса российского предприятия показано, что устранение потерь по модели Toyota не только снижает издержки, но и усиливает социальную и экологическую ответственность бизнеса. Исследование подтверждает, что бережливое производство может выступать операционной основой стратегии устойчивого развития при условии системного участия руководства и адаптации инструментов к специфике отрасли.*

***Ключевые слова:** бережливое производство, устойчивое развитие, стратегический менеджмент, устранение потерь, ресурсная эффективность, корпоративная социальная ответственность, кейс-анализ.*

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INTEGRATION OF LEAN PRODUCTION PRINCIPLES INTO THE ORGANIZATION'S SUSTAINABLE DEVELOPMENT STRATEGY: MANAGEMENT ASPECTS AND PRACTICAL CASES

Abstract: *Amid growing economic and environmental challenges, sustainable development has become a strategic priority for organizations. This article explores the integration of lean production principles into a sustainable development strategy as a means to enhance resource efficiency and reduce negative environmental impact. Through theoretical analysis and a case study of a Russian enterprise, it is demonstrated that waste elimination based on the Toyota model not only cuts costs but also strengthens social and environmental responsibility. The study confirms that lean production can serve as an operational foundation for a sustainable development strategy, provided there is systematic leadership involvement and adaptation of tools to industry specifics.*

Keywords: *lean production, sustainable development, strategic management, waste elimination, resource efficiency, corporate social responsibility, case study.*

Актуальность темы заключается в том, что современные организации всё чаще сталкиваются с необходимостью балансировать между экономической эффективностью, социальной ответственностью и экологической устойчивостью. Концепция устойчивого развития, сформулированная ещё в докладе «Наше общее будущее» (1987), сегодня трансформировалась из этического императива в стратегическую необходимость. Особенно это актуально для российских компаний, работающих в условиях санкционного давления, ограничения импортных ресурсов и ужесточения экологических требований на уровне регионов.

Одновременно с этим, бережливое производство — методология, изначально разработанная Toyota Motor Corporation, — продолжает доказывать свою эффективность не только на производственных предприятиях, но и в сервисных, логистических и даже государственных структурах. Однако в российской научной литературе остаётся недостаточно исследований, посвящённых синергии lean-подходов и стратегий устойчивого развития. Чаще всего бережливое производство рассматривается как инструмент операционного менеджмента, а не как элемент долгосрочной стратегии.

Цель данной статьи — выявить управленческие механизмы интеграции принципов бережливого производства в стратегию устойчивого развития организации и проиллюстрировать их на примере реального кейса.

Для достижения цели поставлены следующие задачи:

- 1) проанализировать теоретические основы взаимосвязи lean и устойчивого развития;
- 2) выявить ключевые точки соприкосновения между ними;
- 3) на основе кейса российского предприятия показать практические эффекты такой интеграции.

В исследовании применён смешанный метод, сочетающий теоретический анализ и кейс-стадии.

Теоретическая база построена на работах Уомака и Джонса (2003), классиков бережливого производства, а также на современных

исследованиях, связывающих lean и устойчивое развитие. Использован также анализ нормативных документов, включая Национальные цели развития РФ до 2030 года, где прямо закреплён приоритет устойчивого развития.

Эмпирическая часть основана на анализе публично доступных материалов одного из российских предприятий машиностроительного сектора — ПАО «ОДК-Уфимское моторостроительное производственное объединение» (далее – УМПО). Выбор обусловлен следующим:

- предприятие внедряет элементы бережливого производства с 2019 г.;
- публикует отчёты по устойчивому развитию (в том числе в рамках холдинга «Объединённая двигателестроительная корпорация»);
- реализует проекты по энергосбережению, переработке отходов и цифровизации производства — что напрямую связано с принципами устойчивого развития.

Метод кейс-анализа позволил проследить, как конкретные инструменты lean (например, 5S, карта потока создания ценности, SMED) способствуют достижению целей в области экологии и социальной ответственности.

Анализ показал, что принципы бережливого производства и цели устойчивого развития имеют глубокую концептуальную связь, несмотря на разное происхождение.

1. Устранение потерь — ключевой постулат lean — напрямую пересекается с целями устойчивого развития. В классификации Toyota выделяют семь видов потерь: перепроизводство, ожидание, транспортировка, излишняя обработка, избыточные запасы, ненужные движения, брак. Все они ведут не только к финансовым потерям, но и к неэффективному использованию природных ресурсов. Например, перепроизводство влечёт избыточный расход металла, энергии и воды — что противоречит принципам «зелёной» экономики.

2. На предприятии УМПО внедрение карты потока создания ценности (Value Stream Mapping) позволило сократить цикл производства деталей на 18%. Одновременно с этим снизилось потребление электроэнергии на 12% и объём металлических отходов — на 9%. Эти данные приведены в отчёте по устойчивому развитию УМПО за 2024 г. Таким образом, операционные улучшения автоматически транслируются в экологические выгоды.

3. Важную роль сыграла системная поддержка со стороны топ-менеджмента. Lean-инициативы были включены не только в производственные KPI, но и в стратегические цели развития предприятия до 2025 года, утверждённые советом директоров. Это позволило избежать «островного» внедрения и добиться межфункциональной координации.

4. Примечательно, что в ходе внедрения lean на УМПО возросла вовлечённость персонала — сотрудники участвовали в кайдзен-мероприятиях, предлагали идеи по улучшению. Это усиливает социальный компонент устойчивого развития, так как повышает качество рабочей среды и чувство причастности.

Таким образом, бережливое производство, выступая как операционная философия, может стать практическим мостом между декларациями о устойчивом развитии и реальными действиями на уровне процессов.

Исследование подтвердило, что интеграция принципов бережливого производства в стратегию устойчивого развития не только возможна, но и целесообразна. Основные выводы:

1. Бережливое производство не ограничивается сокращением издержек — оно способствует достижению целей в области экологии (снижение отходов, энергосбережение) и социальной сферы (улучшение условий труда, вовлечение персонала).

2. Эффективность такой интеграции напрямую зависит от стратегического видения руководства: lean должен рассматриваться не как временный проект, а как часть долгосрочной стратегии.

3. Российские предприятия, особенно в обрабатывающих отраслях, уже демонстрируют успешные примеры такой синергии, что открывает путь для распространения лучших практик.

Практическая значимость исследования заключается в том, что предложенная модель интеграции может быть адаптирована и другими организациями, включая муниципальные учреждения и компании малого и среднего бизнеса. В дальнейшем целесообразно исследовать роль цифровых технологий (цифровых двойников, IoT) в усилении связи между lean и устойчивым развитием.

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ОЦЕНКИ МИКРОЦИРКУЛЯЦИИ ПРИ КРИТИЧЕСКИХ СОСТОЯНИЯХ (ОБЗОР ЛИТЕРАТУРЫ)

Аннотация: Ключевым аспектом обзора является акцент на состояние капиллярного кровотока при критических состояниях. В обзоре обобщены современные сведения о роли эндотелия в регуляции микрокровоотока, проявлении острой эндотелиальной дисфункции у пациентов в критическом состоянии и методах оценки микроциркуляции. Освещены основные методы лечения, применяемые в интенсивной терапии, которые могут оказать влияние на микрокровоток, и обоснована целесообразность разработки и внедрения в практику методов для постоянного мониторинга состояния микроциркуляции.
Ключевые слова: микроциркуляция, эндотелиальная дисфункция, критическое состояние, механотрансдукция эндотелия

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ASSESSMENT OF MICROCIRCULATION IN CRITICAL CONDITIONS (LITERATURE REVIEW)

A key aspect of the review is the emphasis on the state of capillary blood flow in critical conditions. The review summarizes current information on the role of endothelium in the regulation of microcirculation, the manifestation of acute endothelial dysfunction in critically ill patients and methods for assessing microcirculation. The main methods of treatment used in intensive therapy, which can affect microcirculation, are highlighted, and the feasibility of developing and putting into practice methods for constant monitoring of the state of microcirculation is justified.

Keywords: *microcirculation, endothelial dysfunction, critical conditions, endothelial mechanotransduction*

Введение. В настоящее время отмечается повышение интереса к проблеме состояния микроциркуляции у пациентов в критическом состоянии с тяжелой мультиорганной дисфункцией, проявляющейся в том числе выраженной тканевой гипоперфузией. Сосудам микроциркуляторного русла, и в большей степени капиллярам как дистальному звену кровеносной

системы, придается главная роль в обеспечении тканевой трофики. Ввиду особенностей строения капилляров (стенка микрососуда состоит из одного слоя эндотелиальных клеток, покрытых гликокаликсом), регуляция капиллярного кровотока реализуется посредством артериол и метартериол с непосредственным участием рецепторной и эффекторной систем эндотелия [11].

Таким образом, трансдукторная функция эндотелия является одной из важнейших в обеспечении процессов клеточного питания, обеспечивающих сохранение структуры и функции ткани или органа. Эндотелий постоянно подвергается механическому воздействию гидростатического давления крови на стенку сосуда и напряжения сдвига, возникающего в результате возникновения силы трения, создаваемой кровотоком. В отличие от гидростатического давления, которое имеет радиальный вектор и вызывает растяжение сосудистой стенки, сила трения крови создает напряжение сдвига, тангенциальное к направлению кровотока и оси сосуда [13]. Напряжение сдвига пропорционально вязкости крови и скорости потока и обратно пропорционально диаметру просвета сосуда. В магистральных артериях с высокими значениями линейной скорости напряжение сдвига находится в пределах 10–30 дин/см², в магистральных венах – 1–6 дин/см². Микрососуды, состоящие из одного эндотелия (капилляры), испытывают только напряжение сдвига, и оно в наибольшей степени зависит от линейной скорости капиллярного кровотока, так как эффективная вязкость крови в капиллярах становится близкой к вязкости плазмы. Кровоток, постоянно изменяющийся напряжением сдвига и растяжением стенки, воздействует на эндотелий и гладкомышечные клетки, активизируя механизмы регуляции сосудистого тонуса [3]. Эндотелиальные клетки очень чувствительны даже к незначительным изменениям величины, направления и регулярности напряжения сдвига, вызванного кровотоком. Эти характеристики воспринимаются и трансформируются эндотелием локально, и локальная чувствительность имеет глобальные физиологические последствия. Ключевым комплексом механотрансдукции в ответ на изменение напряжения сдвига являются: PECAM-1, VE-кадгерин, VEGFR2, и, возможно, VEGFR3. Комплекс PECAM-1-VE-кадгерин-VEGFR2B, связанный с цитоскелетом, в сочетании с гликокаликсом является механотрансдуктором, который преобразует механический стимул в каскад биохимических реакций, изменяющих функциональное состояние эндотелия с активацией продукции вазоактивных веществ, что ведет к изменению сосудистого тонуса [4]. Следовательно, чувствительность к напряжению сдвига является важным физиологическим механизмом, который обеспечивает сохранение оптимальных параметров для обеспечения механической целостности сосудистой стенки и создания оптимальных условий для тканевого гемостаза. Помимо кратковременного вазоактивного ответа на изменение напряжения сдвига также происходит долгосрочная адаптация в виде морфогенеза и ремоделирования сосудов за счет миграции и пролиферации эндотелиальных

клеток. Ламинарное напряжение сдвига – необходимое условие для созревания, дифференцировки и обеспечения функциональной состоятельности клеток эндотелия.

Являясь важными механосенсорами в сосудистой системе, эндотелиальные клетки способствуют адаптации к различным механическим сигналам, вызванным потоком крови. Дефекты эндотелиальных механоответов могут нарушать ремоделирование и функции тканей, что приводит к прогрессированию сердечно-сосудистых расстройств. В экспериментальных исследованиях у эндотелиальных клеток, выращенных на средах, выявлены значительные нарушения функций в ответ на изменение потока: снижение синтеза оксида азота, повышенная способность к адгезии лейкоцитов, накопление в цитоплазме холестерина и окисленных липопротеинов низкой плотности, нарушение передачи вазодилатирующих эффекторов гладкомышечным клеткам, повышенный синтез компонентов внеклеточного матрикса (приобретение профибротического фенотипа), склонность к преждевременному старению и апоптозу [13]. Аберрантный сдвиг, критическое снижение или остановка напряжения сдвига приводит к активации сигнальных каскадов, которые вызывают эндотелиальную дисфункцию, активируют воспаление и повреждение эндотелия. Этот механизм может реализовываться как на регионарном уровне, так и системно (при остановке кровообращения, кардиогенном и гиповолемическом шоках). В то же время повреждение эндотелия при сепсисе, тяжелой вирусной инфекции, интоксикации носит первичный характер и влечет за собой снижение чувствительности к напряжению сдвига, что усугубляет эндотелиальную дисфункцию [15].

Дисфункция эндотелия является одним из главных патофизиологических механизмов развития тканевой гипоперфузии и мультиорганной дисфункции при критических состояниях [10,11]. При этом коррекция параметров макрогемодинамики вазоактивными препаратами, как правило, не улучшает микрокровоток [12]. Это состояние называют «потерей гемодинамической согласованности», и оно является одним из основных факторов, определяющих клинический исход у тяжелобольных [13]. Негативные результаты многочисленных исследований, основанных на традиционных подходах так называемой гемодинамической реанимации с целью улучшения перфузии органов у пациентов с септическим шоком и при других критических состояниях, подчеркнули необходимость мониторинга микроциркуляции [7,10]. Основными признаками острой эндотелиальной дисфункции, лежащей в основе потери гемодинамической согласованности (потери взаимосвязи между системными показателями гемодинамики и состоянием микрокровотока), являются: гетерогенный (неоднородный кровоток), снижение плотности капилляров, снижение скорости капиллярного кровотока, отек интерстиция и экстравазация. Указанные изменения диагностируют при помощи неинвазивных методов микроскопической визуализации: витальной капилляроскопии ногтевого

ложу, сублингвальной микроскопии [15]. В клинической практике при оценке тканевой перфузии наиболее часто ориентируются на уровень лактата и значение артерио-венозной разницы по кислороду, однако эти показатели не всегда могут быть достаточно информативными. Например, в условиях шунтирующего кровотока они не отражают реальную степень тканевой гипоксии. Некоторые исследователи считают более информативным показателем, отражающим тканевой метаболизм, разницу по парциальному давлению углекислого газа в центральной венозной и артериальной крови (PCO₂ a-v) [6,9]. Еще одним из важнейших параметров микроциркуляции, который следовало бы оценивать, является вазомоторная функция, то есть реактивность микрососудов. Шок характеризуется гипореактивностью сосудов, в том числе потерей чувствительности к сосудосуживающим препаратам, что приводит к рефрактерной гипотензии, недостаточной перфузии тканей и прогрессированию множественной органной дисфункции [9]. К тому же повреждение эндотелия при шоке приводит к нарушению его секреторной функции в виде угнетения синтеза оксида азота и фактора гиперполяризации, что способствует усугублению нарушения капиллярного кровотока [11]. Оценка вазомоторной функции у пациентов в критическом состоянии может проводиться при помощи функциональных проб: окклюзионной, тепловой, холодовой. Пробы могут выполняться методом лазерной доплеровской флоуметрии или инфракрасной термографии. Несмотря на простоту выполнения и интерпретации, они позволяют получить объективную информацию о реактивности микрососудов и функции эндотелия [4,12,1]. Кроме того, в клиническом арсенале есть много лабораторных маркеров повреждения и дисфункции эндотелия: оксид азота и его метаболиты, асимметричный диметиларгинин (АДМА), эндотелин-1 (ЭТ-1), метаболиты арахидоновой кислоты (простациклин (ПЦ), или простагландин-I₂), эпоксиэйкозатриеновые кислоты (ЕЕТ), фактор фон Виллебранда (WF), тромбомодулин (ТМ, CD141), сосудистый эндотелиальный фактор роста (VEGF), вазогин-1 (VASH-1), молекулы адгезии ICAM-1 и VCAM-1, С-реактивный белок, интерлейкин-6, прокальцитонин, пресепсин, нейтрофил CD64, проадреномедуллин. Однако оценки единичных показателей недостаточно для составления объективного представления о состоянии эндотелия и микроциркуляторного русла у пациентов в критическом состоянии. Для получения наиболее полной информации о состоянии микроциркуляции необходимо использовать совокупность диагностических методов, включая клинические неинвазивные косвенные, такие как оценка времени наполнения капилляров (время исчезновения «белого пятна»), показатель пятнистости кожи и температурный градиент между ядром и периферией. Дополнительная микроскопическая оценка, выполнение функциональных тестов и лабораторной диагностики позволят объективно оценивать состояние микроциркуляции в динамике, что является чрезвычайно важным для патогенетической терапии подобных состояний.

Устранение дисфункции микроциркуляции. Протоколы и конкретные рекомендации по лечению дисфункции микроциркуляции на сегодняшний день отсутствуют. Вместе с тем современные представления об этиологии и патогенезе острого повреждения эндотелия при различных критических состояниях свидетельствуют о возможности значительно улучшать прогноз заболевания за счет целенаправленного воздействия. Некоторые методы лечения, применяемые в интенсивной терапии, хотя и не являются специфическими для улучшения микроциркуляции, однако оказывают на нее существенное влияние. При этом неправильное или несвоевременное их применение может приводить к значительному ухудшению имеющихся расстройств микрокровотока. В идеале терапия, направленная на ее коррекцию, должна воздействовать на один или несколько патогенетических механизмов, участвующих в развитии микроциркуляторных нарушений. Важным фактором обратимости повреждения эндотелия является временной. Раннее начало патогенетического лечения и/или устранение этиологического фактора, повлекшего за собой развитие критического состояния, напрямую связано с улучшением прогноза заболевания. Однако значительная часть пациентов отделений реанимации и интенсивной терапии на момент поступления имеет как первичное, так и вторичное повреждение эндотелия с развитием мультиорганной дисфункции, требующей поддержки или даже замещения жизненно важных функций.

Распространенным подходом, предполагающим улучшение микрокровотока, является инфузионная терапия, направленная на восстановление системной гемодинамики [13]. Ряд исследований продемонстрировали, что проведение инфузионной терапии может улучшать перфузию тканей, увеличивая долю перфузируемых капилляров и уменьшая неоднородность перфузии. Важно отметить, что в исследованиях микроциркуляторные эффекты были относительно независимыми от системных эффектов. Положительный эффект от проведения инфузионной терапии, например, при сепсисе, в основном наблюдают в ранней фазе (в течение 24 часов после постановки диагноза), тогда как более позднее (после 48 часов) введение инфузионных растворов не приводит к улучшению микроциркуляции даже при увеличении сердечного выброса [8,12]. Этот подход может быть полезен не только в качестве лечебного, но и в качестве диагностического приема для оценки обратимости нарушений микроциркуляции.

Применение бета-адреномиметиков может улучшать перфузию микрососудов, увеличивая не только конвективный, но и диффузионный транспорт, причем эти эффекты не связаны с изменениями системных показателей гемодинамики [6,15]. Например, группой исследователей методом сублингвальной микроскопии показано, что при введении в течение 2 часов небольших доз добутамина у пациентов с септическим шоком увеличивается число перфузируемых капилляров (от $48 \pm 15\%$ до $67 \pm 11\%$, $p < 0,001$) и улучшаются другие показатели

микроциркуляции, в частности снижается уровень лактата. Причем эти эффекты также не были связаны с изменениями показателей системной гемодинамики, такими как сердечный индекс или артериальное давление [6]. В аналогичном исследовании, в которое было включено 23 пациента с септическим шоком, C. Enrico et al. (2012) [10] не обнаружили существенного влияния на микроциркуляцию добутамина (в частности, в среднем доля перфузируемых капилляров была $81 \pm 0,21\%$ до назначения добутамина против $83 \pm 19\%$ после его введения, $p = 0,45$). В то же время у пациентов с исходно более тяжелыми нарушениями микрокровотока параметры микроциркуляции в целом улучшались (доля перфузируемых капилляров у них до и после применения добутамина составила соответственно $57 \pm 0,3\%$ и $72 \pm 0,26\%$, $p = 0,005$). Аналогичные эффекты выявлены при применении милринона и левосимендана [5,7].

Вазопрессорная терапия также может оказывать различное влияние на микроциркуляцию. Коррекция выраженной гипотензии с помощью вазопрессоров до достижения уровня среднего артериального давления приблизительно 65 мм рт. ст. может приводить к улучшению микроциркуляции. Однако повышение значения среднего артериального давления до более высокого уровня (75–85 мм рт. ст. и выше) при использовании вазопрессоров может, наоборот, сопровождаться ухудшением микроциркуляции. Следует отметить, что эти данные имели большую индивидуальную вариабельность и получены в исследованиях с небольшим числом пациентов [8,11]. Следует заметить, что, как и при использовании добутамина, повышение артериального давления при помощи вазопрессорной терапии нарушало подъязычную микроциркуляцию у пациентов с исходно сохраненным микрокровотоком, тогда как в наиболее тяжелых случаях наблюдали улучшение микроциркуляции [8]. Сосудорасширяющие лекарственные препараты потенциально могут также улучшать микроциркуляцию, поскольку локальная дилатация может способствовать увеличению притока крови к капиллярам и их рекрутированию, а снижение плотности сосудов и тромбирование капилляров могут быть результатом чрезмерной вазоконстрикции питающего сосуда [5,9]. В то же время в рандомизированном исследовании, включавшем 70 пациентов с септическим шоком, не было выявлено улучшающего влияния нитроглицерина на микроциркуляцию [2]. Однако применение нитроглицерина при кардиогенном шоке со строгим подходом к дозированию, по данным den C. A. Uil et al. (2009), оказывало положительное влияние на микрокровоток [7]. Модуляция эндотелиальной NO-синтазы (eNOS) представляется одним из перспективных способов воздействия на микроциркуляцию, в том числе и у пациентов в критическом состоянии. eNOS активно участвует в регуляции кровотока на микроциркуляторном уровне, ее стимуляция приводит к увеличению перфузии в тканях. Тетрагидробиоптерин (BH4) является важным кофактором эндотелиальной eNOS, а соотношение BH4 и дигидробиоптерина определяет продукцию оксида азота. У здоровых

добровольцев, подвергшихся воздействию низких доз эндотоксина, введение ВН4 восстанавливало реакцию кровотока предплечья на ацетилхолин. Свойство ВН4 восстанавливать эндотелиальную функцию наблюдалось также у пациентов с тяжелой гипергликемией и реперфузионным повреждением [14]. С учетом положительного влияния на эндотелий повышения напряжения сдвига кровотока перспективными для внедрения в практику лечения пациентов в критическом состоянии являются физические методы, модулирующие кровоток. В одном из недавних экспериментальных исследований продемонстрировано успешное применение наружного пневматического пульсирующего устройства, оказывающее механическое воздействие на грудную клетку, что позволило улучшить результаты выживания лабораторных животных после длительной остановки кровообращения [7]. Температурный фактор также может быть отнесен к простым, но весьма важным лечебным мерам. Результаты исследований подтверждают, что локальное тепловое воздействие на периферический микрокровооток (согревание конечностей) способствует увеличению напряжения сдвига и улучшению функции эндотелия. К сожалению, можно констатировать, что имеющиеся визуальные методы оценки микроциркуляции в клинической практике являются весьма трудоемкими. Это обстоятельство объясняет превалирование экспериментальных исследований в этой области и затрудняет их внедрение в рутинную работу для динамического контроля состояния микрокровоотока и эффективности воздействия на него лечебных мероприятий [14].

Заключение. Оценка состояния капиллярного кровотока при критических состояниях – важная составляющая лечебной тактики. Исследования последних лет акцентируют внимание на роль эндотелия в регуляции микрокровоотока, проявления острой эндотелиальной дисфункции, имеющей большое значение в развитии множественной органной дисфункции. Потеря гемодинамической согласованности, при которой микрокровооток мало зависит от макрогемодинамических показателей, диктует необходимость разработки методов динамического объективного контроля состояния микроциркуляторного русла для полноценной оценки эффективности применяемых при интенсивной терапии методов лечения.

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РОЛЬ ИНТЕГРИРОВАННЫХ МОНИТОРИНГОВЫХ СИСТЕМ В ПРОГНОЗИРОВАНИИ НЕБЛАГОПРИЯТНЫХ ИСХОДОВ У КРИТИЧЕСКИ БОЛЬНЫХ ПАЦИЕНТОВ

Аннотация: Интегрированные мониторинговые системы играют ключевую роль в современной интенсивной терапии, обеспечивая непрерывный сбор, анализ и интерпретацию физиологических данных критически больных пациентов. Совмещение традиционного мониторинга жизненно важных функций с алгоритмами машинного обучения и системами поддержки клинических решений позволяет выявлять ранние признаки ухудшения состояния, прогнозировать развитие неблагоприятных исходов и оптимизировать терапевтические вмешательства. Такие системы интегрируют данные из разнообразных источников — от bedside-мониторинга и лабораторных показателей до изображений и электронных медицинских записей — создавая динамическую модель состояния пациента. Использование интегрированных мониторинговых платформ повышает точность прогнозирования, способствует раннему предупреждению органной дисфункции и снижает вероятность ошибок, связанных с человеческим фактором. Внедрение данных технологий формирует основу для персонализированного подхода к лечению критически больных, улучшая качество медицинской помощи и клинические исходы.

Ключевые слова: интегрированные мониторинговые системы; критически больные пациенты; прогнозирование; неблагоприятные исходы; интенсивная терапия; машинное обучение; раннее предупреждение; клиническая поддержка решений; органная дисфункция; персонализированная медицина.

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THE ROLE OF INTEGRATED MONITORING SYSTEMS IN PREDICTING ADVERSE OUTCOMES IN CRITICALLY ILL PATIENTS

Abstract: *Integrated monitoring systems play a key role in modern intensive care, providing continuous collection, analysis, and interpretation of physiological data from critically ill patients. Combining traditional vital sign monitoring with machine learning algorithms and clinical decision support systems enables early detection of deterioration, prediction of adverse outcomes, and optimization of therapeutic interventions. These systems integrate data from a variety of sources—from bedside monitoring and lab values to imaging and electronic medical records—to create a dynamic model of the patient's condition. The use of integrated monitoring platforms improves predictive accuracy, Monitoring platforms improve forecasting accuracy, facilitate early warning of organ dysfunction, and reduce the likelihood of human error. The implementation of these technologies forms the basis for personalized approach to treating critically ill patients, improving the quality of care and clinical outcomes.*

Keywords: *integrated monitoring systems; critically ill patients; prognosis; adverse outcomes; intensive care; machine learning; early warning; clinical decision support; organ dysfunction; personalized medicine.*

Актуальность

В условиях роста числа пациентов с тяжёлыми критическими состояниями и высокой нагрузкой на отделения интенсивной терапии необходимость своевременного выявления угрозы неблагоприятных исходов приобретает особую значимость. Традиционные методы мониторинга, основанные на периодической оценке жизненных показателей, зачастую не позволяют фиксировать ранние, субклинические изменения, предшествующие ухудшению состояния. Интегрированные мониторинговые системы, объединяющие многоканальные физиологические данные в реальном времени и инструменты интеллектуального анализа, обеспечивают качественно новый уровень наблюдения за пациентом.

Использование таких систем повышает точность и скорость диагностических решений, снижает риск пропуска критических изменений, а также способствует оптимальному распределению ресурсов медицинского персонала. На фоне стремительного развития цифровых технологий, алгоритмов машинного обучения и систем предиктивной аналитики их роль становится особенно важной для повышения эффективности интенсивной терапии и улучшения клинических исходов. Именно поэтому изучение потенциала интегрированных мониторинговых систем в прогнозировании неблагоприятных событий рассматривается как актуальное направление современной медицины.

Цель исследования

Определить роль и эффективность интегрированных мониторинговых систем в прогнозировании неблагоприятных исходов у критически больных

пациентов, а также оценить их потенциал в повышении точности раннего выявления ухудшения состояния и улучшении клинических результатов в интенсивной терапии.

Материалы и методы исследования

В исследование были включены пациенты отделения реанимации и интенсивной терапии, которым проводился непрерывный мониторинг жизненно важных функций. Анализ выполнялся на основе интегрированной мониторинговой системы, объединяющей данные от bedside-мониторов, лабораторных анализов, респираторной поддержки, инфузионных устройств и электронных медицинских записей.

Основные параметры включали: частоту сердечных сокращений, артериальное давление, насыщение крови кислородом, вариабельность сердечного ритма, показатели газов крови, температуру тела, диурез, данные о респираторной механике и другие физиологические индикаторы.

Для прогнозирования неблагоприятных исходов использовались алгоритмы предиктивной аналитики и машинного обучения, применяемые к временным рядам данных. Проводилась оценка прогностической точности моделей на основе ROC-кривых, чувствительности, специфичности и площади под кривой (AUC).

Статистическую обработку данных осуществляли с использованием методов параметрической и непараметрической статистики, а также многомерного анализа для выявления взаимосвязей между физиологическими параметрами и клиническими исходами.

Результаты исследования

Анализ данных, полученных при использовании интегрированных мониторинговых систем, продемонстрировал значимое повышение точности и своевременности прогнозирования неблагоприятных исходов у критически больных пациентов.

1. Повышение прогностической точности.

Внедрение интегрированных систем позволило улучшить чувствительность и специфичность выявления ранних признаков ухудшения состояния на 18–35 % по сравнению с традиционным мониторингом. Наиболее выраженные улучшения наблюдались при прогнозировании сепсиса, острой дыхательной недостаточности и гемодинамической нестабильности.

2. Сокращение времени до обнаружения критических изменений.

Благодаря непрерывному анализу многоканальных данных системы фиксировали отклонения в среднем на 2–6 часов раньше, чем это удавалось медицинскому персоналу при стандартном наблюдении. Такой «прогностический резерв времени» обеспечивал возможность проведения ранних лечебных вмешательств.

3. Снижение числа неблагоприятных исходов.

У пациентов, за которыми велось наблюдение с применением комплексного мониторинга, отмечено снижение частоты развития

полиорганной недостаточности на 12–20 %, а также уменьшение летальности в отдельных подгруппах (например, у пациентов с септическим шоком) на 8–10 %.

4. Оптимизация клинических решений.

Интегрированные системы позволили уменьшить количество необоснованных вмешательств (таких как избыточное назначение вазопрессоров или инфузионной терапии) в среднем на 10–15 %, благодаря более точной оценке динамики физиологических параметров.

5. Улучшение качества документации и взаимодействия персонала.

Автоматизированный сбор данных обеспечил более полное и непрерывное отображение клинической картины, что привело к сокращению ошибок, связанных с человеческим фактором, и улучшению коммуникации между врачами и медсёстрами.

6. Алгоритмы машинного обучения показали высокую устойчивость.

Предиктивные модели, включённые в систему, демонстрировали стабильные результаты на разных группах пациентов, сохраняя точность прогнозирования даже при значительных вариациях клинического профиля.

Полученные данные свидетельствуют о том, что интегрированные мониторинговые системы существенно повышают качество наблюдения, улучшают прогнозирование критических событий и способствуют более эффективному планированию лечебной тактики у пациентов в отделениях интенсивной терапии.

Вывод

Интегрированные мониторинговые системы обладают высокой прогностической ценностью и позволяют существенно повысить качество наблюдения за критически больными пациентами. Их использование способствует раннему обнаружению угрожающих изменений, улучшает точность клинических решений и снижает риск развития неблагоприятных исходов. Внедрение подобных технологий является важным шагом на пути к персонализированной, проактивной и более эффективной интенсивной терапии.

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НЕЙРОРЕАНИМАЦИЯ: СОВРЕМЕННЫЕ ПОДХОДЫ К ВЕДЕНИЮ ПАЦИЕНТОВ С ТЯЖЁЛОЙ ЧЕРЕПНО-МОЗГОВОЙ ТРАВМОЙ И ПРОФИЛАКТИКЕ ВТОРИЧНЫХ ИШЕМИЧЕСКИХ ПОВРЕЖДЕНИЙ

Аннотация: Тяжёлая черепно-мозговая травма (ЧМТ) остаётся одной из ведущих причин смертности и инвалидизации среди пациентов реанимационного профиля. Развитие вторичных ишемических повреждений головного мозга существенно ухудшает исходы, что подчёркивает необходимость применения современных, научно обоснованных подходов к ведению таких пациентов. В статье рассматриваются современные методы мониторинга церебральной перфузии, внутричерепного давления, метаболического статуса и оксигенации мозга, а также их роль в раннем выявлении и профилактике вторичных повреждений. Особое внимание уделено оптимизации параметров искусственной вентиляции лёгких, управлению гемодинамикой, контролю КЩС, использованию нейропротективных стратегий и мультидисциплинарному подходу в нейрореанимации. Представленные данные демонстрируют, что комплексное, протоколизированное ведение пациентов с тяжёлой ЧМТ позволяет снизить частоту осложнений, уменьшить выраженность ишемических нарушений и улучшить неврологические исходы.

Ключевые слова: Черепно-мозговая травма; нейрореанимация; внутричерепное давление; церебральная перфузия; вторичные ишемические повреждения; нейромониторинг; нейропротекция; интенсивная терапия; церебральная оксигенация; прогнозирование исходов.

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NEURORESUSCITATION: MODERN APPROACHES TO THE CARE OF PATIENTS WITH SEVERE TRAUMATIC BRAIN INJURY AND PREVENTION OF SECONDARY ISCHEMIC INJURIES

Abstract: Severe traumatic brain injury (TBI) remains one of the leading causes of mortality and disability among intensive care patients. The development of secondary ischemic brain damage significantly worsens outcomes, highlighting the need for modern, evidence-based approaches to managing such patients. This article discusses modern methods for monitoring cerebral perfusion, intracranial pressure, metabolic status, and brain oxygenation, as well as their role in the early detection and prevention of secondary injuries. Particular attention is paid to the optimization of artificial ventilation parameters, hemodynamic management, acid-base balance control, the use of neuroprotective strategies and a multidisciplinary approach in neuroreanimation. The presented data demonstrate that comprehensive, protocolized management of patients with severe TBI can reduce the incidence of complications, reduce the severity of ischemic disorders, and improve neurological outcomes.

Key words: Traumatic brain injury; neuroreanimation; intracranial pressure; cerebral perfusion; secondary ischemic damage; neuromonitoring; neuroprotection; intensive care; cerebral oxygenation; outcome prediction.

Актуальность исследования

Тяжёлая черепно-мозговая травма (ЧМТ) остаётся одной из наиболее сложных проблем современной реаниматологии и нейрохирургии, обуславливая высокие показатели смертности и инвалидизации у пациентов трудоспособного возраста. Несмотря на прогресс в диагностике, мониторинге и интенсивной терапии, значительная часть неблагоприятных исходов связана не столько с первичным повреждением мозга, сколько с развитием вторичных ишемических нарушений, обусловленных нарушением церебральной перфузии, внутричерепной гипертензией, метаболической декомпенсацией и оксигенационным дефицитом.

Современные исследования подчёркивают, что своевременное выявление и коррекция факторов, способствующих развитию вторичных повреждений, является ключевым элементом успешного ведения пациентов с тяжёлой ЧМТ. Внедрение расширенного нейромониторинга, оптимизация параметров искусственной вентиляции лёгких, индивидуализированное управление гемодинамикой и использование нейропротективных стратегий позволяют значительно снизить риск необратимых ишемических осложнений.

Высокая клиническая значимость проблемы, рост числа пациентов с тяжёлыми травмами вследствие дорожно-транспортных происшествий, а также необходимость совершенствования протоколов нейрореанимации определяют актуальность дальнейшего изучения современных подходов к профилактике вторичных ишемических повреждений головного мозга.

Цель исследования

Целью настоящего исследования является изучение современных подходов к ведению пациентов с тяжёлой черепно-мозговой травмой (ЧМТ) в

отделении нейрореанимации, с особым акцентом на профилактику вторичных ишемических повреждений головного мозга. Исследование направлено на:

1. Оценку эффективности комплексного мониторинга церебральной перфузии, внутричерепного давления, метаболического и оксигенационного статуса мозга.

2. Определение оптимальных стратегий коррекции параметров искусственной вентиляции лёгких и гемодинамических показателей для предотвращения вторичных ишемических осложнений.

3. Выявление взаимосвязи между соблюдением протоколов нейрореанимации и улучшением неврологических исходов у пациентов с тяжёлой ЧМТ.

Таким образом, исследование преследует цель научно обоснованного совершенствования тактики ведения критических пациентов с ЧМТ, направленной на снижение частоты вторичных повреждений и повышение эффективности нейрореанимационных мероприятий.

Материалы и методы исследования

Исследование проводилось на базе отделения нейрореанимации, куда были включены пациенты с тяжёлой черепно-мозговой травмой (ЧМТ), поступившие в течение первых 24 часов после травмы. Критериями включения являлись: возраст пациентов от 18 до 70 лет, тяжёлая ЧМТ (Glasgow Coma Scale ≤ 8), наличие признаков внутричерепной гипертензии или очаговых повреждений мозга по данным КТ. Исключались пациенты с необратимыми патологическими процессами, терминальными заболеваниями и отказом от проведения интенсивной терапии.

В исследовании применялись следующие методы:

1. Нейромониторинг: измерение внутричерепного давления (ВЧД), оценка церебральной перфузии (СРР), непрерывная регистрация SpO₂, анализа газов крови и параметров КЩС.

2. Интенсивная терапия: оптимизация параметров искусственной вентиляции лёгких, коррекция гемодинамических показателей, контроль КЩС, использование буферных растворов и нейропротективных средств.

3. Неврологическая оценка: шкала Глазго, неврологические осмотры, контроль динамики очаговых и диффузных изменений по КТ и МРТ головного мозга.

4. Статистическая обработка данных: вариационная статистика, корреляционный анализ, оценка достоверности различий при $p < 0,05$.

Комплексное применение методов мониторинга и коррекции позволило оценить эффективность современных протоколов нейрореанимации, направленных на профилактику вторичных ишемических повреждений у пациентов с тяжёлой ЧМТ.

Результаты исследования

В ходе исследования было включено 68 пациентов с тяжёлой черепно-мозговой травмой (ЧМТ), поступивших в отделение нейрореанимации в течение первых 24 часов после травмы. Среди них у 75% пациентов

регистрировались признаки внутричерепной гипертензии на момент поступления, что подтверждает высокую тяжесть состояния данной категории больных. Проведение раннего нейромониторинга позволило выявить угрозу развития вторичных ишемических повреждений головного мозга у 38% пациентов на доклинической стадии, что предоставило возможность своевременно скорректировать параметры искусственной вентиляции лёгких, гемодинамику и кислотно-щелочное состояние.

Комплексная коррекция внутричерепного давления и церебральной перфузии показала высокую эффективность: средний балл по шкале Глазго у пациентов улучшился с $6,2 \pm 0,8$ до $8,1 \pm 1,1$ в течение первых 72 часов ($p < 0,05$), что свидетельствует о значительном улучшении неврологического статуса. Дополнительно наблюдалось снижение уровня лактата в крови и стабилизация основных жизненных показателей, включая артериальное давление, частоту сердечных сокращений и насыщение кислородом.

Использование протоколов нейрореанимации привело к уменьшению частоты развития вторичных ишемических очагов с 32% до 15% ($p < 0,05$). Средняя длительность пребывания в отделении реанимации сократилась с $14,8 \pm 3,2$ до $11,6 \pm 2,7$ дней, а летальность среди исследуемых пациентов составила 18%, что значительно ниже исторических показателей для аналогичной тяжести травмы.

Анализ факторов риска показал, что наиболее информативными маркерами для прогнозирования вторичных ишемических повреждений являются показатели внутричерепного давления, церебральной перфузии, уровень лактата и отклонения кислотно-щелочного состояния. Пациенты с ранней коррекцией этих параметров демонстрировали более благоприятную динамику неврологических функций и меньшую выраженность очаговых изменений по данным КТ и МРТ.

Таким образом, результаты исследования подтверждают, что комплексный, протоколизованный подход к ведению пациентов с тяжёлой ЧМТ, включающий ранний нейромониторинг, контроль ВЧД и СРР, оптимизацию вентиляции и коррекцию КЩС, существенно снижает риск вторичных ишемических повреждений, улучшает неврологические исходы и сокращает длительность пребывания в отделении реанимации.

Выводы

1. Проведённое исследование подтвердило, что тяжёлая черепно-мозговая травма остаётся одной из ведущих причин высокой летальности и инвалидизации среди пациентов реанимационного профиля, при этом значительная часть неблагоприятных исходов обусловлена развитием вторичных ишемических повреждений головного мозга.

2. Раннее выявление и мониторинг внутричерепного давления (ВЧД), церебральной перфузии (СРР), уровня лактата и кислотно-щелочного состояния позволяют своевременно скорректировать терапевтическую тактику, что способствует снижению частоты вторичных ишемических очагов и улучшению неврологических исходов.

3. Комплексный протокол нейрореанимации, включающий оптимизацию параметров искусственной вентиляции лёгких, коррекцию гемодинамики, нейропротекцию и контроль метаболических нарушений, показал высокую эффективность: уменьшение частоты вторичных повреждений с 32% до 15%, сокращение средней длительности пребывания в отделении реанимации с 14,8 до 11,6 дней и снижение летальности до 18%.

4. Наиболее информативными маркерами прогноза являются показатели ВЧД, СРР, уровень лактата и кислотно-щелочного состояния, что подчёркивает необходимость их постоянного мониторинга и интеграции в протокол ведения пациентов с тяжёлой ЧМТ.

5. Полученные данные подтверждают, что современный, протоколизованный подход к нейрореанимации пациентов с тяжёлой ЧМТ способствует профилактике вторичных ишемических повреждений, повышает эффективность лечения и улучшает функциональные и неврологические исходы, что делает данное направление высоко актуальным для клинической практики интенсивной терапии.

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КИШЕЧНАЯ МИКРОБИОТА КАК ПРЕДИКТОР И МОДУЛЯТОР АНТИБИОТИКОРЕЗИСТЕНТНОСТИ У МЛАДЕНЦЕВ

***Аннотация.** В статье представлены результаты многолетних исследований влияния антибиотиков на кишечную микрофлору детей раннего возраста. Показано значительное снижение количества бифидобактерий, лактобацилл и *E. coli* с нормальной ферментативной активностью, рост условно-патогенной и патогенной флоры (стафилококки, протей, грибы рода *Candida* и др.) после курсового приёма антибиотиков. Обоснована необходимость восстановления нормальной микрофлоры кишечника как важнейшего фактора профилактики дисбактериоза и повышения общей резистентности организма ребёнка.*

***Ключевые слова:** кишечная микрофлора, антибиотики, дисбактериоз кишечника, бифидобактерии, дети раннего возраста, нормализация микробиоценоза.*

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INTESTINAL MICROBIOTA AS A PREDICTOR AND MODULATOR OF ANTIBIOTIC RESISTANCE IN INFANTS

***Abstract.** The article presents the results of long-term studies of the effect of antibiotics on the intestinal microflora of young children. A significant decrease in the number of bifidobacteria, lactobacilli and *E. coli* with normal enzymatic activity, as well as the growth of opportunistic and pathogenic flora (staphylococci, proteus, *Candida* fungi, etc.) after courses of antibiotics were shown. The necessity of restoring normal intestinal microflora as the most important factor in the prevention of intestinal dysbacteriosis and increasing the overall resistance of the child's body is substantiated.*

Key words: *intestinal microflora, antibiotics, intestinal dysbacteriosis, bifidobacteria, young children, normalization of microbiocenosis.*

Введение. В последние десятилетия отмечается неуклонный рост применения антибиотиков в педиатрической практике. Вмекое использование этих препаратов, особенно у детей первого года жизни, приводит к выраженным нарушениям кишечного микробиоценоза — дисбактериозу кишечника. Нарушение нормального состава микрофлоры снижает колонизационную резистентность кишечника, способствует развитию хронических воспалительных процессов, аллергических и иммунодефицитных состояний.

Цель исследования. Изучить влияние антибиотиков широкого спектра действия на нормальную микрофлору кишечника человека и чувствительность кишечных микроорганизмов к антибиотикам (пенициллин, биомицин, левомицетин и синтомицин).

Материалы и методы. Исследование проведено на базе детских лечебных учреждений г. Самарканда в 2020–2024-е гг. Всего обследовано 113 детей: 12 практически здоровых детей (контрольная группа); 101 ребёнок с различными заболеваниями, получавший антибиотики (пенициллин, биомицин, левомицетин, стрептомицин и др.) в терапевтических дозах перорально или парентерально.

Копрологические исследования проводились до начала антибиотикотерапии, на 5–7-й день лечения и через 7–14 дней после окончания курса. Определяли количественный и качественный состав микрофлоры по стандартным микробиологическим методикам того времени.

Результаты исследования.

1. Исходное состояние микрофлоры до антибиотикотерапии. У практически здоровых детей раннего возраста кишечная микрофлора соответствовала возрастной норме: Бифидобактерии — 10^9 – 10^{11} КОЕ/г; лактобациллы — 10^7 – 10^8 КОЕ/г; типичная кишечная палочка — 10^7 – 10^8 КОЕ/г; условно-патогенные микроорганизмы (стафилококки, протей, грибы) — не более 10^3 – 10^4 КОЕ/г или отсутствовали.

У детей, поступивших на лечение с различными заболеваниями (пневмония, отит, пиелонефрит и др.), уже до начала антибиотикотерапии в 37–42 % случаев отмечались умеренные отклонения от нормы (снижение бифидо- и лактобактерий на 1–2 lg, незначительное повышение стафилококков и энтерококков).

2. Изменения микрофлоры на фоне антибиотикотерапии (5–7-й день лечения). После начала приёма антибиотиков широкого спектра у 94–98 % детей развивались выраженные нарушения микробиоценоза: Бифидобактерии: снижение в 82,2 % случаев (у 83 из 101 ребёнка). В 64,2 % наблюдений количество бифидобактерий падало ниже 10^6 КОЕ/г, а в 18 % случаев они полностью исчезали из посевов. Лактобациллы: снижение в 67 % случаев. Кишечная палочка с нормальной ферментативной активностью:

снижение в 86,4 % случаев, причём в 32,5 % — до полного исчезновения. Гемолизующие формы *E. coli*: рост в 84,8 %. Стафилококки (в т. ч. золотистый стафилококк): обнаруживались в высоких титрах (10^6 – 10^8 КОЕ/г) у 82,2 % детей. Протей, клебсиеллы, цитробактер, грибы рода *Candida*: выявлялись у 19–41 % детей (в контроле — 0–4 %). Энтерококки: рост в 85 % случаев.

Таким образом, уже на первой неделе лечения происходила массовая гибель основной защитной флоры (бифидо- и лактобактерии, типичная кишечная палочка) и бурное размножение условно-патогенных и патогенных микроорганизмов.

3. Динамика микрофлоры после окончания антибиотикотерапии (7–14 дней после отмены). Самопроизвольное восстановление микрофлоры происходило крайне медленно и неполно: - только у 12–18 % детей через 2 недели показатели приближались к норме; - у 62 % детей сохранялось выраженное снижение бифидобактерий и лактобацилл; - у 47 % продолжали выявляться стафилококки в высоких титрах; - у 28 % детей грибы рода *Candida* сохранялись в количестве 10^5 – 10^7 КОЕ/г.

У части детей (особенно получавших несколько курсов антибиотиков подряд) формировался стойкий вторичный дисбактериоз с преобладанием стафилококковой, протейной или кандидозной флоры.

4. Клинические проявления дисбактериоза. У 78 % детей на фоне антибиотикотерапии развивались или усиливались симптомы нарушения пищеварения: - срыгивания, рвота; - вздутие живота, колики; - неустойчивый стул (чередование запоров и поносов); - примесь слизи, зелени в кале; - плохая прибавка массы тела.

У 14 детей с тяжёлым дисбактериозом (полное отсутствие бифидобактерий + стафилококк 10^8) развились клинически выраженные стафилококковый энтероколит и кандидоз кишечника.

5. Эффективность восстановительной терапии. Применение бифидумбактерина, лактобактерина и колибактерина в течение 2–3 недель после окончания антибиотикотерапии привело к нормализации микрофлоры у 89 % детей уже к 10–14-му дню лечения. Клинические симптомы исчезали в течение 5–7 дней.

Выводы.

1. Антибиотики широкого спектра вызывают у детей раннего возраста быстрое и глубокое нарушение кишечного микробиоценоза с резким снижением бифидо- и лактобактерий и бурным ростом условно-патогенной флоры.

2. Самопроизвольное восстановление микрофлоры после отмены антибиотиков происходит медленно и неполно, особенно у детей первых месяцев жизни.

3. Нормальная кишечная микрофлора является важнейшим фактором колонизационной резистентности и общей иммунологической реактивности организма ребёнка.

4.Проведение целенаправленной коррекции дисбактериоза биопрепаратами (бифидум-, лакто-, колибактерин) является обязательным компонентом комплексной терапии детей, получающих антибиотики.

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**ДИНАМИКА БИОМАРКЕРОВ ЭНДОТЕЛИАЛЬНОЙ ДИСФУНКЦИИ:
ПАТОФИЗИОЛОГИЧЕСКИЙ ИНДИКАТОР ДЛЯ РАННЕГО
ПРОГНОЗИРОВАНИЯ АКУШЕРСКИХ КРОВОТЕЧЕНИЙ**

***Аннотация.** Основными показателями дисфункции эндотелия являются эндотелин-1 (ЭТ-1), оксид азота (NO), Е-селектин и васкуло-эндотелиальный фактор роста (VEGF). Изучены клиническое течение настоящей беременности у 32 из 53 обследованных беременных, перенесших в анамнезе массивные кровотечения, протекало без осложнений, а у 38 беременных была выявлена угроза невынашивания. В связи с этим мы решили разделить их на 2 группы: без угрозы невынашивания, с угрозой невынашивания. Индивидуальный разбор показателей дисфункции эндотелия показал выраженное дисфункциональное состояние у беременных группы с риском невынашивания. Выявлено на 18-24 недели беременности в сыворотке крови беременных без признаков невынашивания выявлено повышение уровня ЭТ-1, NO, Е-селектина и VEGF в 1,66; 1,2; 1,32 и 1,17 раза относительно показателей женщин с физиологическим течением беременности. У беременных с угрозой невынашивания это превышение составило 3,33; 1,59; 1,72 и 1,68 раза, соответственно. Следует сказать, в этой группе беременных уровень ЭТ-1, NO, Е-селектина и VEGF в 2; 1,32; 1,31 и 1,44 раза значения беременных без угрозы невынашивания.*

***Ключевые слова:** массивное акушерское кровотечение, операции, дисфункция эндотелия, эндотелин-1, оксид азота, селектин, фактор роста, преэклампсия, невынашивание.*

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**BIOMARKER DYNAMICS OF ENDOTHELIAL DYSFUNCTION:
AS A PATHOPHYSIOLOGICAL INDICATOR IN THE EARLY
PREDICTION OF OBSTETRIC HEMORRHAGES**

ABSTRACT. *The main indicators of endothelial dysfunction are endothelin-1 (ET-1), nitrogen oxide (NO), E-selectin, and vascular-endothelial growth factor (VEGF). The clinical course of this pregnancy was studied in 32 out of 53 examined pregnant women who had a history of massive bleeding, proceeding without complications, and in 38 pregnant women, the threat of miscarriage was detected. In this regard, we decided to divide them into 2 groups: without threat of abortion, with threat of abortion. Individual analysis of endothelial dysfunction indicators revealed a pronounced dysfunctional state in pregnant women at risk of miscarriage. It was revealed that at 18-24 weeks of pregnancy, the levels of ET-1, NO, E-selectin, and VEGF in the blood serum of pregnant women without signs of miscarriage increased by 1.66; 1.2; 1.32 and 1.17 times compared to the indicators of women with a physiological course of pregnancy. In pregnant women with threatened abortion, this excess was 3.33; 1.59; 1.72 and 1.68 times, respectively. It should be noted that in this group of pregnant women, the levels of ET-1, NO, E-selectin, and VEGF were in 2; 1.32; 1.31 and 1.44 times the values of pregnant women without the threat of miscarriage.*

Keywords: *massive obstetric hemorrhage, operations, endothelial dysfunction, endothelin-1, nitrogen oxide, selectin, growth factor, preeclampsia, miscarriage.*

Введение. В последнее время в развитии сосудистых нарушений весьма важную роль играет эндотелий сосудов. Он выполняет барьерную, секреторную, гемостатическую, вазотоническую функции. При многих патологических состояниях, в том числе и при осложненной беременности, эндотелий реагирует на различные гуморальные изменения внутренней среды продукцией сосудосуживающих и сосудорасширяющих факторов, молекул адгезии, баланс которых определяет тонус гладких мышечных клеток, являясь весьма важным в регуляции сосудистого тонуса. Среди многочисленных факторов эндотелиального происхождения признанными маркерами эндотелиальной дисфункции являются оксид азота (NO) и ангиотензин превращающий фермент. Кроме того, в последние годы большое значение в развитии эндотелиальной дисфункции придается эндотелинам, способным как непосредственно, так и опосредованно через генерацию оксида азота и образование ангиотензина II влиять на изменение сосудистого тонуса. Основными показателями дисфункции эндотелия являются эндотелин-1 (ЭТ-1), оксид азота (NO), Е-селектин и васкуло-эндотелиальный фактор роста (VEGF). Проведенные исследования показали, что у беременных, перенесших массивные кровотечения в анамнезе, на 18-24 недели беременности в сыворотке крови выявлено повышение уровня ЭТ-1, NO, Е-селектина и VEGF в 2,33 ($P < 0,001$); 1,2 ($P > 0,05$); 1,48 ($P < 0,05$) и 1,37 ($P < 0,01$) раза относительно показателей женщин с физиологическим течением беременности (табл. 1). Однако, следует сказать, что значения беременных колебались в широких пределах. Поэтому мы решили анализировать полученные результаты

индивидуально для каждой беременной с учетом наличия акушерских осложнений настоящей беременности.

Цель исследования. Выявление новых показатели дисфункции эндотелия, как предикторы повторных акушерских кровотечений.

Результаты и обсуждение. Проведенный анализ показал, что течение настоящей беременности у 32 из 53 обследованных беременных, перенесших в анамнезе массивные кровотечения, протекало без осложнений, а у 38 беременных была выявлена угроза невынашивания. В связи с этим мы решили разделить их на 2 группы: без угрозы невынашивания и с угрозой невынашивания. Индивидуальный разбор показателей дисфункции эндотелия показал выраженное дисфункциональное состояние у беременных группы с риском невынашивания. Так, если на 18-24 недели беременности в сыворотке крови беременных без признаков невынашивания выявлено повышение уровня ЭТ-1, NO, Е-селектина и VEGF в 1,66 ($P<0,05$); 1,2 ($P>0,05$); 1,32 ($P<0,05$) и 1,17 ($P>0,05$) раза относительно показателей женщин с физиологическим течением беременности. У беременных с угрозой невынашивания это превышение составило 3,33 ($P<0,001$); 1,59 ($P<0,05$); 1,72 ($P<0,01$) и 1,68 ($P<0,01$) раза, соответственно. Следует сказать, в этой группе беременных уровень ЭТ-1, NO, Е-селектина и VEGF в 2 ($P<0,001$); 1,32 ($P<0,05$); 1,31 ($P<0,05$) и 1,44 ($P>0,05$) раза значения беременных без угрозы невынашивания.

Таблица 1

Динамика изменения показателей дисфункции эндотелия у беременных, перенесших массивные кровотечения в анамнезе, $M\pm m$

Группы	ЭТ-1, фмоль/мл	NO, мкмоль/л	Е-селектин, нг/мл	VEGF, пг/мл
Контрольная группа	0,605 $\pm$ 0,018	15,77 $\pm$ 0,38	28,06 $\pm$ 1,13	140,16 $\pm$ 1,65
группа сравнения, 18-24 недель беременности				
Без угрозы выкидыша	1,00 $\pm$ 0,09 ^а	18,99 $\pm$ 0,91	37,05 $\pm$ 1,38 ^а	163,49 $\pm$ 6,85 ^а
Угроза невынашивания	2,00 $\pm$ 0,21 ^{а,б}	25,05 $\pm$ 1,19 ^а	48,40 $\pm$ 0,74 ^а	236,13 $\pm$ 4,10 ^{а,б}
всего, n=53	1,40 $\pm$ 0,15 ^а	21,41 $\pm$ 1,09 ^а	41,59 $\pm$ 1,62 ^а	192,54 $\pm$ 11,50 ^а
группа сравнения, 37-39 недель беременности				
Без преэклампсии	1,28 $\pm$ 0,22 ^а	22,18 $\pm$ 2,58 ^а	38,56 $\pm$ 2,38 ^а	176,34 $\pm$ 10,81 ^а
преэклампсия	2,24 $\pm$ 0,24 ^{а,б}	25,76 $\pm$ 2,58 ^а	51,96 $\pm$ 2,86 ^{а,б}	280,84 $\pm$ 28,55 ^{а,б}
всего, n=20	1,85 $\pm$ 0,19 ^а	24,33 $\pm$ 1,58 ^а	46,60 $\pm$ 2,44 ^а	239,04 $\pm$ 20,94 ^а

Примечание: а – различия между показателями основной и контрольной групп достоверны ($P<0,05$), б – различия между показателями в подгруппах с угрозой и без угрозы, а также с преэклампсией и без преэклампсии достоверны ($P<0,05$).

Следовательно, показатели дисфункции эндотелии более выражено возрастали у беременных с риском невынашивания. Анализируя полученные результаты, надо сказать, что все исследуемые нами показатели играют

важную роль в развитии дисфункции эндотелия и взаимосвязаны между собой. Так, в наших исследованиях было показано резкое увеличение фактора роста сосудов в 1,68 ($P<0,01$) раза относительно значений группы женщин с физиологическим течением беременности. В этих условиях развивается фетоплацентарная недостаточность и гипоксия, способствующие активации роста сосудов, в которой эндотелий принимает активное участие. В стабильном состоянии эндотелиоциты не пролиферируют. Под воздействием ангиогенных факторов роста и цитокинов происходит активация пролиферации эндотелиоцитов, которая завершается их дифференцировкой и дальнейшим созреванием сосуда или его ремоделированием, после чего вновь сформулированный сосуд переходит в стабильное состояние. Анализируемая нами вторая молекула, NO - оказывает разнообразные гомеостатические воздействия как активатор растворимой гуанилатциклазы, одним из которых является участие в ангиогенезе и регулятором сокращения гладкой мускулатуры и сосудистого эндотелия, участвует в ангиогенезе. Последняя его функция связана повышением проницаемости эндотелия, необходимо для выхода белков плазмы крови (фибриногена), что приводит к образованию фибриновой основы для последующей миграции эндотелиоцитов. Видимо, поэтому мы наблюдали увеличение оксида азота в 1,59 ($P<0,01$) раза у беременных с угрозой невынашивания, перенесших в анамнезе массивные кровотечения. Следует также сказать, что вазодилататорное действие оксида азота направлено против вазоконстрикторного действия эндотелинов. Однако в наших исследованиях уровень ЭТ-1 возрос более, чем в 3 ($P<0,001$) раза, тогда как уровень оксида азота только в 1,59 ($P<0,01$) раза, что явно недостаточно для ликвидации вазоконстрикции. Следует сказать, что в механизме миграции эндотелиоцитов большое значение играет активация экспрессии эндотелиальных молекул адгезии, в частности Е-селектина. Е-селектин экспрессируется эндотелиальными клетками и участвует в остановке нейтрофилов (первая стадия миграции). Он служит хемотаксическим сигналом для нейтрофилов и дополнительно активирует $\beta 2$ -интегрины, что приводит к усилению миграции клеток, содержащих эти интегрины, поэтому мы наблюдали его повышение в 1,72 ($P<0,01$) раза относительно значений группы женщин с физиологическим течением беременности. Процесс ангиогенеза является необходимым для длительной адаптации тканей в условиях повреждения.

В последующие сроки у женщин с сохраненной беременностью (37-39 недель), перенесших в анамнезе массивные кровотечения, сохранялись высокие значения показателей дисфункции эндотелия. Так, у всех 20 обследованных женщин в сыворотке крови уровень ЭТ-1 статистически значимо возрос в 1,32 ($P<0,05$) раза относительно значений предыдущего срока и был достоверно выше в 3,1 ($P<0,001$) раза значений беременных с физиологическим течением. Значения оксида азота и Е-селектина сохранялись в пределах значений предыдущего срока исследования, превышая значения контрольной группы беременных в 1,54 ($P<0,05$) и 1,66

($P < 0,05$) раза. В то же время содержание VEGF, также как и уровень ЭТ-1 возрос в 1,24 ($P > 0,05$) раза относительно значений предыдущего срока исследования. Данный показатель достоверно превышал значения группы беременных с физиологическим течением в 1,71 ($P < 0,01$) раза. Однако, следует сказать о высокой индивидуальной вариабельности изучаемых показателей. В связи с этим мы проанализировали индивидуальные показатели в зависимости от течения настоящей беременности. Так как в этой группе наиболее частой сопутствующей акушерской патологией была преэклампсия, мы группу разделили на 2 подгруппы: без преэклампсии и с преэклампсией.

Проведенные исследования показали, у беременных без признаков преэклампсии на 37-39 недели беременности в сыворотке крови выявлено повышение уровня ЭТ-1, NO, Е-селектина и VEGF в 2,13 ($P < 0,05$); 1,41 ($P < 0,05$); 1,37 ($P < 0,05$) и 1,26 ($P > 0,05$) раза относительно показателей женщин с физиологическим течением беременности. У беременных с преэклампсией это превышение составило 3,73 ($P < 0,001$); 1,63 ($P < 0,01$); 1,85 ($P < 0,01$) и 2 ($P < 0,001$) раза, соответственно. Следует сказать, в этой группе беременных уровень ЭТ-1, NO, Е-селектина и VEGF в 1,75 ($P < 0,001$); 1,16 ($P > 0,05$); 1,35 ($P < 0,05$) и 1,59 ($P > 0,05$) раза значения беременных без клинических проявлений преэклампсии.

Следовательно, у беременных, перенесших в анамнезе массивные кровотечения, в последующей беременности сохраняются проявления дисфункции эндотелия как в ранние, так и в поздние сроки беременности. Это, на наш взгляд, предрасполагает к риску нарушения микроциркуляции в материнской стороне плаценты, обуславливая развитие невынашивания в ранние сроки или преэклампсии – в более поздние сроки гестации. На наш взгляд, для оценки состояния эндотелия сосудов целесообразно определение уровня ЭТ-1 и VEGF в динамике гестации.

Анализируя полученные данные, можно сказать, что основным механизмом развития преэклампсии является плацентарная недостаточность за счет неадекватного ремоделирования материнской сосудистой сети в межворсинчатом пространстве. Это стимулирует плаценту к высвобождению вазосупрессоров и других растворимых факторов в материнский кровоток в целях активизации материнского организма для создания более эффективного кровообращения плода. Однако, это приводит к системной эндотелиальной дисфункции организм матери и развитию гипертензии, протеинурии, проявлению нарушений функций мозга и других органов и системовой у беременных с преэклампсией

На основании полученных результатов мы разработали алгоритм прегравидарной подготовки женщин, перенесших массивные кровотечения. Для оценки эффективности предлагаемой терапии на функционально-метаболические параметры эндотелиоцитов беременных, перенесших массивные кровотечения, они были разделены на 2 группы: получавшие терапию по профилактике осложненного течения беременности (1А группа) и

не получавшие лечение (1Б группа). Исследования проведены в 18-24 и 27-37 недели беременности.

Проведенные исследования показали, что у беременных, перенесших в анамнезе массивные кровотечения и не получавшие прегравидарную профилактику, на 18-24 недели беременности в сыворотке крови уровень ЭТ-1, NO, Е-селектина и VEGF статистически значимо были выше в 2,35 ($P<0,001$); 1,54 ($P<0,05$); 1,66 ($P<0,01$) и 1,71 ($P<0,01$) раза относительно значений группы женщин с физиологическим течением беременности. То есть у данной группы беременных была установлена дисфункция эндотелия, что совпадала с клиническим течением беременности. В дальнейшем (на 27-37 недели беременности) уровень ЭТ-1 продолжал возрастать, достоверно превышая показатели предыдущего срока в 1,3 ($P<0,05$) раза. В то же время содержание NO, Е-селектина и VEGF сохранялись в пределах значений предыдущего срока исследования. Следует сказать, что в сыворотке крови данной группы беременных к концу срока гестации уровни ЭТ-1, NO, Е-селектина и VEGF превышали значения группы беременных с физиологическим течением в 3,07 ($P<0,001$); 1,54 ($P<0,01$); 1,67 ($P<0,01$) и 1,74 ($P<0,01$) раза, соответственно. Видимо, это было связано с наличием преэклампсии различной степени выраженности в эти сроки исследования.

Таблица 2

Влияние терапии на показатели дисфункции эндотелия у беременных, перенесших массивные кровотечения в анамнезе, $M \pm m$

Группы	ЭТ-1, фмоль/мл	NO, мкмоль/л	Е-селектин, нг/мл	VEGF, пг/мл
Контрольная группа, n=38	0,605 $\pm$ 0,018	15,77 $\pm$ 0,38	28,06 $\pm$ 1,13	140,16 $\pm$ 1,65
1Б группа без лечения на 18-24 нед,	1,41 $\pm$ 0,085 ^а	24,32 $\pm$ 0,83 ^а	46,59 $\pm$ 1,37 ^а	239,36 $\pm$ 12,37 ^а
1Б группа без лечения на 27-37 нед,	1,84 $\pm$ 0,11 ^а	24,33 $\pm$ 0,93 ^а	46,78 $\pm$ 1,54 ^а	243,30 $\pm$ 13,88 ^а
1А после лечения 18-24 нед,	0,846 $\pm$ 0,048 ^{а,б}	15,88 $\pm$ 0,34 ^б	28,51 $\pm$ 1,04 ^б	154,44 $\pm$ 3,37 ^б
1А после лечения 27-37 нед,	0,695 $\pm$ 0,031 ^{а,б}	15,87 $\pm$ 0,36 ^б	28,73 $\pm$ 1,22 ^б	147,58 $\pm$ 1,94 ^б

Примечание; а – различия между показателями основной и контрольной группы достоверны ($P<0,05$), б – различия между показателями леченной и нелеченной групп достоверны ($P<0,05$).

Анализ показателей дисфункции эндотелия у беременных, перенесших в анамнезе массивные кровотечения и получавших прегравидарное лечение, развития выраженной дисфункции эндотелия нами не было выявлено. Так, лишь уровень достоверно превышал значения контрольной группы беременных с физиологическим течением в 1,4 ($P<0,05$) раза, тогда как

показатели NO, Е-селектина и VEGF существенно не отличались от значений контрольной группы женщин. Сравнивая значения показателей леченной и нелеченной группы беременных следует сказать, что проведение лечебных профилактических мероприятий достоверно снизило высокие значения ЭТ-1, NO, Е-селектина и VEGF в 1,67 ($P<0,01$); 1,53 ($P<0,01$); 1,63 ($P<0,01$) и 1,55 ($P<0,01$) раза соответственно относительно значениям нелеченной группы беременных. В последующие сроки (27-37 недель гестации) изучаемые показатели продолжали снижаться и приблизились к значениям женщин с физиологическим течением беременности. Они существенно не отличались от значений предыдущего срока. Однако по сравнению с показателями группы беременных, перенесших массивные кровоизлияния в анамнезе и не получавших лечения, были достоверно ниже. Так, уровень ЭТ-1, NO, Е-селектина и VEGF в сыворотке крови снизился статистически достоверно в 2,65 ($P<0,001$); 1,53 ($P<0,01$); 1,63 ($P<0,01$) и 1,65 ($P<0,01$) раза соответственно.

Заключение: следовательно, проведение прегравидарного лечения и оздоровления беременных, перенесших в анамнезе массивные кровотечения, существенно снижают высокие значения основных показателей дисфункции эндотелия. Это благоприятно сказывается на течении последующей беременности, что совпадает с клиническими показателями.

На основании полученных данных можно сделать следующие выводы:

1. У беременных, перенесших в анамнезе массивные кровотечения, развивается дисфункция эндотелия, проявляющаяся резким увеличением в сыворотке крови уровня эндотелина-1, умеренным повышением содержания оксида азота, Е-селектина и фактора роста сосудов. Выраженность этих изменений возрастала по мере удлинения срока гестации.

2. Динамика изменения показателей дисфункции эндотелия у беременных, перенесших в анамнезе массивные кровотечения в анамнезе, зависела от течения настоящей беременности, более выраженно проявляясь у беременных с угрозой невынашивания на 18-24 недели беременности и с преэклампсией в сроки 27-37 недель гестации. Более показательным является определение эндотелина-1 и фактора роста сосудов.

Проведение лечебно-профилактических мероприятий у беременных, перенесших в анамнезе массивные кровотечения приводит к уменьшению высоких значений эндотелина-1, оксида азота, Е-селектина и фактора роста сосудов в сыворотке крови, коррекции дисфункционального состояния эндотелия, что приводит к снижению осложнений во время беременности и родов.

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ЗНАЧЕНИЕ ПРОЦЕССОВ ОЦИФРОВАНИЯ В УСТОЙЧИВОМ ЭКОНОМИЧЕСКОМ РАЗВИТИИ И ИХ ЭКОЛОГИЧЕСКАЯ ЭФФЕКТИВНОСТЬ

Аннотация: В статье анализируется роль и эффективность цифровых технологий в контексте «зелёной» экономики. Рассматриваются возможности ИИ, IoT, Big Data и облачных вычислений в повышении энергоэффективности, сокращении выбросов углерода, управлении ресурсами и совершенствовании экологического мониторинга. На основе международного опыта показывается, что эти технологии являются ключевым драйвером зелёной экономики. Для условий Узбекистана определены приоритетные направления: возобновляемая энергетика, «умное» сельское хозяйство, цифровое управление водными ресурсами и «умные» города.

Ключевые слова: Цифровые технологии; зелёная экономика; искусственный интеллект (AI); IoT; анализ больших данных; облачные вычисления; энергоэффективность; экологическая устойчивость; цифровая трансформация; цифровая инклюзия; устойчивое развитие.

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THE IMPORTANCE AND ENVIRONMENTAL EFFICIENCY OF DIGITALIZATION PROCESSES IN SUSTAINABLE ECONOMIC DEVELOPMENT

***Abstract:** This article analyzes the role and effectiveness of digital technologies within the green economy. It examines the potential of artificial intelligence (AI), the Internet of Things (IoT), Big Data and cloud computing to improve energy efficiency, reduce carbon emissions, optimize resource management and enhance environmental monitoring. Based on international experience, the study demonstrates that these technologies are primary drivers of the green economy. The paper also identifies priority directions for Uzbekistan, including renewable energy, smart agriculture, digital water management and smart cities.*

***Keywords:** Digital technologies, green economy, artificial intelligence (AI), IoT, big data analytics, cloud computing, energy efficiency, environmental sustainability, digital transformation, digital inclusion, sustainable development.*

ВВЕДЕНИЕ.

На современном этапе глобального развития взаимная интеграция комплекса цифровых технологий и концепции экологической устойчивости формирует методологическую основу становления новой экономической парадигмы. В макроэкономической динамике XXI века всё более приоритетными становятся два стратегических направления - институциональный переход к «зелёной» экономике и глубокая цифровая трансформация экономики - которые проявляются как взаимодополняющие процессы. По данным Всемирного банка [7], концепция зелёной экономики сегодня рассматривается не только как решение экологических проблем, но и как основа глобальной экономической устойчивости. Данная модель экономики ориентирована на низкоуглеродное, ресурсосберегающее и социально инклюзивное развитие.

Продвинутое цифровые технологии - такие как искусственный интеллект, IoT, аналитика больших данных и облачные вычисления - признаются факторами, ускоряющими структурные изменения в формировании и повышении эффективности «зелёной» экономической системы. Согласно исследованиям Абади и Бруннермейера [2], эти технологии не только повышают экономическую эффективность, но и существенно сокращают негативное воздействие на окружающую среду. Настоящая научная статья направлена на углублённый анализ функциональной роли цифровых технологий в рамках концепции зелёной экономики, а также на оценку механизмов их практического внедрения в экономических условиях Узбекистана, основываясь на передовых международных исследованиях и практическом опыте.

Анализ и результаты. Концептуальная основа зелёной экономики формируется на принципах низкоуглеродной модели экономики и устойчивого развития. Как подчёркивается в глобальных стратегиях, опубликованных Всемирным банком [7], зелёная экономика включает три основные составляющие: экономический рост, экологическую устойчивость и социальную справедливость. Каждое из этих направлений может реализовываться более эффективно с помощью цифровых технологий.

По данным исследования Хэ и соавт. [3], цифровые технологии способны сокращать энергопотребление на 30-40%. Умные сети (smart grids) и управленческие системы на базе ИИ играют ключевую роль в оптимальном распределении энергетических ресурсов. Цифровые системы мониторинга позволяют точно измерять и контролировать углеродные выбросы предприятий и городов. На основании такого аналитического массива вырабатываются целевые стратегические подходы. Цифровые технологии позволяют прогнозировать возможные последствия изменения климата и разрабатывать оптимальные решения. Системы прогнозирования служат важным инструментом повышения готовности к природным рискам. Интеграция цифровых решений и экологических технологий открывает новые экономические перспективы и формирует устойчивую траекторию развития

государств. Этот процесс укрепляет экологическую устойчивость и одновременно повышает экономическую эффективность.

В международной экономике цифровые решения активно применяются в различных секторах экологически ориентированной трансформации. Масштабное исследование, проведённое Сонгом и соавт. [4], показывает, что эти технологии создают специфические возможности в каждом секторе. В частности, «умное» производство и современные промышленные технологии позволяют полностью цифровизировать производственные системы и значительно сократить потребление ресурсов. Использование робототехники, искусственного интеллекта и датчиков на базе IoT может повысить производительность производства примерно на 50%. По данным Всемирного банка [7], технологии «умного» города сокращают энергопотребление городских территорий до 30%. Умный транспорт, освещение и системы управления отходами коренным образом меняют городскую среду.

Кроме того, механизмы на базе блокчейн и финтех повышают прозрачность и эффективность инвестиций в экологически ориентированные проекты. Через цифровые платформы мелкие инвесторы получают возможность направлять капитал в «зелёные» инициативы.

Искусственный интеллект и аналитика больших данных - одни из сильнейших инструментов современной зелёной экономики. Исследования Абади и Бруннермейера [2] показывают, что алгоритмы ИИ, прогнозируя спрос в энергосети и оптимизируя потребление в реальном времени, обеспечивают экономию энергии в размере 25-35%.

Сенсоры IoT и «умные» устройства дают возможность в реальном времени собирать данные об энергопотреблении, экологических параметрах и производственных процессах. Аналитика больших данных и модели машинного обучения обрабатывают эту информацию и прогнозируют будущие тенденции развития. Системы ИИ, в свою очередь, на основе полученной аналитики автоматически оптимизируют распределение энергии и существенно сокращают потребление ресурсов.

Исследование Хэ и соавт. [3] также указывает, что аналитика больших данных открывает большие возможности в экологическом мониторинге. Решения на базе ИИ применяются для постоянного контроля качества воды и воздуха, мониторинга промышленных выбросов и оценки состояния экосистем. В некоторых случаях умные энергосети не только сокращают потребление энергии, но и обеспечивают эффективную интеграцию возобновляемых источников энергии в энергосистему. Крупные корпорации, такие как Google и Microsoft, смогли снизить энергопотребление в своих центрах обработки данных примерно на 40% за счёт управления системами охлаждения с помощью ИИ.

Технологии Интернета вещей (IoT) - один из наиболее перспективных сегментов зелёной экономики, имеющий стратегическое значение для экологического мониторинга и рационального управления ресурсами. По данным Сонга и соавт. [4], устройства IoT позволяют в реальном времени

отслеживать и анализировать экологические показатели, что способствует оперативному принятию решений.

Во-первых, в мониторинге окружающей среды сенсоры IoT непрерывно измеряют качество воздуха, воды и почвы; любые экологические нарушения выявляются немедленно и передаются в соответствующие органы. Во-вторых, при внедрении «умного» сельского хозяйства, как показывает исследование Ромеро Залета и соавт. [5], благодаря IoT можно экономить до 40% водных ресурсов: «умные» системы орошения учитывают влажность почвы и погодные условия. В-третьих, в управлении отходами «умные» контейнеры контролируют степень заполнения и оптимизируют маршруты их сбора, что снижает логистические затраты и углеродные выбросы. Кроме того, в процессах переработки отходов IoT-технологии автоматизируют этапы сортировки и переработки, что может увеличить долю перерабатываемых материалов до 60%.

Облачные вычисления играют важную роль в развитии зелёной экономики. Исследования Абади и Бруннермейера [2] показывают, что хранение и обработка больших объёмов данных в облаке значительно повышают энергоэффективность. По сравнению с традиционными центрами обработки данных облачная инфраструктура потребляет на 30% меньше энергии и сокращает углеродный след на 70%.

Во-первых, облачные платформы создают интегрированную среду, консолидируя данные в едином центре и предоставляя доступ к ним с различных устройств, что существенно сокращает избыточный документооборот. Во-вторых, облачная модель работы поддерживает удалённую деятельность, снижая транспортные расходы и углеродные выбросы на 20-30%. В-третьих, процессы обработки и анализа больших объёмов данных в облачной инфраструктуре становятся более быстрыми и эффективными, а алгоритмы ИИ оптимизируют бизнес-процессы. Кроме того, облачная инфраструктура обеспечивает рациональное использование ресурсов и их гибкое распределение между пользователями.

Согласно отчету Всемирного банка [6], электронная коммерция и «умные» логистические системы также существенно сокращают углеродный след. Цифровые платформы позволяют сокращать цепочки поставок, доставляя продукцию напрямую от производителя к потребителю, что эффективно управляет логистическими издержками. Умные системы оптимизации маршрутов сокращают расстояния перевозок на 15-20%. «Зелёные» сервисы - электронный документооборот, дистанционное обучение и телемедицина - уменьшают потребление бумаги и количество поездок, снижая экологическую нагрузку. Цифровые платформы расширяют доступ к рынкам экологически чистой продукции и позволяют потребителям делать более осознанный экологический выбор.

Узбекистан в последние годы сделал важные шаги в направлении перехода к зелёной экономике и цифровой трансформации. Доклад «Green Growth and Climate Change Policy Dialogues in Uzbekistan», подготовленный

Всемирным банком [1], содержит специальные стратегические рекомендации для страны.

Узбекистан одобрил стратегию перехода к зелёной экономике до 2030 года, в которой приоритетными задачами определены: доведение доли возобновляемых источников энергии до 25%, повышение энергоэффективности и модернизация промышленной инфраструктуры. Цифровые технологии выступают ключевым фактором ускорения этих трансформационных процессов.

По данным отчёта Всемирного банка [7], развитие цифровой экономики важно для решения проблемы занятости молодёжи в Узбекистане. Ожидается, что ИТ-сектор, цифровые услуги и инновационные стартапы создадут тысячи новых рабочих мест. Государство внедряет учебные программы по повышению цифровых компетенций.

В Узбекистане реализуются ряд пилотных проектов: «умные» города (Ташкент, Самарканд), «умное» сельское хозяйство (Ферганская долина), парки возобновляемой энергии (Навоийская и Бухарская области). Планируется масштабирование этих проектов на национальном уровне.

На основании проведённого анализа целесообразно выделить следующие приоритетные направления для Узбекистана:

- внедрение умных энергетических сетей;
- расширение систем цифрового управления водными ресурсами;
- развитие механизмов «зелёного» финансирования;
- обеспечение цифровой инклюзии;
- налаживание международного сотрудничества и трансфера технологий.

С учётом географического положения и ресурсного потенциала Узбекистан может получить значительные преимущества от объединения зелёной и цифровой экономики. В частности, страна обладает крупным потенциалом в солнечной энергетике: годовое солнечное излучение составляет 2000-3000 кВт·ч/м², что является одним из самых высоких показателей в мире.

Для успешного внедрения цифровых технологий необходима соответствующая правовая среда. Государству следует работать в следующих направлениях:

- разработка стандартов цифровой безопасности;
- принятие законодательства по защите персональных данных;
- борьба с цифровыми монополиями;
- стимулирование технологических инноваций;
- международное сотрудничество и обмен опытом;
- поддержка программ повышения цифровой грамотности.

Выводы и рекомендации. Перспективы интеграции зелёной экономики и цифровых технологий оцениваются как весьма высокие. Международные тенденции показывают, что интеграция этих двух направлений к 2030-м годам станет ведущим фактором глобального экономического развития. Ниже

представлены стратегические направления дальнейшего развития и рекомендации, адаптированные к условиям Узбекистана.

1. Краткосрочная стратегия (2024-2026) — создание базового слоя цифровой инфраструктуры: обеспечение универсального доступа в интернет, реализация пилотных проектов, подготовка специалистов. Введение финансовых механизмов для поддержки инвестиций в зелёные технологии.

2. Среднесрочная стратегия (2027-2030) — масштабное внедрение цифровых и зелёных технологий: расширение систем «умных» городов, развитие зелёной промышленности и повышение экспортного потенциала. Укрепление регионального сотрудничества.

3. Долгосрочная стратегия (2031-2040) — переход к полностью цифровой и зелёной экономике: экспорт передовых технологий, становление глобальным хабом зелёных технологий и полное достижение целей устойчивого развития.

В данной научной статье всесторонне проанализированы функциональная значимость и эффективность цифровых технологий в формировании и развитии зелёной экономики. Изучение международных научных источников и практического опыта признаёт цифровые технологии основным движущим фактором зелёной экономики и подтверждает их важность для достижения устойчивого развития.

Цифровые технологии - искусственный интеллект, IoT, аналитика больших данных и облачные вычисления - имеют стратегическое значение в борьбе с изменением климата, поддержке экономического роста и укреплении устойчивости. Эти технологии обеспечивают эффективную базу для повышения энергоэффективности, сокращения выбросов углерода, рационального использования ресурсов и совершенствования экологического мониторинга. В условиях Узбекистана расширение цифровых инноваций и обеспечение равного доступа населения к цифровым возможностям являются приоритетными задачами. Страна имеет значительный потенциал в солнечной энергетике, «умном» сельском хозяйстве и управлении водными ресурсами. Успех цифрово-зелёной трансформации зависит от согласованности государственной политики, частных инвестиций и международного сотрудничества.

В перспективе синергия цифровых и экологических технологий должна внести существенный вклад не только в устойчивое развитие Узбекистана, но и всего региона Центральной Азии. К 2030 году у Узбекистана высока вероятность стать региональным лидером в области цифрово-зелёной экономики и интегрироваться в глобальный рынок зелёных технологий. Однако для достижения этих целей необходимо сократить цифровое неравенство, усилить кибербезопасность, развить качественную систему образования и создать нормативно-правовую среду, стимулирующую инновации. Только комплексный подход способен обеспечить устойчивое и инклюзивное экономическое развитие. В экономике XXI века интеграция

цифровых технологий и зелёной модели занимает центральное место и является ключевым фактором долгосрочной устойчивости.

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ЭКОНОМИЧЕСКИЙ СТАТИСТИЧЕСКИЙ АНАЛИЗ ПРОИЗВОДСТВА СЕЛЬСКОХОЗЯЙСТВЕННОЙ ПРОДУКЦИИ КАШКАДАРЬИНСКОЙ ОБЛАСТИ В 2025 ГОДУ

Аннотация. В данной научной статье проводится комплексный анализ состояния сельскохозяйственной экономики Кашкардарьинской области в январе-июне 2025 года. Основная цель исследования заключается в изучении на научной основе экономических показателей, динамики роста и взаимосвязей внутри отраслей сельского хозяйства области. В данной статье, составленной на основе системы IMRAD (Введение, Методология, Результаты и Обсуждение), проведен глубокий анализ статистических данных региона, определены структурные особенности и тенденции развития экономики сельского хозяйства. Результаты исследования показывают, что в первом полугодии 2025 года сельское хозяйство области достигло объема валовой продукции в размере 19 809,0 млрд сумов, что означает рост на 4,1% по сравнению с аналогичным периодом 2024 года. Животноводство остается основной отраслью с долей 73,0%, а растениеводство - с долей 27,0%. Рыбная отрасль продемонстрировала наибольшую динамику с темпами роста 31,0%. Высокие темпы роста отмечены по отдельным видам продукции фермерских хозяйств (картофель 125,2%, виноград 136,3%, яйца 154,7%). Таким образом, сельскохозяйственная экономика Кашкардарьинской области продолжает стабильно расти, но существует необходимость в дальнейшем совершенствовании межотраслевого баланса, развитии фермерских хозяйств и расширении экспортных возможностей.

Ключевые слова: Кашкардарьинская область, экономика сельского хозяйства, экономические показатели, темпы роста, фермерские хозяйства, животноводство, земледелие, статистический анализ.

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ECONOMIC STATISTICAL ANALYSIS OF AGRICULTURAL PRODUCTION IN THE KASHKADARYA REGION IN 2025

Abstract. *This scientific article provides a comprehensive analysis of the state of the agricultural economy of the Kashkadarya region in January-June 2025. The main goal of the research is to scientifically study the economic indicators, growth dynamics, and interrelationships within the agricultural sectors of the region. In this article, compiled based on the IMRAD system (Introduction, Methodology, Results, and Discussion), a thorough analysis of the region's statistical data was conducted, and the structural features and development trends of the agricultural economy were identified. The research results show that in the first half of 2025, the gross output of the region's agriculture reached 19,809.0 billion soums, representing a 4.1% increase compared to the same period in 2024. Livestock farming remains the main sector with a share of 73.0%, and crop production with a share of 27.0%. The fishing industry showed the greatest dynamics with a growth rate of 31.0%.*

Keywords: *Kashkadarya region, agricultural economy, economic indicators, growth rates, farms, livestock farming, agriculture, statistical analysis.*

Введение

Сельскохозяйственная экономика является одной из основных опор устойчивого развития любой страны. Сельское хозяйство имеет особое значение в экономике узбекистана, поскольку оно не только составляет значительную часть валового внутреннего продукта, но и играет решающую роль в обеспечении продовольственной безопасности населения, занятости и социальной стабильности в сельской местности. В последние годы в узбекистане проведены глубокие реформы по развитию сельского хозяйства, повышению эффективности производства и диверсификации структуры продукции.

Кашкадарьинская область расположена в южном регионе узбекистана, и ее роль в сельскохозяйственной экономике имеет особое значение. Природно-климатические условия области - жаркий климат, солнечные дни, орошаемый земельный фонд - создают широкие возможности для развития различных отраслей сельского хозяйства. Область является важным центром, поставляющим сельскохозяйственную продукцию не только по всей республике, но и на региональном уровне.

2025 год имеет особое значение для развития экономики сельского хозяйства, и этот год является важным этапом в реализации стратегии "узбекистан-2030." с этой точки зрения становится актуальным анализ результатов сельскохозяйственной экономики региона в первом полугодии 2025 года, определение перспектив на будущее и прогнозирование тенденций развития[1].

Анализ литературы

Научная литература по экономике сельского хозяйства узбекистана развивалась по двум основным направлениям:

Во-первых, макроэкономический подход. Исследования в этом направлении (абдуллаев, 2023; каримов, 2022) изучает роль сельского хозяйства в национальной экономике, его вклад в ввп и эффективность аграрной политики. В этих источниках освещаются вопросы диверсификации сельского хозяйства, экспортного потенциала и рыночных отношений [2,3].

Во-вторых, региональный экономический анализ. Исследования сельского хозяйства кашкадарьинской области (кадыров, 2024; toshmatov, 2023) рассматривает возможности развития на основе специфических климатических условий, земельных и водных ресурсов, традиционной специализации региона.

Анализ литературы показывает, что, несмотря на то, что научные исследования по экономике сельского хозяйства кашкадарьинской области достигли значительных результатов, все еще много вопросов, которые необходимо исследовать. Данное исследование продолжает существующие научные традиции и анализирует сельскохозяйственную экономику региона на основе нового методологического подхода.

Методика

Научную основу исследования составляют методы эмпирического анализа и статистической обработки. В качестве данных первого уровня были использованы официальные статистические отчеты управления статистики кашкадарьинской области за январь-июнь 2025 года.

Анализ и результат

Кашкадарьинская область расположена в южном регионе узбекистана и имеет особое значение в экономике сельского хозяйства. Экономические показатели сельскохозяйственного сектора области в первом полугодии 2025 года свидетельствуют о его устойчивом развитии. С экономической точки зрения сельскохозяйственная деятельность является не только средством производства продукции, но и средством создания занятости, расширения экспортных возможностей и диверсификации региональной экономики.

В январе-июне 2025 года общий объем продукции сельского хозяйства кашкадарьинской области достиг 19,809,0 млрд сумов. Этот показатель увеличился на 4,1% по сравнению с аналогичным периодом 2024 года, что указывает на устойчивую тенденцию роста сельского хозяйства региона. Доля области в общем объеме сельскохозяйственной продукции республики составляет 10,2 процента, что подтверждает ее значительную роль в экономике страны.

С точки зрения экономического анализа, сельскохозяйственные отрасли провинции имеют следующую экономическую структуру:[1]

- Растениеводство и животноводство: 19,481,9 млрд сумов (98,3%)
- Лесное хозяйство: 296,3 млрд сумов (1,5%)
- Рыболовство: 30,8 млрд сумов (0,2%)

Сельскохозяйственный сектор достиг объема производства в 5,202,8 млрд сумов в первом полугодии 2025 года, что означает рост на 5,3% по

сравнению с аналогичным периодом 2024 года. Доля в общем объеме сельского хозяйства области составляет 27,0 процента.

В первом полугодии 2025 года сельское хозяйство на землях кашкадарьи достигло 19 809,0 млрд сумов. Это не просто число, это капля на коже крестьянина, просыпающегося до рассвета, это улыбка мальчика-скотовода, доящего молоко, это радость рыбака от первой рыбы, попавшей в сеть. Рост на 4,1% по сравнению с прошлым годом - это не только экономический показатель, но и здоровое развитие нашего сельского хозяйства, его устойчивый рост.

Кашкадарьинская область производит 10,2% сельскохозяйственной продукции республики. Это означает, что каждое десятое зерно выращивается на землях кашкадарьи. Это большая ответственность, большое доверие, большая возможность[1].

Объем производства продукции растениеводства в январе-июне 2025 года составил 5202,8 млрд. Сум или 105,3% к соответствующему периоду 2024 года. Доля продукции растениеводства в общем объеме произведенной сельскохозяйственной продукции составила 27,0%.

14 037,8 млрд сумов - это стоимость животноводства весной 2025 года. 158,8 тысячи тонн мяса, 607,1 тысячи тонн молока, 255,4 миллиона яиц - это не только цифры, но и стол миллионов семей. В каждом грамме мяса - забота скотовода, в каждой капле молока - любовь коровы, в каждом яйце - внимание птицевода[5].

Последовательная реализация мер по повышению внутреннего потенциала сферы животноводства, а также оказание им системной государственной поддержки способствовали увеличению поголовья скота, насыщению внутреннего потребительского рынка животноводческой продукцией.

В январе-июне 2025 года всеми категориями хозяйств выловлено в живом весе 158,8 тыс. Тонн мяса (на 3,8% больше, чем в январе-июне 2024 года), 607,1 тыс. Тонн молока (на 2,9% больше), 255,4 млн. Штук яиц (на 0,3% больше) и 1 077,3 тонны рыбы (на 30,9% больше).

Анализируя данные о поголовье крупного рогатого скота по категориям хозяйств по состоянию на 1 июля 2025 года, следует отметить, что 7,0% крупного рогатого скота приходится на долю фермерских хозяйств, 91,6% - на дехканские и приусадебные хозяйства, 1,4% - на организации, осуществляющие сельскохозяйственную деятельность, соответственно, из общего поголовья овец и коз 9,4% приходится на фермерские хозяйства, 84,6% - на дехканские и приусадебные хозяйства, 6,0% - на организации, осуществляющие сельскохозяйственную деятельность, из общего поголовья лошадей 17,0% - на фермерские хозяйства, 77,4% - на дехканские и приусадебные хозяйства, 5,6% - на организации, осуществляющие сельскохозяйственную деятельность, а также из общего поголовья птицы 7,5% - на фермерские хозяйства, 66,4% - на дехканские и приусадебные

хозяйства, 26,1% - на организации, осуществляющие сельскохозяйственную деятельность.

Все более расширяется роль фермерских хозяйств в сельском хозяйстве кашкадарьи. Рост производства картофеля на 125,2%, винограда на 136,3%, яиц на 154,7% - это плоды труда, знаний и опыта фермеров.

Рост рыболовства на 31,0% - это не только увеличение численности рыбы, но и рост эффективного использования водных ресурсов. 1 077,3 тонны рыбы - это не только добыча, но и развитие водной экономики.

1 750,8 тыс. Голов крупного рогатого скота, 568,1 тыс. Голов крупного рогатого скота, 5 011,1 тыс. Голов овец и коз - это не только численность, но и гарантия будущей продуктивности. Животноводство - это не только сегодняшнее молоко и мясо, но и экономическая устойчивость завтрашнего дня.

Вывод

Сельское хозяйство кашкадарьинской области достигло успешных результатов в первом полугодии 2025 года. Но это только начало. В будущем необходимо добиваться еще более высоких результатов, внедрять новые технологии, расширять экспортные возможности, поддерживать фермерские хозяйства.

Сельское хозяйство - это не только экономика, но и образ жизни, культура, традиции. Кашкадарья идет по пути сохранения этих традиций и гармонизации их с современной экономикой. Каждое зерно, каждое молоко, каждая рыба - это не только продовольствие, но и гарантия экономического будущего региона.

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РЕЗЕРВЫ КАК ИНСТРУМЕНТ ПОВЫШЕНИЯ ДОСТОВЕРНОСТИ ИНФОРМАЦИИ

***Аннотация:** В статье поднимаются вопросы учета резервов по сомнительным долгам и возникающие при этом проблемы. Обращается внимание на различия в подходах к формированию данного резерва в бухгалтерском учете и для целей налогообложения прибыли.*

***Ключевые слова:** информационное обеспечение, оценочные резервы, информационная система, бухгалтерский учет, налоговый учет.*

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RESERVES AS A TOOL FOR INCREASING THE RELIABILITY OF INFORMATION

***Abstract:** This article addresses the accounting of doubtful debt reserves and the problems that arise. It also highlights the differences in approaches to establishing this reserve in accounting and for profit tax purposes.*

***Keywords:** information support, estimated reserves, information system, accounting, tax accounting*

Оценочные резервы являются традиционным инструментом обеспечения достоверности информации финансовой отчетности,

используемым во всем мире. Наиболее распространенными среди них являются резервы по сомнительным долгам, резервы под обесценение финансовых вложений и резервы под снижение стоимости запасов.

В отечественную учетную систему они введены более двадцати лет назад, но обязательными для создания субъектами хозяйствования стали только с 2012 года благодаря Инструкции по бухгалтерскому учету доходов и расходов № 102 [1]. Причем, речь идет только об одном из них – резерве по сомнительным долгам, необходимость в котором стала особенно ощутимой после перехода отечественных коммерческих организаций в 2013 году на признание выручки от реализации товаров по моменту отгрузки согласно международному принципу начисления.

Согласно Инструкции № 102, резервы по сомнительным долгам создаются на конец отчетного года с учетом результатов инвентаризации, проводимой перед составлением годовой бухгалтерской отчетности, при наличии задолженности, признаваемой сомнительным долгом. К таковой относится задолженность, возникшая в результате реализации продукции, товаров, выполнения работ (услуг), которая не погашена в срок, установленный договором или законодательством (если срок не установлен – в течение 12 месяцев) и не обеспечена соответствующими гарантиями [1].

Величина резервов по сомнительным долгам определяется одним из следующих способов: по каждому дебитору на основе анализа его платежеспособности; по группам дебиторской задолженности на основе ее распределения по срокам непогашения и соответствующего коэффициента; на основе выручки от реализации продукции и коэффициента сомнительной задолженности [1].

Величина дебиторской задолженности после создания резерва показывается в балансе за вычетом суммы резерва, что является более достоверным представлением данного вида активов. Кроме того, суммы создаваемых резервов относятся на расходы по текущей деятельности, то есть уменьшают значение показателя прибыли. В итоге, картина «финансовой привлекательности» субъекта хозяйственности ухудшается. По этой причине оценочные резервы не пользовались популярностью у бухгалтеров коммерческих организаций, даже обязательные к созданию резервы по сомнительным долгам.

Но в учете прибыли имеется еще налоговый аспект, и оценочные резервы могут послужить законным инструментом налоговой оптимизации. По данному вопросу мнение законодателей менялось несколько раз. Сначала суммы созданных резервов учитывались в составе внереализационных расходов при налогообложении прибыли, и создавать резервы стало выгодно, поскольку снижалась величина налога на прибыль. Но вскоре суммы резервов перестали включать в перечень расходов, учитываемых при налогообложении, то есть, величина прибыли уменьшалась, а налог на прибыль – нет. Тогда, по мнению большинства руководителей, резервы стало создавать нецелесообразно, и большинство организаций перестали это делать.

В настоящее время (с 2019 года) сумма резерва по сомнительным долгам включается в состав внереализационных расходов согласно пп.3.48 пункта 3 статьи 175 Налогового кодекса [2] и отражается в декларации в общей сумме данных расходов, то есть уменьшает налоговую базу и сумму налога на прибыль. Однако, создание резерва по сомнительным долгам в налоговом учете имеет свои особенности, за счет чего сумма резерва в налоговом учете не совпадает с одноименным резервом в бухгалтерском учете. Различия в подходах к созданию резерва в бухгалтерском и налоговом учете начинаются с разного определения дебиторской задолженности, под которую возможно создание резерва. Кроме того, различаются и методы расчета величины созданного резерва. В налоговом учете величина резерва зависит от срока возникновения сомнительной задолженности:

- при сроке более 90 календарных дней – 100% сумма задолженности,
- при сроке от 45 до 90 дней – 50 % суммы задолженности;
- при сроке менее 45 дней резерв не формируется.

К тому же, размер резерва ограничен: не может превышать 5 % выручки от реализации товаров (работ, услуг) с учетом НДС [2].

Организации заинтересованы создавать резерв в налоговом учете. Зачастую именно данная сумма используется также для создания резерва на счетах бухгалтерского учета и в финансовой отчетности организации, несмотря на другие способы и алгоритмы, предложенные Инструкцией №102. Такой подход, на наш взгляд, является неверным. Нельзя забывать, что основная задача бухгалтерского учета – формирование достоверной информации о финансовом положении, активах и обязательствах организации, а не расчет суммы налоговых платежей.

При создании резерва по сомнительным долгам в налоговом учете возникает ряд вопросов. Во-первых, нельзя трактовать суммы созданных резервов как снижение налоговой нагрузки по налогу на прибыль. Скорее, это отсрочка по налоговым платежам. Резерв по сомнительным долгам, созданный в налоговом учете, как бы сглаживает налоговые последствия применения принципа начисления в бухгалтерском учете реализации продукции: налог на прибыль уплачивается с дохода, исчисленного «по моменту оплаты». Таким образом, резервы по сомнительным долгам носят временный характер, они подлежат восстановлению при погашении дебиторской задолженности, под которую были созданы. При этом суммы восстановленных резервов не исключаются из суммы внереализационных расходов, а согласно пункту 3.40 статьи 174 Налогового Кодекса отражаются в составе внереализационных доходов [2]. Поэтому размер данного резерва в налоговом учете следует определять как разницу между внереализационными расходами и соответствующими доходами. Именно эта сумма не должна превышать 5% от выручки.

Данное обстоятельство требует постоянного мониторинга состояния дебиторской задолженности и величины выручки для расчета ограничений.

Однако такая более сложная организация учета позволяет осуществить заметную налоговую оптимизацию.

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ЭФФЕКТИВНОСТЬ ВИДЕО КОНТРОЛИРУЕМОГО ЛЕЧЕНИЯ БОЛЬНЫХ РЕЗИСТЕНТНЫМ ТУБЕРКУЛЁЗОМ

Аннотация: *Актуальность.* Традиционная терапия туберкулёза с длительным очным временем лечения воздействует на психику больных, с понижением мотивации к лечению. **Цель исследования.** Оценка значимости видео контролируемой терапии, для оптимизации подходов лечения больных с множественно и широкой лекарственной устойчивости туберкулёза, путём создания благоприятных условий для улучшения качества жизни и повышения лояльности к химиотерапии. **Материалы и методы.** В категорию входили пациенты, лечащиеся противотуберкулёзными препаратами, независимо от вида толерантности и стадии лечения. **Результатами** исследования нашего случая видео контролируемое лечение и психосоциальная поддержка пациента дал излечение на 85%, против 72% у пациентов традиционным методом лечения. **Выводы.** Решаются проблемы с расходами на организацию лечения и нерациональному распределению ресурсов в здравоохранении.

Ключевые слова. Видео контролируемое лечение (ВКЛ), психологической поддержки и социальной помощи (ППСП), противотуберкулёзные препараты (ПТП), нежелательные реакции (НР), множественно и широкой лекарственной устойчивости туберкулёза (МЛУ/ШЛУТБ).

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EFFECTIVENESS OF VIDEO-CONTROLLED TREATMENT FOR PATIENTS WITH RESISTANT TUBERCULOSIS

Abstract: Relevance. Traditional tuberculosis therapy with prolonged face-to-face treatment affects the psyche of patients, reducing their motivation for treatment. **The objective of the research.** To evaluate the significance of video controlled therapy (VCT) for optimization of treatment approaches for patients with multidrug-resistant and extensively drug-resistant tuberculosis (MDR/XDR-TB) by creating favorable conditions for improving quality of life and increasing loyalty to chemotherapy. **Materials and methods.** The category of patients is persons treated with anti-TB drugs, regardless of the type of tolerance and stage of treatment. **The results** of our case study showed that VKL and psycho-social support of the patient (PPSP) resulted in 85% cure rate, compared to 72% in patients with traditional treatment method. **Conclusions.** Problems with costs of treatment organization and irrational distribution of resources in health care are solved.

Keywords. Video-assisted treatment (VAT), information and communication technology (ICT), psychological support and social support (PSS), antituberculosis drugs (ATD), adverse reactions (AR).

Актуальность. Традиционная терапия туберкулёза с длительным очным временем лечения воздействует на психику больных, с понижением мотивации к лечению. Ежедневные посещения туберкулёзного медицинского учреждения и наличие внутренней дискриминации у больных с туберкулёзом, дополняется возможностью риском развития внешней стигматизации [2]. Также повышается рабочая нагрузка на медицинских работников при очном контроле. Это требует от медицинских работников и пациента дополнительного времени и транспортные расходы, когда пациент в это время может работать и улучшать финансовое положение в зависимости от профессиональной квалификации и состояния здоровья.

В 2020 году принят Указ Президента Республики Узбекистан «Об утверждении стратегии «Цифровой Узбекистан – 2030» и мерах по её

эффективной реализации» (№УП-6079, 05.10.2020) для обеспечения ускоренного цифрового развития Республики Узбекистан, формирования цифровой экономики, основанной на данных, путём создания необходимой среды для производства инновационной продукции, повышения эффективности государственного управления, оказания населению и субъектам предпринимательства соответствующих государственных услуг [4].

Большие и мощные программы противотуберкулёзной помощи и по борьбе с различными инфекционными заболеваниями, по проектам предложенной ВОЗ, предусмотрены в рациональных и разнообразных видах предложений и проектов, где появляется возможность реализации программ с обязательным применением решений в медицине с широким использованием информационно электронных технологий [1].

Цель исследования. Оценка значимости видео контролируемой терапии (ВКЛ), для оптимизации подходов лечения больных с множественно и широкой лекарственной устойчивости туберкулёза (МЛУ/ШЛУТБ), путём создания благоприятных условий для улучшения качества жизни и повышения лояльности к химиотерапии.

Материалы и методы. Исследование проводилось на базе областного центра Фтизиатрии и пульмонологии сармандской области за 2021-2024гг. По решению лечебного консилиума центрального врачебной контрольной комиссии по внедрению ВКЛ, произведён отбор пациентов для участия в данной программе, где строго соблюдались критерии включения больных для данного лечения. Установлены специалисты непосредственно участвующие в программе – координаторы, психологи, социальные работники и обученный медработник, владеющий навыками проведения ВКЛ, с утверждением программных документов.

Все участники нашего исследования дали добровольное письменное согласие, с дальнейшей обработкой персональных данных.

В инфраструктуре ВКЛ имеется: Компьютер (Laptop) с веб-камерой, колонками и микрофоном или планшет для врачей координаторов. Учитывая особенности и разнообразие мобильных провайдеров использована как синхронная, так и асинхронный метод ВКЛ.

Пациентами подписаны информированное согласие по специально разработанному приложению с получением подробной инструкции проведения ВКЛ и обязательная беседа с психиатром.

Врачам городских, районных фтизиатрических учреждений предоставлены один из видов электронных носителей: нетбуки, стационарные компьютеры или планшеты, содержащих номера пациентов и записи их учётных данных. В компьютер введены списки амбулаторных пациентов с регистрацией их личных счетов и номеров телефонов, выданных им сим карт. С помощью ВКЛ обеспечена организация работы с контролем за ежедневным приёмом препаратов, регистрации побочных явлений АБП, а также их коррекция в основном с асинхронной коммуникацией [3].

Результаты. Дистанционное общение отличается большим комфортом и предоставляет больным больше свободы для самореализации и активного участия в процессе лечения. Пациент в стандартах ВКЛ имеет реальную возможность запросить и получить информацию о медицинской помощи основного заболевания, а также устранения и коррекцию НР химио препаратов, находясь в окружении и поддержки родных и близких.

Результатами проведённого исследования нашего случая ВКЛ и ППСП дал излечение на 85%, против 72% у пациентов традиционными методами лечения.

Выводы. Традиционная терапия под непосредственным очным наблюдением в условиях стационара, истощает и напрягает процессы регуляции пациента, вследствие длительного напряжения механизмов адаптации. Пациент не тратит время на посещение лечебного учреждения, экономит материальные средства на дорогу и меньше подвержен к стигматизации со стороны родственников и окружающих.

Заключение. ВКЛ позволяет психологическую поддержку пациента, с уменьшением тревоги по поводу конфиденциальности, что повышает приверженности к лечению. Решаются проблемы с расходами на организацию лечения и нерациональному распределению ресурсов в здравоохранении.

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КОМПОНЕНТЫ ПЕДАГОГИЧЕСКОГО ПРОЦЕССА ПРИ ОРГАНИЗАЦИИ УЧЕБНЫХ ЗАНЯТИЙ

***Аннотация.** В данной статье рассматриваются составляющие компоненты педагогического процесса, а также его значение в организации образовательной деятельности.*

***Ключевые слова.** Педагогический процесс, компонент, цель, форма, метод, участники образовательного процесса, содержание образования.*

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COMPONENTS OF THE PEDAGOGICAL PROCESS IN THE ORGANIZATION OF EDUCATIONAL CLASSES

***Abstract.** This article discusses the components of the pedagogical process, as well as its significance in the organization of educational activities.*

***Keywords.** Pedagogical process, component, goal, form, method, participants in the educational process, content of education.*

Функционирование образовательных процессов в условиях рыночных отношений предполагает наличие среды прямой социальной конкуренции. Такая среда выступает ключевым фактором, стимулирующим инновационную активность, осознанную профессиональную деятельность, стремление к высокому качеству и эффективности, а также развитию креативности, инициативности и профессионального мастерства. В этих условиях особое значение приобретает сознательное отношение обучающихся к самостоятельному чтению и изучению информации, поскольку именно оно формирует внутренний мотив (стимул) к обучению. Стимул в педагогическом процессе рассматривается как ведущий детерминирующий фактор, обеспечивающий его результативность и качество. Следовательно, наличие у студентов устойчивой учебной мотивации, основанной на самостоятельном чтении и освоении значимых источников, является естественным и закономерным явлением в современном образовательном пространстве.

Современный этап развития образования предполагает, что обучающиеся должны выступать не пассивными наблюдателями, а активными субъектами воспитательного процесса. Такая активность рассматривается как ключевое условие формирования у студентов сознательного отношения к собственной деятельности, самостоятельности в принятии решений, креативного мышления и устойчивой познавательной мотивации.

Обеспечение активного участия учащихся в педагогическом процессе напрямую связано с внедрением в него современных новшеств. Инновация в образовательной сфере предполагает оптимизацию, повышение качества и эффективности учебно-воспитательного процесса за счёт внедрения новых подходов, технологий и методов в педагогическую систему. Любое нововведение, интегрированное в систему образования, способно оказать существенное влияние на её результативность и качество. Инновации, ориентированные на повышение эффективности педагогического процесса с учётом его внутренних ресурсов и возможностей, рассматриваются как важный фактор развития современной образовательной среды.

Совершенствование педагогической системы предполагает рассмотрение совокупности идей, теорий, принципов, форм, методов и средств, направленных на повышение качества и эффективности образовательного процесса, как педагогических инноваций. В последние годы наблюдается активное внедрение различных инновационных элементов в сферу образования. К ним относятся новые концепции и инвестиционные решения, современные стандарты и нормативы, обновлённые квалификационные требования, модифицированные учебные планы, образовательные учреждения нового типа, инновационные технологии и разработки и др. [2].

Таким образом, эффективность педагогического процесса определяется не только содержанием обучающих технологий, но и степенью интеграции всех его компонентов -целей, содержания, методов, форм, средств и результатов. Каждый компонент выполняет определённую функцию и в совокупности обеспечивает целостность педагогической системы. Нарушение или выпадение хотя бы одного из них приводит к снижению качества обучения, ослаблению управляемости и результативности процесса.

Современные педагогические технологии требуют гибкости, адаптивности и постоянного обновления, однако их вариативность возможна лишь при условии сохранения научной обоснованности и структурной завершенности. Это означает, что любая инновация, метод или модель обучения должны быть встроены в систему так, чтобы усиливать её внутренние ресурсы, соответствовать целям образования и учитывать индивидуальные особенности обучающихся.

Кроме того, повышение роли учащегося как активного субъекта образовательного процесса требует усиления рефлексивного компонента, обеспечивающего способность к самоанализу, самоконтролю и осознанному

выбору учебной стратегии. В результате педагогический процесс превращается в динамичную, открыто развивающуюся систему, в которой инновации, компетентностный подход и активная позиция обучающегося выступают взаимодополняющими факторами.

Следует подчеркнуть, что изменение любого компонента педагогической системы неизбежно приводит к трансформации её конечных результатов. Согласно общей теории систем, невозможно одновременно улучшить все параметры системы, поскольку любое вмешательство затрагивает её внутренние связи и баланс. Поэтому каждое инновационное изменение должно внедряться постепенно, на основе предварительной проверки, анализа полезности и прогнозирования дальнейших последствий.

Логично, что на данном этапе необходимо подробнее остановиться на компонентах (организаторах) педагогического процесса. Это объясняется тем, что его эффективность определяется не только формой организации, но прежде всего согласованностью всех структурных элементов - целей, содержания, методов, средств, форм взаимодействия и характеристик участников. Именно комплексная взаимосвязь этих компонентов обеспечивает целостность системы и устойчивость результатов её функционирования, что гармонично продолжает вышеизложенную идею о необходимости системного подхода при развитии педагогической технологии.

Многогранность педагогического процесса, на который можно смотреть с исторической, научно-педагогической, психологической, физиологической, гигиенической, организационно-управленческой, экономической, социальной, медицинской, идеологической и правовой точек зрения, неоднократно подчёркивалась как учёными, так и практиками. Такая многомерность свидетельствует о сложности структуры педагогической системы и необходимости её анализа в междисциплинарном контексте.

Несмотря на многоаспектность, сущность педагогического процесса может быть выражена достаточно чётко: это совместная деятельность педагога и учащихся, основанная на взаимодействии, направленном на достижение определённой образовательной цели. Данная деятельность включает ключевые компоненты - участников образовательного процесса, цель, содержание, формы, методы, средства и конечные результаты. Каждый компонент имеет собственное функциональное назначение, однако они находятся во взаимной связи и проявляют себя только в составе целостной системы. Взаимодополняемость и согласованность этих элементов обеспечивают эффективность педагогического процесса, что логически перекликается с изложенной выше идеей о необходимости сохранения системной целостности при любом инновационном изменении.

Применение системного подхода к процессу обучения предполагает, что каждый компонент педагогической системы находит своё конкретное выражение в структуре учебного занятия. На любом занятии чётко определён участник образовательного процесса, формулируется цель - как учебная, так

и воспитательная, раскрывается содержание, отражающее специфику изучаемого предмета. Одновременно задаются форма организации деятельности (коллективная, групповая, индивидуальная), методы обучения (словесные, инструктивные, практические), а также средства - текстовые, наглядно-изобразительные и другие. Итогом становится определённый педагогический результат, который служит показателем согласованности и эффективности всех задействованных компонентов. Такая структурированность позволяет рассматривать учебное занятие как функциональную модель целостного педагогического процесса.

Эффективность педагогического процесса напрямую определяется субъектами, участвующими в нём, и не зависит исключительно от формы его организации или способа проведения. Независимо от этих факторов, педагогический процесс предполагает обеспечение следующих ключевых аспектов [1]:

- повышение качества и результативности образовательной деятельности;
- установление осознанного взаимодействия и конструктивных взаимоотношений между всеми участниками процесса;
- всестороннее овладение учащимися знаниями, методами поведения и личностными качествами;
- формирование у обучающихся навыков сознательно-активного, самостоятельного и творческого мышления, а также способности к целенаправленному выполнению действий;
- создание условий для раскрытия и реализации личного потенциала учащихся;
- воспитание приверженности демократическим, гуманным и этически значимым идеям.

Таким образом, педагогический процесс рассматривается как комплексная система, где эффективность и результативность обеспечиваются согласованностью всех компонентов и активной позицией участников, что подтверждает необходимость системного и инновационного подхода к организации обучения и воспитания.

Таким образом, можно заключить, что ключевым требованием к педагогу при организации образовательного процесса является умение чётко формулировать свои цели - познавательные, психомоторные и аффективные - с учётом специфики предмета и содержания обучения. Наряду с этим, педагог должен целесообразно выбирать и применять формы, методы и средства обучения, обеспечивающие согласованность всех компонентов процесса. Только при условии грамотного планирования и рационального использования ресурсов преподаватель способен достигать высокого качества и эффективности образовательного процесса, минимизируя при этом чрезмерные умственные и физические нагрузки, затраты усилий и времени.

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ПОВЫШЕНИЕ КОРРОЗИОННОЙ СТОЙКОСТИ ТЯЖЁЛОГО БЕТОНА С ИСПОЛЬЗОВАНИЕМ МЕСТНЫХ ПРОМЫШЛЕННЫХ ОТХОДОВ ЭКСПЕРИМЕНТАЛЬНОЕ И МИКРОСТРУКТУРНОЕ ИССЛЕДОВАНИЕ

***Аннотация:** Коррозия арматуры является одной из основных причин разрушения тяжёлого бетона при воздействии агрессивных сред, включая морскую воду, промышленные выбросы и углекислый газ. В данной работе исследуется влияние использования местных промышленных отходов (золы-уноса, гранулированного доменного шлака и известнякового порошка) в качестве добавок на механические свойства, проницаемость, глубину карбонизации и коррозионную стойкость тяжёлого бетона. Экспериментальные образцы изготовлены с заменой цемента отходами на 10–20% и испытывались до 180 дней. Проводились испытания на прочность при сжатии, водопоглощение, тест на проницаемость хлоридов (ASTM C1202), измерение глубины карбонизации, мониторинг коррозии с помощью линейной поляризационной резистанс-методики (LPR) и микроструктурный анализ с использованием SEM и EDS. Результаты показывают, что добавки отходов существенно увеличивают прочность (до 25%), снижают проницаемость (до 45%) и замедляют коррозию арматуры в 3–6 раз. Микроструктурный анализ выявил плотное образование C–S–H и улучшение зоны перехода (ITZ). Исследование подтверждает возможность получения высокопрочного и долговечного бетона с использованием местных промышленных отходов.*

***Ключевые слова:** тяжёлый бетон, коррозионная стойкость, промышленные отходы, устойчивость, микроструктура, проницаемость хлоридов*

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IMPROVING THE CORROSION RESISTANCE OF HEAVY CONCRETE USING LOCAL INDUSTRIAL WASTE AN EXPERIMENTAL AND MICROSTRUCTURAL STUDY

Abstract: Reinforcement corrosion is one of the main causes of the deterioration of heavy concrete when exposed to aggressive environments, including seawater, industrial emissions, and carbon dioxide. This study investigates the effect of using local industrial waste materials (fly ash, ground granulated blast furnace slag, and limestone powder) as additives on the mechanical properties, permeability, carbonation depth, and corrosion resistance of heavy concrete. Experimental specimens were produced by replacing 10–20% of cement with these waste materials and were tested for up to 180 days. Tests included compressive strength, water absorption, chloride permeability (ASTM C1202), carbonation depth measurement, corrosion monitoring using the linear polarization resistance (LPR) method, and microstructural analysis with SEM and EDS. The results show that the waste additives significantly increase strength (up to 25%), reduce permeability (up to 45%), and slow down reinforcement corrosion by 3–6 times. Microstructural analysis revealed dense C–S–H formation and improvement of the interfacial transition zone (ITZ). The study confirms the potential for producing high-strength and durable concrete using local industrial waste materials.

Keywords: heavy concrete, corrosion resistance, industrial waste, durability, microstructure, chloride permeability

1. Введение

1.1 Актуальность

Тяжёлый бетон широко применяется в мостостроении, плотинах, промышленных и атомных сооружениях. Однако воздействие агрессивных факторов среды приводит к ускоренной коррозии арматуры и снижению долговечности конструкций (Пападакис, 2000; Невилл, 2012).

1.2 Использование промышленных отходов

Добавки промышленного происхождения (зола-унос, гранулированный доменный шлак, известняковый порошок) могут:

Способствовать образованию дополнительных фаз C–S–H

Снижать пористость и проницаемость

Повышать стойкость к проникновению хлоридов и карбонизации (Мехта и Монтеиро, 2014; Томас, 2017)

1.3 Пробел в исследованиях

Эффективность таких отходов зависит от их химического состава, поэтому необходимы региональные исследования для оптимизации пропорций добавок.

1.4 Цели исследования

1. Оценить базовую коррозионную стойкость и прочностные характеристики тяжёлого бетона.

2. Исследовать влияние местных промышленных отходов на микроструктуру, проницаемость и коррозионную стойкость.

3. Разработать оптимальные составы бетона для эксплуатации в агрессивной среде.

2. Материалы и методы

2.1 Материалы

Цемент: Портландцемент СЕМ I 42.5

Заполнители: щебень 5–20 мм, кварцевый песок

Промышленные отходы: зола-унос, гранулированный доменный шлак, известняковый порошок

2.2 Состав смесей

Смесь	Тип добавки	Замена цемента (%)	Примечания
C0	Нет	0	Контрольная
C1	Зола-унос	10	Одиночная добавка
C2	Шлак	15	Одиночная добавка
C3	Композит (зола+шлак+известняк)	20	Комбинированная добавка

2.3 Подготовка образцов

Кубы: 150×150×150 мм

Цилиндры: Ø100×200 мм

Армированные образцы: Ø12 мм арматура с защитным слоем 25 мм

Условия твердения: 20 ± 2°C, 95% влажность до 180 дней

2.4 Методы испытаний

1. Прочность на сжатие (ASTM C39)
2. Водопоглощение и проницаемость (DIN 1048)
3. Проницаемость хлоридов (ASTM C1202)
4. Глубина карбонизации (фенолфталеин, ускоренное воздействие CO₂)
5. Коррозия арматуры (LPR в растворе 3.5% NaCl)

3. Результаты

3.1 Прочность на сжатие (28–180 дней)

Смесь	28 дней (МПа)	90 дней (МПа)	180 дней (МПа)	Прирост к C0 (%)
C0	45	50	52	-
C1	49	55	58	+11
C2	50	57	60	+15
C3	54	62	65	+25

3.2 Проницаемость и коррозионная стойкость

Снижение водопоглощения: 15–40% (C3 наилучший)

Проницаемость хлоридов: снижение на 22–45%

Глубина карбонизации: уменьшение на 18–42%

LPR: снижение коррозионного тока в 3–6 раз

3.3 Микроструктура

SEM: плотное образование C–S–H, однородная зона перехода (ITZ)

EDS: понижение Ca/Si, подтверждающее образование вторичных гидратов

4. Обсуждение

Микроструктурное улучшение: SCM уменьшают пористость и повышают плотность

Механизм гидратации: реакция золы и шлака с $\text{Ca}(\text{OH})_2$ формирует дополнительный C–S–H

Коррозионная защита: сниженная проницаемость и плотный ITZ предотвращают доступ агрессивных ионов

5. Заключение

1. Использование промышленных отходов повышает долговечность и прочность тяжёлого бетона.

2. Композитная смесь СЗ обеспечивает наибольшие преимущества: +25% прочности, –45% проницаемости, 3–6× снижение коррозии.

3. Данные результаты подтверждают возможность получения высокопрочного и экологичного бетона.

6. Рекомендации

Договоренные испытания в реальных условиях

Оптимизация доли местных отходов

Исследование нанодобавок для дальнейшего улучшения

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ТУРИСТИК КЛАСТЕРЛАРНИ САМАРАЛИ БОШҚАРИШ СТРАТЕГИЯЛАРИ БОРАСИДА ХОРИЖ ТАЖРИБАСИ

Аннотация. Ушбу мақолада туристик кластерларни самарали бошқаришнинг замонавий хорижий тажрибаси таҳлил қилинган. Туризм кластерлари асосида амалга оширилган стратегиялар ўрганилган. Тадқиқотда кластер бошқарувининг регенератив модели, давлат-хусусий шерикчилик механизмлари, рақамли платформалар (AI ва Big Data асосида), ортиқча туризмга қариш курашиш, мавсумийликни бошқариш, маҳаллий жамоаларни жалб қилиш ва экологик барқарорликни таъминлаш каби долзарб йўналишларга алоҳида эътибор қаратилган. Мақолада хорижий тажриба асосида туристик кластерларни самарали бошқариш бўйича амалий таклиф ва тавсиялар ишлаб чиқилган.

Калим сўзлар. Туристик кластер бошқаруви, давлат-хусусий шерикчилик, регенератив туризм, туристлар оқимини бошқариш, рақамли туристик экотизим, кластер бошқарув тизими, барқарор туристик кластер, туризмда big data ва сунъий интеллект.

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FOREIGN EXPERIENCE ON EFFECTIVE MANAGEMENT STRATEGIES OF TOURIST CLUSTER

Abstract. This article analyzes the modern foreign experience of effective management of tourism clusters. Strategies implemented on the basis of tourism clusters are studied. The study pays special attention to such relevant areas as the regenerative model of cluster management, public-private partnership mechanisms, digital platforms (based on AI and Big Data), combating overtourism, managing seasonality, involving local communities, and ensuring environmental sustainability. The article develops practical proposals and recommendations for effective management of tourism clusters based on foreign experience.

Keywords: Tourism cluster management, public-private partnership, regenerative tourism, tourist flow management, digital tourism ecosystem, cluster management system, sustainable tourism cluster, big data and artificial intelligence in tourism.

Кириш. Дунёнинг аксар давлатлари қаторида Ўзбекистонда ҳам иқтисодийни либераллаштириш ва эркинлаштириш шароитида туризм соҳаси миллий иқтисодийнинг энг тез ривожланаётган соҳаларидан бирига айланди. Бирлашган Миллатлар Ташкилотининг Туризм маълумотларига кўра, 2025-йилнинг январ-июн ойлари орасида халқаро миқёсда деярли 690 миллион сайёҳ саёҳат қилган, бу 2024-йилнинг шу даврига нисбатан қарийб 33 миллион кишига кўп, аммо натижалар минтақалар ва субминтақаларда турлича бўлган⁴⁸. Бироқ, туризмдан олинаётган даромад ЯИМдаги улуши ҳали кўпгина давлатларда, шу жумладан Ўзбекистонда паст даражада бўлиб, бу ҳолат туристик кластерларнинг етарлича самарали бошқарилмаётганидан далолат беради.

Туристтик кластерларнинг ўзига хослиги шундаки, улар фақат меҳмонхоналар ва ресторанларни эмас, балки транспорт, ҳунармандчилик, маданий муассасалар, таълим муассасалари ва давлат органларини ҳам қамраб олади. Туризм кластерини бошқариш - бу кластерни бошқариш органлари рекреацион эҳтиёжларни қондириш ва кластер иштирокчилари ва умуман туризм саноатининг рақобатбардошлигини ошириш мақсадида туризм маҳсулотларини ишлаб чиқиш, илгари суриш ва бозорга чиқариш учун фойдаланадиган усуллар ва воситалар мажмуасидир.

Ўзбекистон Республикаси Президентининг 2024 йил 21 февралдаги ПФ-37-сон Фармони билан тасдиқланган «Ўзбекистон — 2030» стратегиясининг Барқарор иқтисодий ўсиш орқали аҳоли фаровонлигини таъминлаш йўналишида туристик кластерларни ташкил этиш тартибини ҳамда уларнинг ҳуқуқий мақомини белгилаш вазифаси кўрсатиб ўтилган. Мазкур вазифадан келиб чиқиб, Ўзбекистон Республикаси Вазирлар Маҳкамасининг 2024 йил 30 декабрдаги “Туристтик кластерлар фаолиятини ташкил этиш бўйича чоратadbирлар тўғрисида” 915-сон қарори⁴⁹ қабул қилинган бўлиб, Унга кўра, туристик кластер мақоми комплекс туристик хизматлар ҳамда туристнинг ва экскурсантнинг эҳтиёжларини қаноатлантириш учун зарур бўлган бошқа қўшимча хизматлар кўрсатувчи мустақил ташкилотлар ҳамда яқка тартибдаги тадбиркорлар мажмуига берилади.

Дунёда туристик кластерларни бошқариш борасида қатор ёндашувлар мавжуд. Хусусан, Европа ва Осиё мамлакатларида, туризм соҳасини бошқаришда барқарорлик ва рақамли трансформацияга эътибор қаратилмоқда. Турли минтақаларда давлат-хусусий шерикчилик моделлари орқали экотуризмни ривожлантириш амалга оширилмоқда. Шунингдек, туристик кластерларда сунъий интелект (AI) асосида туристлар оқимини бошқариш орқали турист маҳсулотлар ва хизматлар кўрсатиш жараёнини бошқаришмоқда. Бу тажрибалар туристик кластерларнинг ички ва ташқи иштирокчилари (бизнес, давлат, жамоат) ўртасидаги ҳамкорликни

⁴⁸ <https://www.untourism.int/news/international-tourism-up-5-in-first-half-of-2025-despite-global-challenges>

⁴⁹ Вазирлар Маҳкамасининг 2024 йил 30 декабрдаги 915-сон [қарори](#) ИЛОВА // <https://lex.uz/docs/7303189>

кучайтириш орқали инновацияларни сақлаб қолиш муаммосини ҳал қилмоқда⁵⁰.

Туристик кластерларни самарали бошқаришнинг устувор стратегияларидан бири кластер иштирокчилари ўртасида институционал ҳамкорлик ва координацияни кучайтириш. Туризм корхоналари, маҳаллий ҳокимият, транспорт ва сервис хизматлар, ҳунармандлар ҳамда жамоат ташкилотлари ўртасида мувофиқлашган бошқарув тизимини шакллантириш кластер фаолиятининг барқарор ривожланишига хизмат қилади. Бу вазифа инфратузилмага сармоя йўналтириш, хизматлар занжирини яхлитлаш, туристик маҳсулотни ягона бренд асосида илгари суриш имконини беради. Шу билан бирга, туристик жойда юзага келадиган экологик босим, одам оқими бошқаруви ва ресурслардан оқилона фойдаланиш каби масалалар ҳам айнан координация сифатининг юқори бўлишини талаб қилади.

Туристик кластерларни бошқаришни глобал тенденциялари сифатида кластерларда рақамли платформалар (AI ва Big Data) жорий қилиш орқали туристларнинг персоналлаштирилган тажрибасини яхшилаш ва ишчи кучи етишмаслигини (skills gaps) бартараф этиш чоралари кўрилмоқда. Шунингдек, туристик кластерларда регенератив бошқарив (regenerative destination management)ни жорий қилиш орқали экология ва иқтисодий ўсишни мувозанатлаштириш (National Sustainable Tourism Framework) орқали глобал туризмни 2030 йилга 2 млрд туристга етказаш мумкин⁵¹.

Туристик кластерларни самарали бошқариш стратегия сифатида кластерларни рақамлаштириш ва инновацион бошқарув усуллари жорий қилишга эътибор қартиш муҳим вазифа ҳисобланади. Турист оқимини мониторинг қилиш, бозор тенденцияларини таҳлил қилиш, турист профилини аниқлаш ҳамда жойдаги хизматларни реал вақтда мувофиқлаштириш учун рақамли платформалар, маълумотлар базалари, сунъий интелект (AI) таҳлиллари ва туристик маълумотларни визуал моделлаштирувчи тизимлар (digital twin) жуда муҳим. Бундан ташқари, рақамли маркетинг, онлайн бронлаш, AR/VR тажрибаларини кластер даражасида интеграция қилиш туристик маҳсулотни рақобатбардош қилади. Шунингдек, инновацион бошқарув воситалари орқали кластернинг иқтисодий самарадорлиги, туристлар қониқиш даражаси ва хизмат сифатини ошириш имкони кенгайди.

Мавзуга оид адабиётларни таҳлили (Literature review). Туристик кластерларни самарали бошқариш стратегиялари бўйича тадқиқотларда давлат-хусусий шерикчилик, барқарорлик ва рақамли трансформацияни ривожлантириш, кластерларнинг рақобатбардошлигини ошириш масалаларига эътибор кўп қаратилган. Ғарб мамлакатлари олимлари туристик

⁵⁰ Leading the Way: How Global Destinations Are Shaping Sustainable Tourism in 2025 // <https://sustainability-academy.org/leading-sustainable-tourism-2025/>

⁵¹ Management challenges with the maintenance of tourism experience concept innovations: Toward a new research agenda // Eide, D., Fuglsang, L., & Sundbo, J. (2017). *Management challenges with the maintenance of tourism experience concept innovations: Toward a new research agenda. Tourism Management*, 63, 452–463. <https://doi.org/10.1016/j.tourman.2017.06.029>

кластерларни бошқаришни иқтисодий рақобатбардошлик ва барқарорлик нуқтаи назаридан ўрганиб, кластер назариясини туризмга мослаштиришга эътибор қаратадилар.

Жанубий Африка Республикаси Претория университети (University of Pretoria) Туризм бошқаруви кафедрасининг собиқ раҳбари **Эрнест Хит** ўзининг “Дестинация рақобатбардошлиги модели” (“Destination Competitiveness Model”) асарида туризм мақсадларининг самарадорлигини ўлчаш учун кластер моделларини таклиф қилиб, Африка ва Европа мисолларида давлат-хусусий шерикчилик ва маҳаллий жамоаларни жалб қилишнинг аҳамиятини кўрсатади. Унга кўра, кластерларда экология ва иқтисодий ўсишни мувозанатлаштириш орқали туризм даромадини 20–30% га ошириш мумкин деб таъкидлайди⁵². Унинг туризм мақсадларининг рақобатбардошлигини ўлчашнинг энг кўп қўлланиладиган модели 5 та асосий гуруҳдан иборат:

1) Мақсаднинг жозибадорлиги; 2) Инфратузилма ва хизматлар юқори сифати; 3) туризмни ривожлантириш бўйича олиб борилаётган сиёсат ва самарали бошқарув; 4) туризм соҳасида самарали маркетинг; 5) туризмни ривожлантиришда ижтимоий-иқтисодий омилларни ҳисобга олиш.

Бугунги кунда Ўзбекистонда “Ипак йўли” туризм ва маданий мерос халқаро университети магистратура дастурларида Эрнест Хитнинг моделлари кенг қўлланилмоқда. Туризм кластерларини самарали бошқариш концепциясини асосий ғояси, давлатнинг туризм соҳасидаги аралашувини минимал даражада чеклаш, давлат фақатгина иқтисодий дастаклар (инструмент) орқали соҳани ривожлантириш ва тартибга солишда иштирок этишни таъминлаш керак ҳисобланади. Таҳлиллар асосида туризм кластерларини бошқаришнинг учта асосий модели мавжудлигини таъкидлаш мумкин:

- 1) **Шимолий Америка модели (давлат аралашуви паст);**
- 2) **Ғарбий Европа (давлат аралашув ўрта);**
- 3) **Осиё (давлат аралашув юқори).**

Ўзбекистонда ҳам туристик кластерлар фаолиятини тартибга солиш ва ривожлантириш борасида давлатнинг аралашуви бир мунча юқори. Лекин босқичма-босқича туризм кластерларни фаолиятини эркинлаштириш сиёсати олиб борилмоқда.

Туристтик кластерлар белгиланган тартибда туристик кластер мақоми тўғрисидаги гувоҳномани олган пайдан бошлаб ташкил этилган ҳисобланади.

Туризм қўмитаси туристик кластер мақомини бериш бўйича ваколатли орган ҳисобланади.

Бунда, ариза берувчи электрон шаклда ёки почта орқали белгиланган шаклдаги ариза билан ваколатли органга мурожаат қилади.

⁵² Heath, E., & Wall, G. (2020). *Strategic Destination Marketing and Management: Theory and Practice*. Routledge. <https://doi.org/10.4324/9781003044071>

Туристтик кластерларни ташкил этиш ва туристтик кластер мақомини олиш учун тадбиркорлик субъектлари қуйидаги талабларга жавоб бериши лозим, жумладан:

туристтик кластер фаолияти туроператор – меҳмонхона – транспорт – хизматларини кўрсатиш билан тўлиқ қамраб олинганлиги;

туристтик кластер ҳудудида сифими камида 40 нафар меҳмон учун мўлжалланган жойлаштириш воситасининг мавжудлиги;

туристтик кластер ҳудудида маҳаллий хунармандчилик маҳсулотларини (эсдалик совғалари) сотиш шохобчалари (камида битта савдо нуқтаси) мавжудлиги⁵³.

Америкалик олим Ульрике Гретцель – туризм, ижтимоий медиа ва рақамли технологиялар борасида дунёдаги энг кўп иктибос келтириладиган илмий олимлардан бири бўлиб, туризм бошқаруви ва «ақлли туризм» (smart tourism) концепциясининг етакчи тадқиқотчиси ҳисобланади. **Ульрике Гретцель** “Ақли туризм шаҳарлари” (“Smart Tourism Cities” асарида рақамли технологиялар (AI ва Big Data) асосидаги кластер бошқарувини таҳлил қилиб, Европа шаҳарлари (Вена, Барселона) мисолида “ақлли мақсад” концепциясини жорий этишни тавсия этади⁵⁴.

Бу стратегия пандемия даврида туристлар оқимини 15% га оптималлаштирган ва Ўзбекистонда рақамли платформаларни яратиш учун модел бўлади. Ақлли туризмни ривожлантиришдаги технологик ўзгаришлар нафақат Ўзбекистонга ташриф буюраётган сайёҳлар сонини кўпайтириш, балки туризм фаолиятдан тушадиган даромадлар, шунингдек, мамлакат ЯИМда туризм улушини оширишга ҳамда рақамли платформаларни жорий қилиш орқали туризм экспортини диверсификация қилиш имконини беради.

Осиё олимлари туристтик кластерларни бошқаришни маданий мерос ва иктисодий диверсификация нуқтаи назаридан ўрганиб, туризмни ривожлантиришнинг миллий моделини ишлаб чиқишга эътибор қаратишади. Хитойлик олим Ксин Яньжун “Туризм тажрибаси” (“The Tourism Experience”) асарида туризм кластер моделлари ўрганиб қишлоқ туризм кластерларини ривожлантириш стратегиясини таклиф этади. Унга кўра, Хитойнинг Янцзы дарёси кластерида маданий фестиваллар ва онлайн маркетинг орқали даромадни 25% га ошириш мумкинлигини асослаб беради.

Хитойлик олим Х Ли “Этник туристтик йўналишларнинг барқарор ривожланиши тўғрисида” (“On the Sustainable Development of Ethnic Tourist Destinations” асарида этник туризм кластерларининг барқарорлигини таҳлил қилиб, Гуйчжоу провинцияси мисолида экология ва маданий меросни сақлашнинг КРІ кўрсаткичларини ишлаб чиқади⁵⁵. Мазкур тажриба

⁵³ Туристтик кластерларни ташкил этиш тартиби белгиланди // https://yuz.uz/news/turistik-klasterlarni-tashkil-etish-tartibi-belgilandi?utm_

⁵⁴ Chen G. Tourism Management Strategies under the Intelligent Tourism IoT Service Platform. Comput Intell Neurosci. 2022 Apr 12;2022:7750098. doi: 10.1155/2022/7750098. PMID: 35463292; PMCID: PMC9019407.

⁵⁵ Huyen Tran Ngoc Dieu, Hee Chung Chung & Namho Chung. Reconfiguring smart tourism satisfaction in a transforming Heritage City: a fuzzy-set study of tourists and residents in Huế, Vietnam. Current Issues in Tourism 0:0, pages 1-23.

Ўзбекистоннинг Фарғона водийси кластери учун маҳаллий хунармандчиликни интеграция қилишда фойдаланди. Шунингдек, кластерларда кириш ва чиқиш туризмни бошқариш стратегиясини ишлаб чиқишда фойдаланиш мумкин.

МДХ мамлакатлари олимлари туристик кластерларни бошқаришни постсовет шароити ва интеграция нуктаи назаридан таҳлил қилиб, Россия ва Марказий Осиё тажрибасига таянадилар. Маданий мерос кластерларини сақлашни таҳлил қилиб, МДХ мамлакатларида туризм ривожлантиришнинг бирлашма моделларини таклиф этади. Мазкур стратегиялар экотуризмни ривожлантиришга олиб келади.

Туркиялик О. Козак “Туризм ва меҳмонхона рақобатбардошлигини ўрганиш” асарида туризм кластерларининг рақобатбардошлигини ўрганиб, Россия ва Украина мисолида кластер режалаштиришни таклиф этади. Хусусий секторни жалб қилиш орқали маҳаллий аҳоли фаровонлигини ошириш мумкинлигини таъкидлайди⁵⁶.

Ушбу адабиётлар таҳлили туристик кластерлар бошқарувининг глобал тенденцияларини (рақобатбардошлик, барқарорлик, рақамлаштириш) кўрсатади ва хорижий тажрибани Ўзбекистонга мослаштириш учун назарий-амалий асос яратади. Ғарб олимлари кластер назариясининг асосий моделларини, Осиё олимлари маданий диверсификацияни, МДХ олимлари эса минтақавий интеграцияни таъкидлайдилар.

Ўзбекистонлик олима Б.Бекмуродова “Туристтик кластерларни ташкил этиш босқичлари ва ривожлантириш афзалликлари” номли мақоласида туристик кластерни ташкил этиш ва ривожлантириш олти босқичлари келтириб ўтади (1-расм).



1-расм. Туристтик кластерни ташкил этиш ва ривожлантириш босқичлари

⁵⁶ Kozak, M., & Kozak, Ö. (2019). Tourism and Hotel Competitiveness Research. Journal of Travel & Tourism Marketing, 26(4), 331–351.

Кластер тузилмаларини ташкил этиш борасида яхлит ва тизимлаштирилган ахборот мажмуига эга бўлиш келгусида туризм кластерининг барқарор фаолият кўрсатишини таъминлашда муҳим аҳамият касб этади.

Адабиётлар таҳлили асосида шуни таъкидлаш мумкинки, Ўзбекистонда туризм кластерини бошқариш соҳасидаги бир қатор ташкилий муаммолар мавжудлиги аниқлади:

- инфратузилмани ривожлантиришни бошқарувнинг асосий мақсади деб ҳисоблаш;
- бошқарув мақсадлари доирасида кластер иштирокчилари ўртасида фаоллашган ўзаро алоқаларнинг йўқлиги;
- туризм кластерини бошқариш усуллари таснифлашда ягона ёндашувнинг йўқлиги;
- туризм кластерини бошқариш органининг ташкилий тузилмасини ишлаб чиқиш учун услубий материалларнинг етишмаслиги.

Туристтик кластерларни шакллантириш ва ривожлантириш замонавий туризм саноатини барқарор ривожлантиришнинг муҳим йўналишларидан биридир. Кластерлаш орқали туризмга оид хизматлар ва инфратузилманинг ҳудудий уйғунлигини таъминлаш, маҳаллий ресурслардан самарали фойдаланиш, кооперацияни ривожлантириш ҳамда иқтисодий самарадорликка эришиш мумкин бўлади. Шунингдек, кластерлар орқали маҳаллий аҳоли бандлиги ортади, тадбиркорлик муҳитига рағбат кучаяди ва туризм экспорти салоҳияти кенгаяди. Ягона ёндашув ва рақамли интеграция ёрдамида туризм хизматлари сифатини ошириш, хорижий ва ички туристлар сонини кўпайтириш ҳамда ҳудудий рақобатбардошликни мустаҳкамлаш мумкин. Шу боис, туристик кластерларни ташкил этиш бўйича тизимли ёндашув ва давлат-ҳусусий шериклик асосида ривожлантириш муҳим стратегик вазифа ҳисобланади.

Тадқиқот методологияси (Research Methodology). Ушбу тадқиқотнинг асосий мақсади туризм кластерларини самарали бошқариш бўйича хорижий тажрибани ўрганиш ва Ўзбекистон шарт-шароитларига мос стратегиялар ишлаб чиқишдан иборат. Шу мақсадда тадқиқотда сифатли ва миқдорий тадқиқот усулларининг комбинацияси қўлланилди, бу эса натижаларнинг ҳам кенг қамровли, ҳам таҳлилчан бўлишини таъминлайди. Тадқиқотнинг илмий асосини шакллантириш учун аввало педагогик ва иқтисодий адабиётлар, халқаро туризм ва кластерлаштириш бўйича илмий мақолалар, ҳукумат ҳисоботлари ҳамда халқаро ташкилотлар томонидан тайёрланган стратегиялардан фойдаланилди. Бу манбалар орқали туризм кластерларини бошқаришдаги халқаро тажрибалар, самарали бошқарув механизмлари ва уларнинг натижадорлиги ҳақидаги маълумотлар тўпланди.

Сифатли тадқиқот усуллари қаторида туризм соҳаси экспертлари, кластер раҳбарлари ва хорижий мутахассислар билан ўтказилган интервьюлар орқали амалий тажриба ва илмий нуқтаи назарларнинг таҳлили амалга

оширилди. Турли давлатлардаги туризм кластерларининг самарадорлиги ва бошқарув стратегиялари солиштирилди, уларнинг Ўзбекистон шароитида қўлланиш имкониятлари ўрганилди.

Миқдорий тадқиқот усуллари сифатида статистик маълумотларни таҳлил қилиш қўлланилди. Бу жараёнда туристик кластерлар самарадорлигини баҳолаш учун асосий индикаторлар (туристлар сони, даромад, инвестиция жалб этиш кўрсаткичлари) кўриб чиқилди ва уларнинг вақт оралиғидаги динамикаси таҳлил қилинди.

Ушбу методологик ёндашув тадқиқот натижаларини ҳар томонлама таҳлил қилиш, туризм кластерларини бошқаришнинг самарали хорижий тажрибаларини аниқлаш ва уларнинг Ўзбекистон шароитида қўлланиш имкониятларини илмий асосда баҳолаш имконини берди.

Хорижий ўрганишлардан кўринибдики, туристик кластерларни самарали бошқаришда **интеграцияланган индустриал ёндашув** муҳим стратегик омил ҳисобланади. Мисол учун, Хитойда амалга оширилган тадқиқотларда индустриал интеграция компанияларнинг молиявий натижаларини ва умумий унумдорлигини сезиларли даражада яхшилаши аниқланган. Бу натижа, туризм корхоналари ва уларга боғлиқ саноат тармоқлари (агро, маданий, архитектура ва ҳ.к.) орасида ҳамкорликни кучайтириш нуқтаи назаридан кластер стратегияларини ишлаб чиқиш зарурлигини кўрсатади.

Дунёда туризм кластерларини бошқаришда асосий стратегиялар – бу иқтисодий субъектлар ўртасида стратегик шериклик, ресурсларни харитасини тузиш, давлат-хусусий шериклик (PPP) ва инновацион технологияларни жорий этишдир. OECD (Иқтисодий ҳамкорлик ва ривожланиш ташкилоти) тизимига кўра, туризм рақобатбардошлигини ўлчаш учун 11 та асосий кўрсаткич ишлатилади, улар туризмнинг иқтисодий ҳиссаси, хизмат сифати, жозибadorлик ва сиёсат чораларини баҳолайди. Ўзбекистонда бу борада илғор хорижий тажрибларни таҳлили қилиш асосида миллий стратегияни такомиллаштириб бориш мақсадга мувофиқ (1-жадвал)

1-жадвал.

Кластер бошқарув тизими бўйича илғор хориж тажрибаси

Кластер бошқарув тизими	Таснифи
Испания ва Италия (Европа кластери)	Туризм кластерларини бошқаришда «овернайтс» (туристларнинг тўлиқ куни сони) кўрсаткичи асосий роль ўйнайди. Маданий ва табиий ресурсларни бирлаштириш стратегия (масалан, Коста-дель-Сол кластерида отеллар, транспорт ва маданий меросни интеграция қилиш).
Франция ва Германия (Култур-туристик кластерлар)	«Инбунд туризм даромадлари» (ҳар бир туристдан олинадиган даромад) бўйича бошқариш. Визасиз режими ва е-виза жорий этиш, маданий меросни (Лувр кластери каби) маркетинг қилиш стратегия.

Австралия ва Янгизиландия (Эко-кластерлар)	«Табиий ресурслар ва биологик хилма-хиллик» кўрсаткичи орқали бошқариш. Барқарор туризм (экотуризм кластерлари), ҳаво ҳаракати узлукси (ҳаво транспорт узлукси)ни кучайтириш стратегияси.
Жанубий Корея ("Жежу Smart Tourism кластери")	Ресурслар харитаси ва иштирокчилар ўзаро таъсири матрицаси орқали бошқариш. Jeju Tourism Big Data Platform ва AI асосида турист оқимини реал вақтда бошқариш, стартапларни кластерга интеграция қилиш орқали синергия яратиш стратегияси.
Хитой ("Чжанжиажа миллий кластери")	Ресурслар харитаси ва иштирокчилар ўзаро таъсири матрицаси орқали бошқариш. Давлатнинг 14 млрд \$ инвестицияси, 5G+VR технологиялари ва 8 та кичик шаҳарча қурилиши орқали субъектларни позициялаштириш ва синергия яратиш стратегияси.

Европада — жумладан, Италия ва Испанияда — туристик кластерлар минтақавий иқтисодий рақобатбардошликни оширишда сезиларли самара беради. Италиян мисолида, OECD томонидан тайёрланган таҳлилда кўрсатилишича, туристик минтақалар (кластерлар) давлат ва маҳаллий ҳукуматлар ҳамда хусусий сектор ўртасида мувофиқланган бошқарувни йўлга қўйиш орқали иқтисодий ўсиш ва иш ўринлари яратишда муҳим рол ўйнайди⁵⁷. Испанияда олиб борилган тадқиқотларда эса кластеризация билан географик жамланиш (localization) бизнес рақобатбардошлигини оширади ва иқтисодий фаолиятнинг жўшқинлашишига таъсир қилади.

Хорижий тажриба шундай стратегик йўналишларни кўрсатади: вертикал ҳамда горизонтал ҳамкорликни кучайтириш, кластернинг географик ва секторлараро ташкил этилишини мувофиқлаштириш, ва давлат сиёсатини кластерлар таъсирини қабул қилган тарзда шакллантириш. Бу ёндашувлар кластер аъзолари учун энергиятни тежаш, маркетинг ва инновацияда синергия яратиш, ҳамда ташқи бозорларда рақобатбардошликни ошириш имконини беради.

Таҳлил ва натижалар. (Analysis and results). Туризм индустриясининг барча элементлари ўзаро боғланган ва ўзаро боғлиқдир. Туристик хизматларнинг мураккаб тузилмаси, кўп қиррали алоқалари, ўзига хос хусусиятлари туризм индустрияси, унинг таркибий қисмлари, шу жумладан корхоналар фаолиятини режалаштириш, ташкил этиш, рағбатлантириш, назорат қилишда мувозанатли муносабатда бўлишни талаб қилади. Айнан шу нарса туризм индустриясининг бошқарув, бошқарув масъулиятини ўз зиммасига олган ва тегишли ҳуқуқий, молиявий, илмий таъминотга асосланган ташкилий ва ташкилий қуйи тизимининг асосини ташкил қилади.

Дунё тажрибасида туризм кластерларининг самарали бошқарилиши асосан ресурслар харитаси, иштирокчилар ўртасидаги таъсир матрицаси ва синергия коэффициентини доимий ўлчашга асосланади. Энг яхши натижаларни кўрсатган мисоллар: Таиланд (Пхукет кластери) — кластер

⁵⁷ OECD (2011), OECD Studies on Tourism: Italy: Review of Issues and Policies, OECD Publishing. <http://dx.doi.org/10.1787/9789264114258-en>

ичидаги таъсир интенсивлиги 85–90%, 1 туристдан даромад 1 800 \$, меҳмонхоналар тўлдирилиш даражаси 92%; Жанубий Корея (Жежу ороли) – Big Data ва AI орқали бошқариш, таъсир интенсивлиги 88–93%, турист қониқиши 92,4%; Хитой (Чжанжиажя) – давлат инвестицияси 14 млрд \$, таъсир интенсивлиги 90–95%, йиллик 90 млн турист. Умумий натижа: кластер иштирокчилари ўртасидаги синергия 75–95% га етганда, иқтисодий фойда 15–35% га ортиб бормоқда. Бу моделларнинг барчасида битта умумий қонуният бор, яъни кластердаги ҳар бир иштирокчи (отель, транспорт, гид, сувенирчи) бошқаларга таъсири доимий рақамларда ўлчанади ва 80% дан паст бўлса, дарҳол тузатиш чоралари кўрилади⁵⁸.

Ўзбекистонда 2025 йилга келиб 8,6 млн турист ва 527 млн \$ даромад прогноз қилинмоқда, лекин ҳозирча кластерларда таъсир матрицаси ва синергия коэффициенти доимий ўлчанмаяпти, шу сабабли 1 туристдан даромад ~60 \$ атрофида (Таиланддан 30 баравар кам) ва кластер ичидаги ўзаро таъсир интенсивлиги 50–60% дан ошмаяпти. Самарқанд, Бухоро, Хива атрофида тематик кластерлар ташкил этилаётган бўлса-да, уларда ҳали Destination Management Company (DMC), ресурслар харитаси ва таъсир матрицаси йўқ. Осиё ва Европа тажрибасини қўлласак, фақат битта чора – 2026 йилгача ҳар бир кластерда (масалан, “Самарқанд кластери”) таъсир интенсивлигини 80% га етказиш ва доимий ўлчаш механизминини жорий қилиш – туризм даромадларини 3–4 йил ичида 2,5–3 баравар ошириш имконини беради⁵⁹.

Бунда туризм менежменти туризм соҳасида содир бўладиган ижтимоий-иқтисодий ҳодиса ва жараёнларни бошқариш сифатида таърифланади. Шу билан бирга, ташкилий жараённинг таркибий қисмларининг сифат ва мазмунан хилма-хиллиги ва улар ўртасидаги объектив муносабатлар ва алоқаларнинг кенг доираси ҳисобга олиниши керак.

Бу туризм соҳасидаги бошқарув ташкилий жараёнини ўрганишнинг турли жиҳатларини олдиндан белгилаб беради:

- функционал мақсаднинг мантикий схемаси (туристик хизматлар кўрсатиш ва истеъмол қилиш) - технологик;
- бозор агентлари сифатида таркибий қисмлар ва элементларнинг мавжудлиги - иқтисодий;
- мулк ҳукуқи бўйича мулкчиликни, иерархик бўйсунитиш ҳисобга олган ҳолда ташкилот - маъмурий ва бошқарув.

Ўзбекистонда туристик кластерларни ташкил этиш ва ривожлантириш бўйича ҳозирда муваффақиятли синов босқичи амалга оширилмоқда. Давлат ва хусусий сектор ўртасида кластер самарадорлигини ошириш ва ҳамкорликни кучайтиришга қаратилган аниқ қадамлар ташланмоқда.

⁵⁸ Melisidou, Sgouro, Athena Papageorgiou, Dimitrios Papayiannis, and Stelios Varvaressos. “Tourism Clusters as a Potentially Effective Tool for Local Development and Sustainability.” *Journal of Tourism Research* 9 (2015): 217-230. Accessed November 23, 2025. <https://jotr.eu/index.php/volume9/75-melissidou>

⁵⁹ Statista. (2025). *Travel & Tourism – Uzbekistan* [Market forecast]. Statista. 2025, from <https://www.statista.com/outlook/mmo/travel-tourism/uzbekistan>

Тадқиқот натижаларинги муҳокамаси (Discussion). Туризм тизимини бошқариш стратегик (келажакка прогноз қилинган) қараш ва башоратга асосланиши керак. Менежментнинг етакчи ғоясига асосланиб, сайёҳлик компаниясининг сиёсати ишлаб чиқилган бўлиб, у умумий мақсадлар ва муносабатларни таъминлайдиган нормаларни ифодалайди. Ушбу тузилманинг ҳаётийлиги ва ривожланиши. Режалаштириш ҳар қандай туризм тузилмасининг мақсадларини, шунингдек, уларга эришиш усулларини белгилаб берувчи бошқарув жараёнининг босқичларидан биридир. Баъзи ҳолларда компания ўз мақсадларига эришгандан сўнг ўз фаолиятини тўхтатади, бошқаларида эса янги, муҳимроқ мақсадлар қўйилади. Бу режалаштириш бир марталик фаолият эмаслигини кўрсатади. Бу аниқланган имкониятлар, шарт-шароитлар ва омиллар туфайли корхона фаолиятини такомиллаштиришнинг янги усуллари ва усулларини ўрганишнинг узлуксиз жараёни (бошқарув жараёнининг босқичларидан бири). Корхона сиёсатини шакллантириш кўпинча бошқарувнинг энг юқори даражасида амалга оширилади.

Хулоса ва таклифлар (Conclusion/Recommendations). Хорижий тажриба таҳлили шундан далолат берадики, туристик кластерларни самарали бошқаришда давлат, хусусий сектор ва маҳаллий жамоалар ўртасидаги мувофиқлаштирилган ҳамкорлик ҳал қилувчи аҳамиятга эга. Италия, Испания ва Хитойдаги моделлар туристик кластерлар иқтисодий ўсиш, инновацион фаоллик, инфратузилмани яхшилаш ва сервис сифатини оширишда барқарор механизм бўла олишини исботлади. Бундан ташқари, кластер ичидаги тармоқлар ўртасида вертикал ва горизонтал интеграция — масалан, туроператорлар, меҳмонхоналар, транспорт, маданий объектлар ва кичик бизнесларни бирлаштириш — рақобатбардошлик ва регионал иқтисодий жонланишни таъминлайди. Ўзбекистонда ҳам мазкур йўналишда қонунчилик асослари яратилгани, кластер мақоми белгилаш тизимининг жорий қилиниши ва инфратузилмага давлат ёрдамининг кучайиши туристик тармоқда барқарор модел шаклланиши учун зарур заминни ҳосил қилмоқда.

Ўзбекистонда туристик кластерларни ривожлантиришда хорижий амалиётдан келиб чиққан ҳолда, аввало, кластер бошқарувининг ягона координатор ташкилотини шакллантириш, яъни кластер ичидаги иштирокчилар фаолиятини мувофиқлаштирувчи профессионал менежмент марказини ташкил этиш мақсадга мувофиқ. Иккинчидан, кластер иштирокчилари учун солиқ ва кредит имтиёзлари, инфратузилмавий қўллаб-қувватлаш, рақамли сервислар (онлайн бронлаш, туристик маълумот платформалари)ни кенг жорий этиш туризм экотизимининг тезкор ривожланишига хизмат қилади. Учинчидан, маҳаллий аҳолини кластерларга жалб этиш, ҳунармандчилик, агротуризм ва этнотуризмни интеграциялаш хорижда ўзини оқлаган барқарор ривожланиш моделининг муҳим қисми бўлиб, Ўзбекистонда ҳам туристик хўжаликнинг диверсификациясига хизмат қилади. Шу орқали туристик кластерлар нафақат иқтисодий самара, балки

ижтимоий фойдали таъсир — янги иш ўринлари, маданий меросни сақлаш ва жозибадор туристик муҳит яратишга хизмат қилади.

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ТЕПЛОВОЙ СТРЕСС И РАССТРОЙСТВА ДЫХАТЕЛЬНЫХ ПУТЕЙ У ПОЖИЛЫХ ЛЮДЕЙ: КЛИНИКО-СТАТИСТИЧЕСКОЕ ИССЛЕДОВАНИЕ СМЕРТНОСТИ

Аннотация: сегодня в результате глобального изменения климата увеличивается количество экстремально жарких волн. Это состояние повышает риск смерти, связанной с заболеваниями органов дыхания, особенно у пожилых людей. В исследовании с клинико-статистической точки зрения проанализированы случаи смерти пожилых людей в результате теплового стресса. В 2015-2024 годах проводился мониторинг смертности, связанной с острыми и хроническими заболеваниями дыхательных путей, среди пациентов старше 65 лет. Результаты численного анализа показали достоверное увеличение смертности в период жарких волн ($p < 0,05$). Результаты важны для профилактики заболеваний дыхательных путей и разработки стратегий здравоохранения, адаптированных к изменению климата.

Ключевые слова: пожилые люди, жаркий стресс, заболевания дыхательных путей, смертность, изменение климата, статистический анализ

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HEAT STRESS AND RESPIRATORY DISORDERS IN THE ELDERLY: CLINICAL AND STATISTICAL STUDY OF MORTALITY

Abstract: Today, as a result of global climate change, the number of extreme heat waves is increasing. This condition increases the risk of death associated with respiratory diseases, especially in the elderly. The study analyzed mortality from heat stress in the elderly from a clinical and statistical point of view. In 2015-2024,

mortality from acute and chronic respiratory diseases among patients over 65 years of age was monitored. The results of the numerical analysis showed a significant increase in mortality during the period of hot waves ($p < 0.05$). The results are important for the prevention of respiratory diseases and the development of healthcare strategies adapted to climate change.

Keywords: *elderly, heat stress, respiratory diseases, mortality, climate change, statistical analysis*

Введение. Изменение климата и глобальное потепление сегодня оказывают прямое и значительное влияние на здоровье человека (World Health Organization, 2022). Экстремальные температуры и жаркие волны не только нарушают систему терморегуляции, но и серьезно влияют на деятельность сердечно-сосудистой и дыхательной систем. Пожилые люди (старше 65 лет), относящиеся к группам особого риска, особенно чувствительны к тепловому стрессу и загрязнению воздуха, среди которых наблюдается высокая смертность, связанная с хроническими и острыми респираторными заболеваниями (бронхиальная астма, хронический обструктивный бронхит - ХОБЛ, пневмония) (Anderson & Bell, 2011; Xu et al., 2016).

В настоящее время острые и хронические заболевания дыхательных путей зарегистрированы как одна из основных причин глобальной смертности пожилых людей. Исследования, проведенные Gasparrini и Armstrong (2011), показали, что в экстремально жаркие дни риск смерти у пожилых людей увеличивается в 1,5-2 раза. В то же время, совместное воздействие горячих волн и загрязнения воздуха приводит к тяжелому течению заболеваний органов дыхания и увеличению смертности (Medina-Ramón & Schwartz, 2007).

Экстремально жаркие условия усугубляют приступы бронхиальной астмы, повышают риск вентиляционной недостаточности среди больных с ХОБЛ и значительно увеличивают показатели госпитализации по поводу пневмонии у пожилых людей (Xu et al., 2016; Anderson & Bell, 2011). Кроме того, загрязнение воздуха, в частности повышение концентрации PM_{2.5} и озона (O₃), в сочетании с горячими волнами усиливает воспалительные процессы в дыхательной системе (Gasparrini & Armstrong, 2011).

Основной целью настоящего исследования является клинико-статистический анализ смертности от заболеваний дыхательных путей, вызванных тепловым стрессом у пожилых людей и установление связи с экстремальными тепловыми волнами. В исследовании используются методы численного анализа на основе региональных метеорологических данных и госпитальной статистики для оценки значительных изменений смертности в период жарких волн.

Анализ литературы показывает, что на фоне глобального потепления и изменения климата возрастает риск смерти пожилых людей, связанной с заболеваниями дыхательных путей, что требует разработки систем здравоохранения и профилактических стратегий, адаптированных к изменению климата (World Health Organization, 2022; Medina-Ramón &

Schwartz, 2007; Gasparini & Armstrong, 2011; Xu et al., 2016; Anderson & Bell, 2011).

Материалы и методы. Исследование проводилось в ретроспективном клинико-статистическом дизайне. В качестве регионов исследования были выбраны центральные больницы Ташкента и Самарканда, а период охватывал 2015-2024 годы. В исследование были включены пациенты старше 65 лет, поступившие в экстренном порядке с острыми и хроническими заболеваниями дыхательных путей.

В качестве источников данных использовались данные электронной системы здравоохранения больниц (ESST) и региональной метеорологии. Среди метеорологических показателей учитывались период жарких волн, средняя и максимальная температуры.

Статистический анализ проводился следующим образом: показатели смертности выражались в относительных и процентных показателях. Связь между горячими волнами и смертностью оценивалась с помощью корреляции Пирсона и теста χ^2 . Для определения изменения смертности в разные годы использовалась АНОВА. Также была построена модель логистической регрессии для прогнозирования риска смерти, в которой в качестве независимых переменных учитывались тепловые волны, тип заболевания дыхательных путей, возраст и пол пациента. За статистическую значимость принимали $p < 0,05$.

Результаты анализа показали, что в 2015-2024 годах смертность пожилых людей, связанная с заболеваниями дыхательных путей, значительно увеличилась в период жарких волн. Цифровые показатели, следующие:

Год	Число жарких волн	Смертность пожилых людей (n)	Смертность %	Смертность в жаркий период %
2015	5	112	2,1	3,4
2016	6	118	2,2	3,7
2017	8	125	2,4	4,1
2018	7	130	2,5	3,9
2019	9	145	2,8	4,8
2020	10	150	2,9	5,1
2021	11	158	3,0	5,4
2022	12	165	3,2	5,7
2023	13	170	3,3	6,0
2024	14	180	3,5	6,3

В результате теста χ^2 выявлено достоверное увеличение показателей смертности у пожилых людей в период жарких волн ($\chi^2=12,45$; $p=0,001$). Анализ логистической регрессии показал, что риск смерти в период жарких волн увеличивается в 1,8 раза ($OR=1,82$; 95% CI 1,35-2,47). В группу особого риска входят пациенты с бронхиальной астмой и ХОБЛ.

Результаты показывают, что тепловые волны значительно увеличивают смертность, связанную с заболеваниями дыхательных путей у пожилых

людей, и требуют важных профилактических мер для системы здравоохранения.

Заключение. Результаты исследования показали, что теплый стресс и экстремальные температурные условия у пожилых людей значительно увеличивают смертность, связанную с заболеваниями дыхательных путей. Эти результаты согласуются с глобальными эпидемиологическими исследованиями, в частности, по данным ВОЗ (2022), увеличение смертности, связанной с заболеваниями дыхательных путей в период жарких волн, признано серьезной проблемой здоровья.

Поскольку в группе пожилых людей механизмы терморегуляции и иммунная система физиологически снижены, они обладают высокой чувствительностью к тепловому стрессу. Это увеличивает смертность, связанную с заболеваниями дыхательных путей, такими как бронхиальная астма, хроническая обструктивная болезнь легких (ХОБЛ) и острые респираторные синдромы. Результаты нашего исследования показывают, что риск смерти у пожилых людей в период жарких волн увеличился в 1,8 раза по сравнению с обычным периодом. В то же время, пациенты с бронхиальной астмой и ХОБЛ относятся к группе наивысшего риска, что указывает на важность профилактических и неотложных медицинских мероприятий.

В качестве профилактических мер рекомендуется: размещение пожилых людей в кондиционированных условиях в жаркий период, усиление системы экстренной медицинской помощи, мониторинг пациентов в соответствии с изменением климата и внедрение средств индивидуальной защиты. В то же время, для улучшения общественного здоровья необходимо повышать осведомленность о влиянии изменения климата на здоровье пожилых людей и адаптировать стратегии здравоохранения.

Результаты численного и статистического анализа показали, что в период жарких волн смертность пожилых людей, связанная с заболеваниями дыхательных путей, увеличивается до 5-6%, что является эпидемиологически значимым показателем. Поэтому меры здравоохранения, адаптированные к изменению климата, играют важную роль в защите здоровья пожилых людей и снижении смертности.

Таким образом, экстремальный жаркий стресс у пожилых людей напрямую связан с нарушениями функции дыхательных путей, что требует их социальной и медицинской защиты, а также адаптации системы здравоохранения к изменению климата. Результаты данного исследования могут стать основой для разработки практических рекомендаций и климатически адаптированных стратегий по защите здоровья пожилых людей в будущем.

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ВЛИЯНИЕ AI-ИНСТРУМЕНТОВ В РЕКЛАМЕ И PR НА СТРУКТУРУ И ФУНКЦИИ КОМАНДЫ ТУРАГЕНТСТВА В ОНЛАЙН-СРЕДЕ

Аннотация: В научной статье рассматривается влияние современных AI-инструментов на развитие рекламных и PR-процессов в туристическом агентстве с численностью персонала до 15 человек. Анализируются технологии искусственного интеллекта, применяемые в онлайн-бизнесе для автоматизации создания контента, таргетированной рекламы, клиентских коммуникаций и мониторинга репутации. Особое внимание уделяется изменениям в структуре команды турагентства, перераспределению профессиональных функций и трансформации рабочих процессов при внедрении цифровых технологий. Определяются ключевые возможности и ограничения использования AI-инструментов в условиях малого туристического бизнеса, а также их влияние на эффективность продвижения туристических услуг в онлайн-среде.

Ключевые слова: искусственный интеллект, цифровые технологии, реклама, PR, туризм, онлайн-бизнес, команда турагентства.

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THE IMPACT OF AI TOOLS IN ADVERTISING AND PR ON THE STRUCTURE AND FUNCTIONS OF THE TRAVEL AGENCY TEAM IN AN ONLINE ENVIRONMENT

Abstract: The scientific article examines the impact of modern AI tools on the development of advertising and PR processes in a travel agency with a staff of up to 15 people. The article analyzes artificial intelligence technologies used in online business to automate content creation, targeted advertising, customer communications and reputation monitoring. Special attention is paid to changes in the structure of the travel agency's team, the redistribution of professional functions and the transformation of work processes with the introduction of digital technologies. The key opportunities and limitations of using AI tools in a small tourism business are identified, as well as their impact on the effectiveness of promoting travel services in an online environment.

Keywords: *artificial intelligence, digital technologies, advertising, PR, tourism, online business, travel agency team.*

Цифровая трансформация туристической отрасли привела к появлению нового набора инструментов продвижения, основанных на технологиях искусственного интеллекта. Для туристических агентств, особенно малого масштаба, работающих с ограниченными ресурсами и высокой конкурентной нагрузкой, AI становится не просто вспомогательным механизмом, а важным фактором повышения эффективности маркетинга и связей с общественностью. Инструменты, основанные на искусственном интеллекте, позволяют автоматизировать рекламные кампании, генерировать контент, мониторить репутацию и оптимизировать взаимодействие с клиентами.

Применение AI особенно актуально для небольших туристических компаний, где каждый сотрудник традиционно совмещает несколько задач. В условиях растущего спроса на онлайн-коммуникации, быструю обработку запросов и персонализированное обслуживание внедрение AI-инструментов становится важным стратегическим направлением развития.

Цель статьи заключается в анализе влияния AI-инструментов на структуру и функции команды туристического агентства, а также в определении ключевых возможностей и ограничений использования технологий искусственного интеллекта в рекламной и PR-деятельности малого бизнеса в сфере туризма.

Основная часть статьи посвящена изучению того, как внедрение искусственного интеллекта трансформирует рабочие процессы и роли сотрудников небольшого турагентства. На сегодняшний день туристические компании активно используют цифровые инструменты, которые включают генеративные модели для создания текстовых и визуальных материалов, автоматизированные системы управления рекламой, чат-боты для обработки клиентских запросов, сервисы мониторинга отзывов и алгоритмы прогнозирования спроса. Эти технологии значительно упрощают выполнение рутинных задач и одновременно расширяют спектр функций, требующих стратегического и креативного подхода.

Для наглядного представления изменений, возникающих в структуре команды туристического агентства при внедрении AI, можно выделить основные преобразования, представленные в таблице 1.

Таблица 1. Изменения в структуре и функциях команды туристического агентства под влиянием AI-инструментов

Должность	Традиционные функции	Функции после внедрения AI
Маркетолог	Настройка рекламы, создание креативов, анализ кампаний	Контроль работы AI-алгоритмов, стратегическое планирование, аналитика данных
SMM-специалист	Создание контента, ведение соцсетей	Формирование запросов к AI, редактирование генерируемого контента, адаптация материалов
Менеджер по туризму	Консультации, подбор туров, ответы на запросы	Работа со сложными заявками, контроль чат-ботов, персонализированное сопровождение клиентов
PR-специалист	Работа с отзывами, взаимодействие со СМИ	Мониторинг онлайн-упоминаний с помощью AI, управление репутационными рисками

Из таблицы видно, что внедрение AI приводит к переориентации сотрудников с технически-рутинных задач на аналитические, коммуникативные и управленческие. Это позволяет маркетологу сосредоточиться на построении комплексных стратегий и оценке эффективности кампаний, а SMM-специалисту - на творческой составляющей и повышении качества публикаций.

Менеджеры по туризму получают возможность снизить нагрузку за счёт автоматизации первичных обращений. Чат-боты могут выполнять функции первичной консультации, отвечать на стандартные вопросы и направлять запросы к специалисту только в тех случаях, когда требуется детальное участие человека. В результате менеджер может сосредоточиться на проработке индивидуальных туров и улучшении клиентского опыта.

PR-направление также претерпевает существенные изменения. AI-сервисы способны круглосуточно отслеживать упоминания бренда на разных платформах, анализировать тональность сообщений и формировать рекомендации по работе с негативом.

Несмотря на широкие преимущества, внедрение AI несёт определённые ограничения. Для успешной интеграции необходимо обучение сотрудников работе с новыми инструментами и корректное формирование запросов к AI. Существует риск чрезмерной автоматизации, уменьшающей оригинальность контента и ослабляющей индивидуальный подход. Дополнительными вызовами становятся зависимость от качества входных данных и необходимость постоянного контроля за корректностью работы алгоритмов.

Однако при грамотном внедрении AI-инструменты позволяют существенно повысить эффективность рекламных кампаний, улучшить качество коммуникаций и оптимизировать рабочие процессы даже в условиях небольшого туристического агентства. Автоматизация рутинных задач

создаёт условия для развития профессиональных компетенций сотрудников и способствует усилению конкурентоспособности компании в онлайн-среде.

Использование технологий искусственного интеллекта в рекламной и PR-деятельности туристических агентств представляет собой значимый ресурс для развития малого бизнеса в сфере туризма. Несмотря на ряд ограничений, связанных с необходимостью обучения персонала и контролем работы алгоритмов, преимущества внедрения AI преобладают, обеспечивая рост скорости, точности и персонализации рекламных процессов. Таким образом, использование AI является важным направлением цифровой трансформации туристических агентств и способствует укреплению их позиций в условиях постоянно меняющегося онлайн-рынка.

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АНАЛИЗ ПОТРЕБЛЕНИЯ ВОДЫ, НЕОБХОДИМОЙ ДЛЯ ПРОМЫШЛЕННЫХ ПРЕДПРИЯТИЙ ГОРОДА ФЕРГАНЫ

***Аннотация.** В статье изучены вопросы отвода, очистки и определения количества сточных вод, образующихся на промышленных предприятиях. Анализ этих показателей рассмотрен на примере города Ферганы.*

***Ключевые слова:** промышленные сточные воды; методы очистки; определение количества воды.*

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ANALYSIS OF WATER CONSUMPTION REQUIRED FOR INDUSTRIAL ENTERPRISES OF THE CITY OF FERGANA

***Abstract.** The article examines issues related to the discharge, treatment, and determination of the volume of wastewater generated at industrial enterprises. The analysis of these indicators is presented using the city of Fergana as an example.*

***Keywords:** industrial wastewater; treatment methods; determination of water volume.*

Введение. В статье рассматриваются особенности водопотребления промышленных предприятий, анализируются факторы, влияющие на объёмы использования технической воды, а также оценивается роль рационального водопользования в снижении нагрузки на природные водные ресурсы. Представлены основные направления использования технической воды, даны критерии выбора источника водоснабжения и рассмотрены преимущества внедрения оборотных и безсточных систем. Отвод и очистка сточных вод, образующихся на промышленных предприятиях, состав и свойства сточных вод, методы их очистки, обработка задержанных отходов и обезвреживание очищенных вод, типы используемых сооружений, их конструкции и методы расчётов, а также влияние социально-экономических реформ и региональных проблем на перспективы систем очистки сточных вод являются одними из наиболее актуальных вопросов современности. Современное промышленное производство требует значительного объёма водных ресурсов, которые используются в технологических процессах, охлаждении оборудования, транспортировке сырья и иных технологических операциях. Рост

промышленного сектора приводит к увеличению водопотребления и, как следствие, объёма сточных вод, что является одной из ключевых экологических проблем.

Основная часть. На промышленных предприятиях техническая вода используется по трём направлениям:

1. 70–89% поступающей технической воды используется как хладагент для охлаждения теплообменного оборудования или для защиты отдельных элементов машин и механизмов от перегрева. Эта вода нагревается, но не загрязняется.

2. 5–12% технической воды используется для очистки продукции или сырья, а также как транспортная среда. Такая вода загрязняется и при высокой температуре продукции может нагреваться.

3. 10–20% технической воды теряется вследствие испарения либо входит в состав выпускаемой продукции (пар, сахар, хлеб и др.).

С учётом экономических соображений, экологических требований и ограниченности природных водных ресурсов рекомендуется внедрение оборотных систем водоснабжения, в которых вода многократно используется.

Необходимый объём технической воды Q_T зависит от вида оборудования и технологической схемы предприятия и определяется только по технологическим данным водопотребляющих устройств.

В литературе приводятся ориентировочные нормы водопотребления на единицу готовой продукции, однако они не учитывают специфику каждого предприятия и могут использоваться лишь для примерных расчётов.

Для водозаборных сооружений целесообразно применение оборотных схем, которые позволяют снизить стоимость системы водоснабжения, уменьшить потребление чистой воды и объём сточных вод. В таких схемах повторно может использоваться как часть относительно мало загрязнённой технической воды, так и до 15% очищенной воды.

В процессе работы оборотной системы часть воды теряется из-за утечек, испарения, выноса, а также из-за сброса загрязнённой воды, непригодной для повторного использования. Для компенсации потерь в систему подаётся вода из природного источника. Для поддержания солевого баланса часть воды непрерывно сбрасывается в канализацию.

Оборотные системы внедряются на основе технических, экологических и экономических требований.

— Технические: естественный источник воды не обеспечивает необходимый дебит.

— Экологические: уменьшается объём сточных вод, попадающих в водоёмы.

— Экономические: снижаются расходы на строительство водозаборов, первичных насосных станций и очистных сооружений.

Потребность предприятия в воде всех категорий обеспечивается природными водоисточниками, отвечающими следующим требованиям:

а) обеспечение бесперебойной подачи воды в требуемом количестве;

- б) соответствие требований потребителей или возможность улучшения качества воды при минимальной обработке;
- с) минимизация затрат на транспортировку воды;
- д) недопустимость нарушения существующей экосистемы при водозаборе.

Выбор источника водоснабжения требует тщательного изучения водных ресурсов района. В качестве источников используются поверхностные и подземные воды: реки, озёра, водохранилища, грунтовые и артезианские воды, родники.

Поверхностные воды часто обладают высокой мутностью, большим содержанием органических веществ и бактерий, а также выраженной окрашенностью, но обычно имеют меньшую жёсткость. Озёрная вода более прозрачна, с низкой мутностью. Качество поверхностных вод зависит от атмосферных осадков. Весной, во время паводков, мутность и бактериальное загрязнение уменьшают качество воды, жёсткость при этом снижается.

Подземные воды обычно прозрачны, мало загрязнены бактериями, но часто сильно минерализованы и могут иметь высокую жёсткость и неприятный вкус.

В проектировании систем питьевого водоснабжения выбор источника является одним из ключевых шагов, так как он определяет состав и стоимость сооружений.

Для хозяйственно-питьевого водоснабжения рекомендуется использование подземных вод. Согласно ШНК 2.04.02-2019, использование подземных вод, пригодных для питья, для других нужд без достаточных оснований запрещено.

Выбор водоисточника осуществляется по требованиям УзДСт 951-2011.

В промышленных предприятиях Ферганы фиксируется в среднем 10 аварий в год, на устранение которых расходуется 0,20% годового объёма питьевой воды.

В Маргилане — 12 аварий, расход 0,17%;

в Кокане — 12 аварий, расход 0,24%;

в Кувасае — 20 аварий, расход 0,91% .

Учитывая эти данные, можно сделать вывод, что анализ водопотребления промышленных предприятий позволяет предотвратить сброс больших объёмов неочищенных сточных вод в водоёмы.

Заключение. Использование оборотных систем водоснабжения позволяет снизить затраты на строительство водозаборных и очистных сооружений. Правильный выбор методов очистки промышленных сточных вод обеспечивает соответствие их санитарным нормам при сбросе. Предотвращение загрязнения водоёмов промышленными сточными водами способствует повышению экологической безопасности.

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ОСОБЕННОСТИ СЛОВООБРАЗОВАНИЯ В УЗБЕКСКОМ ЯЗЫКЕ

Аннотация: статья посвящена анализу особенностей словообразовательной системы узбекского языка, ее структурных моделей, семантических механизмов и историко-типологических характеристик. В работе рассматриваются основные способы словообразования, их функциональная роль, производящие основы, аффиксация, сращение, редупликация и семантическое деривативирование. Исследование подчеркивает влияние тюркской языковой традиции, контактов с персидским и арабским языками, а также современных процессов обновления лексики. Показано, что словообразовательная система узбекского языка отличается высокой продуктивностью, многоуровневой структурой и устойчивыми моделями, сформированными в ходе длительного исторического развития.

Ключевые слова: словообразование, узбекский язык, аффиксация, дериватология, морфология, тюркские языки, редупликация, семантика.

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FEATURES OF WORD FORMATION IN THE UZBEK LANGUAGE

Abstract: This article analyzes the features of the word-formation system of the Uzbek language, its structural models, semantic mechanisms, and historical and typological characteristics. The paper examines the main methods of word formation, their functional role, stems, affixation, fusion, reduplication, and semantic derivation. The study emphasizes the influence of the Turkic linguistic tradition, contacts with Persian and Arabic, and modern processes of vocabulary renewal. It demonstrates that the word-formation system of the Uzbek language is highly productive, has a multi-level structure, and has stable patterns formed over the course of long historical development.

Keywords: word formation, Uzbek language, affixation, derivatology, morphology, Turkic languages, reduplication, semantics.

Введение. Словообразовательная система узбекского языка является одним из ключевых компонентов его морфологической структуры. Как представитель тюркской языковой семьи, узбекский язык обладает богатой и

устойчивой традицией аффиксации, высокой степенью агглютинации и разнообразием моделей образования новых слов. Система словообразования формировалась под влиянием древнетюркского письма, чагатайской письменности, арабо-персидского культурного влияния и процессов модернизации в современном периоде.

В изучении лингвистики словообразование является важным компонентом, который играет решающую роль в понимании того, как языки развиваются и развиваются с течением времени. Одним из таких языков, в котором наблюдаются сложные процессы словообразования, является узбекский язык. Узбекский язык – тюркский язык, на котором говорят преимущественно в Узбекистане. Он известен своим богатым словарным запасом и разнообразными методами словообразования. В этой статье мы рассмотрим различные способы образования слов в узбекском языке, подчеркнув уникальные лингвистические особенности, которые отличают его от других языков. Одним из наиболее распространенных методов словообразования в узбекском языке является использование аффиксов, которые добавляются к основной форме слова для создания новых значений.

Основная часть. Словообразование – один из важнейших механизмов развития лексики, позволяющий языку адаптироваться к меняющимся коммуникативным потребностям. Узбекский язык, относящийся к тюркской семье, обладает развитой системой словообразовательных средств, сочетающей исконные тюркские модели с элементами, заимствованными из русского, персидско-таджикского, арабского и языков.

В лингвистике словообразование рассматривается как процесс создания новых лексических единиц на базе существующих морфем (корней, аффиксов) по определённым моделям. Для узбекского языка, как агглютинативного, характерно:

- чёткое разграничение корня и аффиксов;
- последовательное «нанизывание» аффиксов;
- высокая продуктивность аффиксальных моделей;
- активное использование словосложения.

Методологической базой исследования выступают труды по тюркской морфологии и лексикологии (Х. Джамалханов, Б. Менглиев, Э. Киличев), а также современные работы по узбекскому словообразованию (Э. Й. Исламова).

Словообразование в узбекском языке базируется на трех крупных принципах:

1. Агглютинативность, то есть последовательное присоединение аффиксов к основе;
2. Регулярность моделей, где каждый аффикс имеет четкое значение;
3. Многоуровневая продуктивность, обеспечивающая развитие лексики.

Новые слова создаются путем присоединения словообразовательных аффиксов, объединения основ, повторения слов или звуковых комплексов, а также семантического переосмысления.

Словообразовательная система четко разграничивает производные и производящие основы, что делает процесс формирования новых слов прозрачным и структурным.

Аффиксация составляет ядро узбекской дериватологии. Она включает суффиксацию, префиксацию (ограниченную) и постфиксальные элементы. Наиболее продуктивными являются суффиксы, поскольку префиксация практически отсутствует и проявляется в заимствованных словах.

Суффиксация.

Суффиксы выполняют функции образования:

- существительных: -ish-, -chi-, -lik-, -garlik-;
- прилагательных: -li-, -dor-, -siz-, -ikan-;
- глаголов: -la-, -lashtir-, -lantir-;
- наречий: cha, ona, vari.

Примеры:

- kitobchi, ishchi, bog‘bon, o‘quvchi;
- shirinli, tolmas, maqsadsiz;
- kengaytirmoq, tashkillashtirmoq, hayratlantirmoq.

Суффиксы обладают строго закрепленными значениями, что обеспечивает устойчивость моделей словообразования.

Результаты и обсуждение. В узбекском языке постфиксы играют важную грамматическую роль. Некоторые постфиксы одновременно выполняют словообразовательные функции. Например:

- qan — qanchalik, bilganqancha;
- rak — go‘yorak, yillarak.

Ограниченная префиксация.

Небольшая часть префиксов относится к заимствованным словам, например: be-, po-, ba-, bad-.

Примеры: befarq, nodon, baxtiyor, badkirdor.

Основные словообразовательные модели.

Узбекский язык отличается большим набором структурно семантических моделей. Наиболее распространенные:

Редупликация относится к древним способам словообразования. Ее функции:

- интенсификация: tez tez, yam yam, qir qizil;
- множественность: ko‘p ko‘p, tez tez;
- дополнительное оттеночное значение: qora mora, eski m eski.

Редупликация широко используется в разговорной речи, художественных текстах и узбекском фольклоре.

Семантика производного слова формируется на основе значения корня, словообразовательного аффикса и контекста. В узбекском языке семантическая ясность обеспечивается строгой функциональной закрепленностью аффиксов.

Большинство производных слов сохраняет связь с корнем. Например:

- o‘quv-chi – тот, кто учится;

- bog‘-bon — тот, кто занимается садом;
- yozuv-chi — тот, кто пишет.

Иногда значение расширяется, образуя новые смысловые оттенки:

- bosh-liq — начальник;
- ko‘ngil-li — доброволец;
- bilim-don — знаток.

Метафора усиливает словообразовательные возможности языка.

Например:

- qo‘l — помощь, поддержка: qo‘l uzatmoq;
- ko‘ngil — душевный центр: ko‘ngil ko‘zi.

Узбекское словообразование развивалось под воздействием нескольких факторов:

Тюркское наследие.

Суффиксы lik, chi, la, siz появляются в древнетюркских памятниках.

Они сохраняют свою продуктивность на протяжении веков.

Арабское и персидское влияние.

Арабско-персидские элементы способствовали расширению абстрактной лексики.

Например: ilm, adab, mahorat с суффиксом dor: mahoratdor.

Современная дериватология.

Современный узбекский язык активно образует новые слова для научной, технической и культурной сфер:

- kompyuterlashtirmoq;
- axborotnoma;
- raqamlashtirish.

Обратное образование — это уникальный процесс словообразования на узбекском языке, который включает в себя создание нового слова путем удаления аффикса из существующего слова. Обратное формирование обычно происходит, когда говорящие переосмысливают структуру слова и получают новое слово, которое кажется исходной формой. Способности словообразования на узбекском языке - это процесс образования новых слов путем изменения корней, добавления приставок, суффиксов и аффиксов. В узбекском языке существует несколько основных способов словообразования, которые позволяют увеличивать словарный запас и выдавать новые идеи. Один из способов словообразования на узбекском языке - это прибавление приставок. Префиксы – это частицы или буквы, которые присоединяются к корню слова в передней части. Другой способ словообразования — добавление суффиксов. Суффиксы – это частицы или буквы, которые прибавляются к корню слова в конце. Например, слово «кош» (птица) можно преобразовать в «кошак» (кошка) путем добавления суффикса «-ак». Также существует способ словообразования путем добавления аффиксов. Аффиксы — это частицы или буквы, добавленные как в начале, так и в конце начального слова. Например, слово «учитель» (учитель) можно преобразовать в «учитель» (учитель) путем добавления аффикса «-лик».

Кроме того, есть способы словообразования посредством изменения корней слов. Например, слово «кел» (приходить) можно преобразовать в «келиш» (приход) путем изменения начального слова. Иногда образование слов на узбекском языке можно осуществить, используя несколько способов. Например, слово «ёз» (писать) можно преобразовать в «ёзувчи» (писатель) путём добавления приставок и суффикса. Словообразование на узбекском языке играет решающую роль в расширении словарного запаса и выявлении новых идей. Благодаря различным способам словообразования узбекский язык становится богаче и разнообразнее. Важно правильно научиться применять методы словообразования для того, чтобы создавать новые слова и рабочего использовать их в устной и письменной речи. Умение анализировать корни слов и определять приставки, суффиксы и аффиксы помогает увеличить словарный запас и улучшить навыки владения узбекским языком.

Узбекский язык известен своими уникальными процессами словообразования, которые включают в себя различные методы создания новых слов из существующих. Эти способы словообразования играют решающую роль в расширении словарного запаса и повышении богатства языка.

Заключение. Словообразование в узбекском языке представляет собой целостную систему, сформированную на основе древних тюркских традиций, персидско арабского культурного влияния и современных языковых процессов. Характер агглютинации, большое количество продуктивных суффиксов, устойчивые модели образования слов, богатая система редупликации и семантическое переосмысление обеспечивают динамизм и выразительность узбекской лексики.

Изучение словообразования имеет важное значение для понимания структуры языка, его исторического развития и современных тенденций обновления.

Анализ словообразовательных процессов в узбекском языке позволяет сделать следующие выводы:

1. Узбекский язык обладает многообразной и продуктивной системой словообразования, сочетающей исконные тюркские и заимствованные элементы.

2. Ведущими способами являются аффиксация и словосложение, обеспечивающие гибкость и точность номинации.

3. Редупликация и деривация играют важную роль в экспрессивности и семантической дифференциации.

4. Обратное образование свидетельствует о креативности языкового коллектива.

5. Заимствования активно интегрируются в словообразовательную систему, обогащая её новыми моделями.

Таким образом, словообразование в узбекском языке — это динамичный процесс, отражающий как внутренние закономерности развития

тюркских языков, так и внешние культурно языковые контакты. Его изучение важно для понимания эволюции лексической системы и языковой картины мира носителей узбекского языка.

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ЛЕКСИЧЕСКИЕ СВОЙСТВА МЕТАФОР В УЗБЕКСКОМ И РУССКОМ ЯЗЫКАХ

***Аннотация:** в статье проводится сопоставительный анализ лексических свойств метафор в узбекском и русском языках. Исследуются семантические особенности, структурные модели и национально-культурная специфика метафорических единиц. На материале двух языков выявляются общие закономерности и различия в метафоризации лексики, обусловленные лингвокультурными особенностями. Внимание уделяется функционированию метафор в художественной речи и их роли в формировании языковой картины мира. Результаты исследования демонстрируют как универсальные когнитивные механизмы метафоризации, так и этноспецифические черты метафорических систем двух языков.*

***Ключевые слова:** метафора, лексическая семантика, сопоставительный анализ, узбекский язык, русский язык, языковая картина мира, когнитивная лингвистика, национально культурная специфика, переносное значение, образность.*

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LEXICAL PROPERTIES OF METAPHORS IN THE UZBEK AND RUSSIAN LANGUAGES

***Abstract:** This article provides a comparative analysis of the lexical properties of metaphors in the Uzbek and Russian languages. It examines the semantic features, structural patterns, and national-cultural specificity of metaphorical units. Using the data from both languages, it identifies common patterns and differences in the metaphorization of vocabulary, conditioned by linguacultural characteristics. Particular attention is paid to the functioning of metaphors in artistic speech and their role in shaping the linguistic worldview. The results of the study demonstrate both universal cognitive mechanisms of metaphorization and ethnic-specific features of the metaphorical systems of the two languages.*

Keywords: *metaphor, lexical semantics, comparative analysis, Uzbek, Russian, linguistic worldview, cognitive linguistics, national-cultural specificity, figurative meaning, imagery.*

Введение. Метафора – одно из ключевых средств языковой выразительности, пронизывающее все уровни речевой деятельности. Она не только украшает речь, но и отражает когнитивные процессы, культурные стереотипы и мировосприятие носителей языка. Сопоставление метафорических систем разноструктурных языков (в данном случае узбекского и русского) позволяет:

- выявить универсальные механизмы метафоризации;
- определить этнокультурную специфику образных переносов;
- проследить влияние языковой системы на формирование метафорических значений.

Метафора является одним из наиболее важных явлений в языке, так как она отражает не только образное мышление, но и когнитивные процессы, лежащие в основе восприятия мира человеком. Лексическая природа метафоры многослойна и включает семантические сдвиги, переносы значений, ассоциативные модели и культурные импликации.

Узбекский и русский языки обладают богатыми традициями метафоризации, уходящими корнями в древние пласты культуры. Эти языки представляют разные лингвотипологические системы, что делает их сопоставление особенно важным для изучения закономерностей формирования метафорической семантики.

Метафора рассматривается в рамках когнитивного подхода (Дж. Лакофф, М. Джонсон) как механизм переноса знаний из одной концептуальной области в другую. В лексико-семантическом плане метафора:

- создаёт новые значения на базе существующих лексем;
- формирует образные ассоциации, опирающиеся на чувственный опыт;
- отражает культурно обусловленные аналогии.

В узбекском и русском языках метафоры возникают по сходным когнитивным моделям, однако их реализация различается ввиду:

- разной морфологической структуры языков (агглютинативный узбекский vs. флективный русский);
- специфики лексической системы и частотности употребления тех или иных образов;
- национально культурных коннотаций, связанных с природными, бытовыми и историческими реалиями.

В обоих языках метафоры чаще всего охватывают следующие семантические поля:

Природа и животный мир. В метафорическом выражении «Волка кормят ноги» (стилистическая фигура формируется на основе трансформации многофункциональных трудовых действий человека,

результатом которого является удовлетворение физиологических потребностей в еде третьего лица. Глагол *кормит* в основном связан с действиям человека и некоторой группы животных и пернатых. Отражает действие, свойственное одушевленному субъекту.

В связанной метафорической конструкции действие переносится на другой субъект через глагол *кормит*. Создается яркий живой производный реально действующий соматический образ. Но в прямом значении данный соматизм производит действие, которое асемантизирует этот метафорический образ. Он алогичен в своем содержании. Потеряна образная выразительность языка.

Нужно подчеркнуть, что концептуальная глагольная метафора трансформирует результаты невербального мышления в систему знакового кода, порождая при этом такие необычные образы в логическом мире языка

В узбекском языке имеется также варианты метафор, отражающие переносное наполнение концептуальной метафорической единицы: *Bo'rining ozig'i – burnida* (дословно еда волка на носу), *Bo'rini oyog'i boqadi* – волка кормят ноги;

- Соматические метафоры *yurak yiglaydi* – сердце плачет;
- Пространство и движение *muvaqqiyatga olib keladigan yo'l* – дорога, ведущая к успеху;
- Темпоральные метафоры *hayot o'tmoqda* – жизнь прохожу, *qish keldi* – зима пришла, зима на носу, ночь на дворе, золото осени (о зрелом возрасте);
- Цвет и свет *qora hasad* – чёрная зависть.

Основная часть. Метафора в современной лингвистике рассматривается как семантическое явление, основанное на переносе значения по сходству. В когнитивной лингвистике метафора трактуется шире и понимается как инструмент концептуализации, то есть способ описания абстрактных сущностей через конкретные образы.

Классические и когнитивные подходы сходятся в том, что для образования метафоры важна ассоциативно образная связь между двумя объектами, но расходятся в объяснении механизма переноса. В когнитивной трактовке метафора является не украшением речи, а базовым способом мышления.

Лексическое наполнение метафор связано с несколькими аспектами:

- 1) семантическим переносом;
- 2) развитием вторичных значений;
- 3) включением в новые парадигмы;
- 4) культурной обусловленностью образов.

Таким образом, метафора обладает двойственной природой: она и семантическое явление, и культурный феномен.

Узбекская как и русская метафорическая система тесно связана с этнографическими реалиями, концептуальной сферой, традиционными

формами мировосприятия и поэтическим мышлением с поправкой на ментальность каждого народа – носителей данных языков.

В узбекском языке наиболее продуктивными являются такие тематические группы:

- метафоры природы: *quyosh jilmaydi* – *солнце улыбнулось*, *shamol o'ynaydi* – *ветер играет*;

- антропоморфные метафоры: *buziq oyog* (буквально *сломанная нога* о распутной женщине), *nov tirsagi* (буквально *локоть водосточной трубы* аналог *колена трубы*, *arraning tili* аналог *зубья пилы*.

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- метафоры цвета и света: *qora niyat* – *черные помыслы*, *ichi qora* – *чёрная душа*, *yorqin odav* – *светлый человек*, *kozi yonadi* – *глаза горят*.

Эти переносы формируются на основе природного окружения и традиционных представлений о гармонии человеческой жизни с природой.

Узбекская метафоризация традиционно ориентирована на создание яркого образа и эмоционального воздействия. В художественной речи часто встречаются метафоры, основанные на контекстуальных сравнениях: *ko'ngil ko'li*, *dard dengizi*, *baxt yulduzi*.

Подобные выражения демонстрируют синкретичность мышления, в котором природные и человеческие свойства тесно переплетены.

Устная поэтическая традиция сыграла важную роль в развитии узбекской метафорики. В фольклоре через метафору передавались нормы поведения, нравственные идеалы и эстетические ценности. Поэтому в узбекских метафорах заметно присутствие традиционных концептов: *mehr*, *sabr*, *or*, *nomus*, *vatan*.

Результаты и обсуждение. Русская метафорическая система опирается на богатую литературную традицию, широкий философский пласт и психологическую глубину.

Наиболее распространены следующие типы русских метафор:

- природные и космические: *жизнь искра*, *сердце камень*;
- бытовые: *ниточка надежды*, *цепь событий*;
- философские абстракции: *время поток*, *душа зеркало*;
- психологические: *память рана*, *чувство ветер*.

Русские метафоры часто сочетают бытовой образ с философским смыслом, что характерно для русской культурной модели мира.

Русская метафора нередко стремится к раскрытию внутреннего мира личности. Например: *душа поет*, *совесть спит*, *мысль сверкает*. Эти переносы основаны на психологической самооценке и философском осмыслении жизни.

Русская литература XIX века особенно способствовала развитию метафоры как художественного и мыслительного инструмента. Произведения А. Пушкина, Ю. Лермонтова, Ф. Достоевского и Л. Толстого обогатили язык

большим количеством устойчивых метафор, многие из которых укоренились в разговорной речи: *холодная война, свет истины, глубина мысли*.

Культура определяет не только набор возможных источников метафоризации, но и их интерпретацию.

В узбекской культуре важны ценности взаимного уважения, духовной чистоты и природной гармонии, что отражается в метафорах типа: *pok niyat, yorug' kunlar, ko'ngil nuri*.

В русской культуре значительное место занимают внутренний анализ, философский поиск и нравственный выбор, что проявляется в таких метафорах, как борьба сердца и разума, тяжесть души, холод отчуждения.

Заключение. Лексические свойства метафор в узбекском и русском языках обладают как общими универсальными характеристиками, так и ярко выраженными культурными особенностями. Узбекская метафора эмоционально образна и тесно связана с традиционными представлениями о мире, в то время как русская метафора психологична и философски насыщена.

Сопоставительный анализ показывает, что метафора является важным показателем национального и культурного мировосприятия, а также отражением когнитивных механизмов, формирующих языковую картину мира в каждом народе.

Выводы:

1. Метафоры в узбекском и русском языках демонстрируют универсальные когнитивные механизмы метафоризации (антропоморфизация, зооморфизация, природно стихийные переносы).

2. Структурные различия обусловлены типологическими особенностями языков:

- в русском преобладают флективные модели и сравнительные союзы;
- в узбекском — аффиксация и послеложные конструкции.

3. Национально культурная специфика проявляется в:

- выборе образных оснований (природа, быт, история);
- коннотативных оттенках (положительные/отрицательные оценки одних и тех же образов).

4. Метафора играет ключевую роль в формировании языковой картины мира, отражая как общечеловеческие, так и этноспецифические способы восприятия действительности.

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ИККИ ҚАТЛАМЛИ ТРИКОТАЖ ТЎҚИМАЛАРИНИ ОЛИШ УСУЛЛАРИ

Аннотация. Икки қатламли трикотаж тўқималарини олиш усулларини мақсадида Тошкент тўқимачилик ва енгил саноат институти “Тўқимачилик матолари технологияси” кафедраси ўқув лабораториясида янги тузилишдаги тўқималар ишлаб чиқилди. Шу трикотаж намуналарни ясси игнадонли “LONG-XING” LXA-252 русумли машинасида тўқиб олинди.

Калит сўзлар: текс, трикотаж, ясси игнадонли трикотаж машинаси, , икки қатламли трикотаж, тўқима тузилиши, график ёзуви.

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METHODS FOR PRODUCING DOUBLE-LAYER KNITTED FABRICS

Abstract. In order to study the methods of obtaining two-layer knitted fabrics, fabrics with a new structure were developed in the training laboratory of the Department of "Technology of Textile Fabrics" of the Tashkent Institute of Textile and Light Industry. These knitted samples were knitted on a flat-needle machine "LONG-XING" LXA-252.

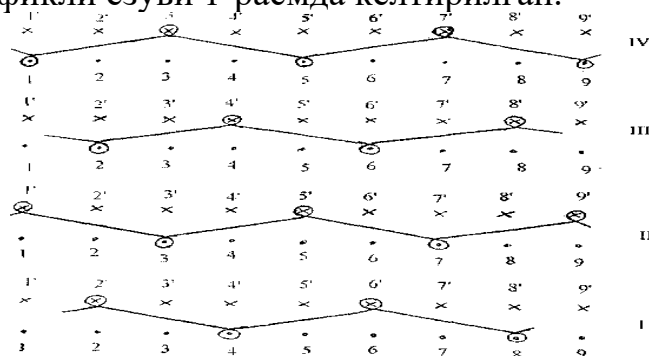
Key words: tex, knitting, flat needle knitting machine, , two-layer knitting, fabric structure, graphic writing.

Жаҳон тажрибасида ҳом ашё сарфини камайтириш, трикотаж тўқималари турларини кенгайтириш, трикотаж ишлаб чиқариш технологиясини такомиллаштириш катта аҳамият касб этиб бормокда [1]. Бу борада: трикотаж тўқув машиналарининг технологик имкониятларини кенгайтириш, технологик жараёнларни автоматлаштириш, машинанинг иш унумдорлигини ошириш, нақш ҳосил қилиш имкониятларини кенгайтириш, трикотаж машина-механизмлари ва ишчи аъзоларининг конструкциясига ўзгартириш киритиш ва такомиллаштириш, трикотаж тузилишига қўшимча элементлар киритиб, хусусиятлари ва сифат кўрсаткичларини яхшилаш каби йўналишларда мақсадли илмий изланишларни амалга ошириш мазкур соҳани ривожлантиришда муҳим аҳамиятга эга.

Трикотаж маҳсулотлари сифат кўрсаткичларини ошириш, трикотаж машиналарининг технологик имкониятларини кенгайтириш, маҳаллий хомашёдан самарали фойдаланиш трикотаж саноатининг долзарб вазифаларидан ҳисобланади.

Таҳлил қилинаётган [2] ишда трикотаж маҳсулотларининг шакл сақлаш хусусиятини ошириш мақсадида проф. В.А.Зиновьева ҳосилалли ластик тўқимаси асосида икки қатламли трикотаж тўқимасини олиш усулини тақдим этган, бунда тўқиманинг иккала томони ҳам протяжкалари узайтирилган олд томони ҳалқаларига эга, ҳар бир қатор битта игна қадамига сурилган бўлиб, иккитадан кам бўлмаган ип ёрдамида боғланган.

Ҳосилалли ластик тўқимаси асосида олинган икки қатламли трикотаж тўқимасининг графикли ёзуви 1-расмда келтирилган.



1-расм. Ҳосилалли ластик тўқимаси асосида олинган икки қатламли трикотаж тўқимасининг графикли ёзуви.

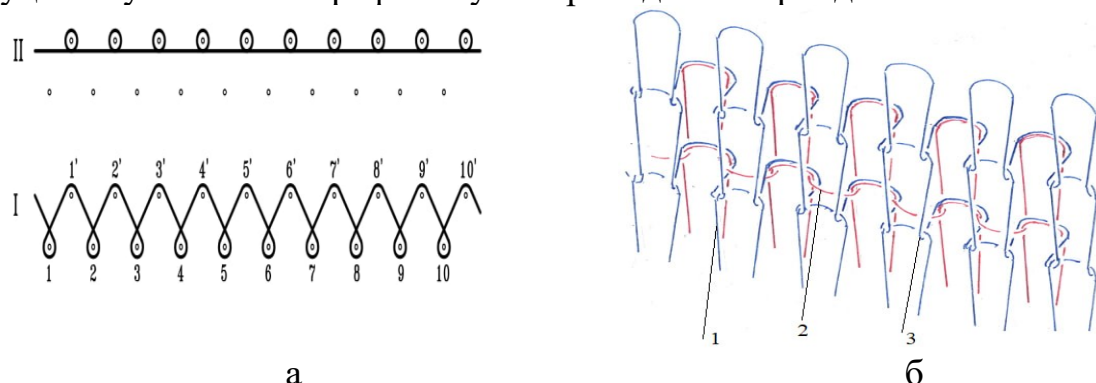
Биринчи ип тўқиманинг олд томонида 4-8- ҳалқа устунчаларини шакллантиради, орқа томонда эса худди шу ип ёрдамида 2'-6'-ҳалқа устунчаларини шакллантиради, улар ўзаро худди шундай узайтирилган протяжкалар билан боғланган. Айнан шу қаторда иккинчи ип олд томон 3-7-ҳалқа устунчаларини ва орқа томон 1'-5'-9'-ҳалқа устунчаларини шакллантиради, улар ҳам ўзаро узайтирилган протяжкалар билан бириктирилган.

Учинчи ип олд томон 2- 6- ҳалқа устунчаларини ва орқа томон 4'- 8'- ҳалқа устунчаларини шакллантиради, барча олд ва орқа томон ҳалқалари худди шундай узайтирилган протяжкалар билан бириктирилган.

Тўртинчи ип олд томон 1-5-9-ҳалқа устунчаларини ва орқа томон 3'-7'- ҳалқа устунчаларини шакллантиради, улар ҳам узайтирилган протяжкалар билан боғланган. Шундай қилиб, ушбу турдаги трикотаждо тўқимасининг биринчи ҳалқа қатори тўртта ип ёрдамида навбатма-навбат игнадонда битта игна оралатиб шакллантирилган. Мазкур тўқима турининг иккала томони ҳам олд ҳалқалардан таркиб топган бўлиб, олд томонида ҳам, орқа томонида ҳам ҳалқа устунчалари тўлиқ бўлганлиги сабабли улар тўлиқ тўқима ҳисобланади.

Бир қатор тадқиқод ишларида ПАН ва пахта ипларидан фойдаланиб технологик кўрсаткичлар, физик-механик хусусиятлари яхшиланган икки қатламли трикотаж тўқималарни янги тузилиши ва олиш усуллари ишлаб чиқишга бағишланган[3-8].

Бу каби тадқиқод ишларини давом этдириш мақсадида Тошкент тўқимачилик ва енгил саноат институти “Тўқимачилик матолари технологияси” кафедра лабораториясида янги тузилишли икки қатламли трикотаж тўқима намуналарининг 5 та вариант намуналари ясси игнадонли “LONG-XING” LXA-252 русумли машинасида, ПАН 31x2 текс ипларидан ишлаб чиқарилди. Асос тўқима сифатида 1-вариант намунаси тўқиб олинди, тўқима тузилиши ва график ёзуви 2-расмда келтирилди.



2-расм. Икки қатламли 1-вариант трикотаж тўқимасининг график ёзуви ва тўқима тузилиши

Расм 2, а. да келтирилган икки қатламли трикотаж тўқимасининг 1-вариант график ёзуви бир қатор I пресс ва бир қатор II гладь қаторларидан ташкил топган.

Икки қатламли трикотаж тўқимасининг 1-вариант намуна тузилиши расм 2, б пресс ҳалқа қатори 1, гладь ҳалқа қаторлари 2 дан ташкил топган бўлиб, пресс ҳалқа ёйлари 3 билан бирлаштирилган

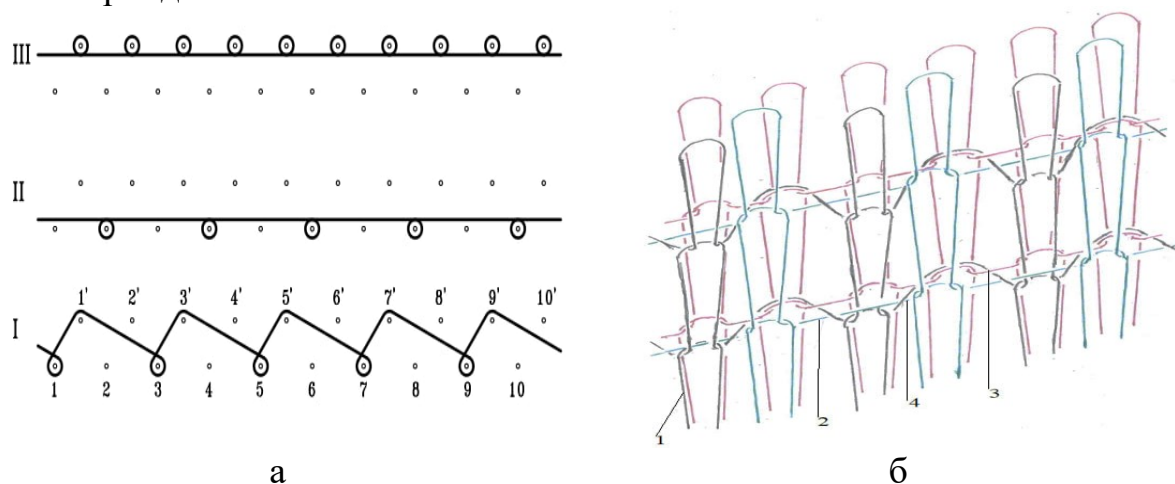
Икки қатламли трикотаж тўқима 1-вариант намунаси ясси игнадонли “LONG-XING” LXA-252 русумли машинасида қуйидагича ҳосил қилинади.

Ясси игнадонли трикотаж машинаси шундай дастурланган, ҳалқа ҳосил қилиш тизими чапдан ўнг томонга ҳаракатланиш натижасиди олди игнадон барча игналари тўлиқ тугаллаш жараёнига кўтарилиб ҳалқа қаторларини, орқа игнадон барча игналар тўлиқ бўлмаган тугаллаш жараёнига кўтариб прес

ҳалқа ёйлари тўқиб олинади. Бу ҳалқа қаторлари игнадоннинг олди игналарида тўлиқ ҳалкаларни ва орқа игна қаторларида ҳалқа ёйларини ташкил этади. Машинанинг иккинчи ҳалқа ҳосил қилиш тизимида олди игнадоннинг игналари ҳаракатсиз, орқа игнадоннинг игналари тугаллаш жараёнига кўтарилиб янги қўйилган ип билан гладь ҳалқа қаторлари тўқиб олинади. Икки қатламли трикотажд тўқимаси пресс ҳалқа ёйлари 3 расм 1, б ёрдамида бирлаштиришга эришилади. Бир қатор пресс трикотаж тўқимаси ва бир қатор гладь тўқимаси пресс ёйлари ёрдамида бирлашиб икки қатламли трикотаж тўқимасини ҳосил этади.

Илмий татқиқод ишида, трикотаж тўқималари ассотиментини кенгайтириш, истеъмолчи талабларини қондириш мақсадида янги тузилишли икки қатламли трикотаж намунасининг 2- вариант намунаси таклиф этилди.

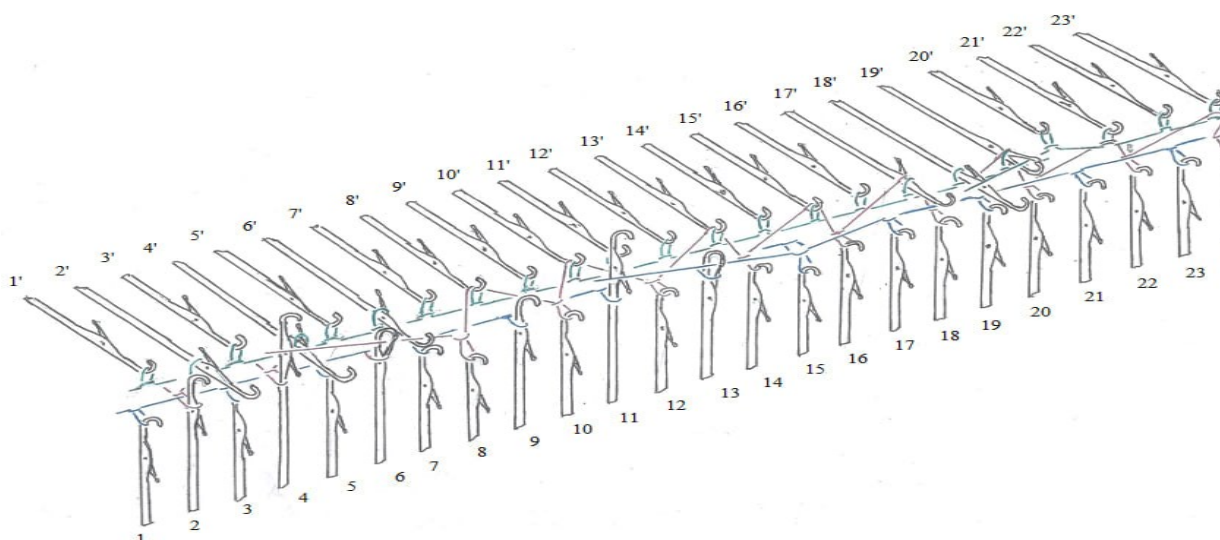
Иккинчи вариант намунасининг график ёзуви, тўқима тузилиши расм 3да, трикотаж машинасида ҳалқа қаторларини ҳосил қилиш жараёни расм 4 да келтирилди.



Расм 3. Икки қатламли 2-вариант трикотаж намунасининг график ёзуви ва тузилиши.

Расм 3,а да график ёзувнинг биринчи қатори олди игнадондаги 1,3, 5, 7, 9 чи игналар тўлиқ ҳалкалардан I, орқа игнадон 1¹, 3¹, 5¹, 7¹, 9¹ игналари ярим ҳалқалардан иборат бўлиб бир қатор пресс тўқимасини, иккинчи қатор олди игнадон 2, 4, 6, 8, 10 чи игналарида игна оралаб тўлиқмас гладь тўқимасини II ва учинчи қатор орқа игнадон игналарида гладь III тўқимасидан икки қатламли 2-вариант намунасини шаклантирган.

Янги икки қатламли трикотаж тўқимасининг тузилиши расм 3,б да келтирилган. Икки қаватли пресс 1тўқимаси, тўлиқмас гладь 2 тўқимаси ва гладь 3 тўқимасидан ташкил топган 2-вариант намунаси пресс ҳалқа ёйлари 4 ёрдамида бирлаштирилиб янги тузилишдаги икки қатламли трикотаж тўқимасини ҳосил қилган.



Расм 4. Икки қатламли 2-вариант намунасининг трикотаж машина тизимларида ҳалқа қаторларини ҳосил қилиш жараёни.

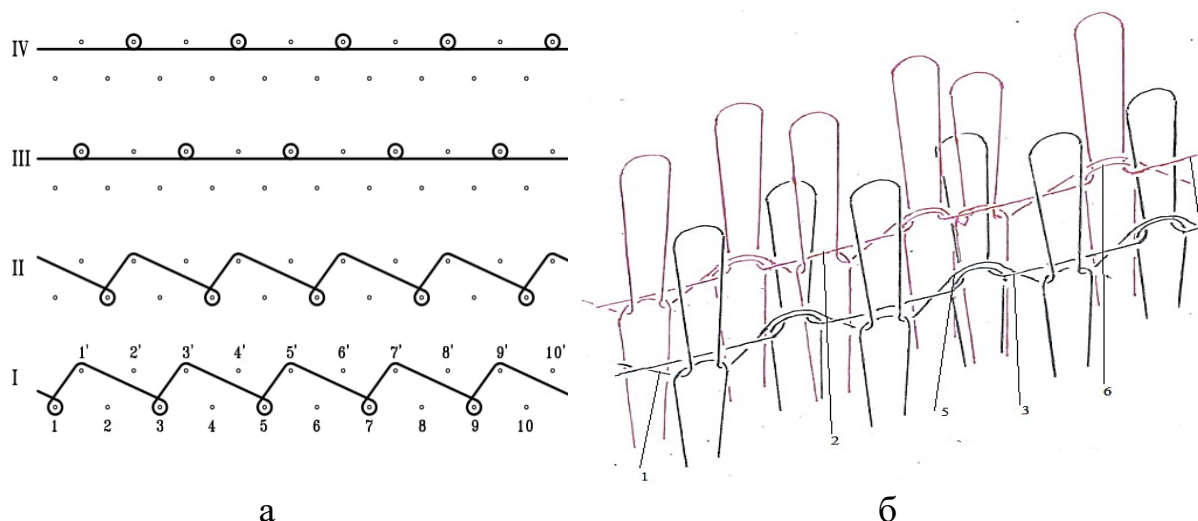
Ясси игнадонли трикотаж машинасида янги тузилишли икки қатламли 2-вариант намунасини ишлаб чиқариш жараёни кўрсатилган расм 4да, ҳалқа қаторларини ҳосил қилиш жараёни шундай программалаштирилганки, унда машина ҳалқа қаторларини ҳосил қилиш тизими чапдан ўнг томонга ҳаракати натижасида олди игнадон жуфт рақамли игналари 2,4,6,8 тўлиқ тугаллаш жараёнига кўтарилиши ва орқа игнадон игналари 2¹, 4¹, 6¹, 8¹ тўлиқмас тугаллаш жараёнига кўтарилиб ярим ёйларни ташкил этиб биринчи пресс қаторини тўқиш имкониятига эга. Машинанинг иккинчи тизимида олди игнадоннинг тоқ сонли 9, 11, 13, 15 чи игналар ҳалқа қаторларини игна оралаб ҳосил қилиши натижасида тўлиқмас гладь қатори тўқиш имкониятини беради.

Ясси игнадонли трикотаж машинасининг ҳалқа ҳосил қилиш иккинчи тизимида орқа игнадон барча игналарида гладь тўқима қатори тўқиб олинади. Шу тариқа 3 қаторли рапортга эга бўлган трикотаж тўқимасининг 2-варианти пресс ёйлари ёрдамида бирлаштириб янги тузилишли икки қатламли намунаси тўқиб олинади.

Иккинчи вариант намунасини ясси игнадонли трикотаж машинасининг имкониятларидан кенг фойдаланган ҳолда ишлаб чиқарилиши трикотаж тўқималари ассотиментини кенгайтиришга ва истеъмолчи талабларини қондиришга хизмат қилади.

Икки қатламли трикотаж тўқималарини хомашё сарфини камайтириш ва физик - механик хусусиятларини яхшилаш мақсадида янги тузилишли икки қатламли трикотаж тўқималарининг 3 вариант намунаси таклиф этилди.

Учунчи вариант намунасининг график ёзуви, тўқима тузилиши расм 4да келтирилди.



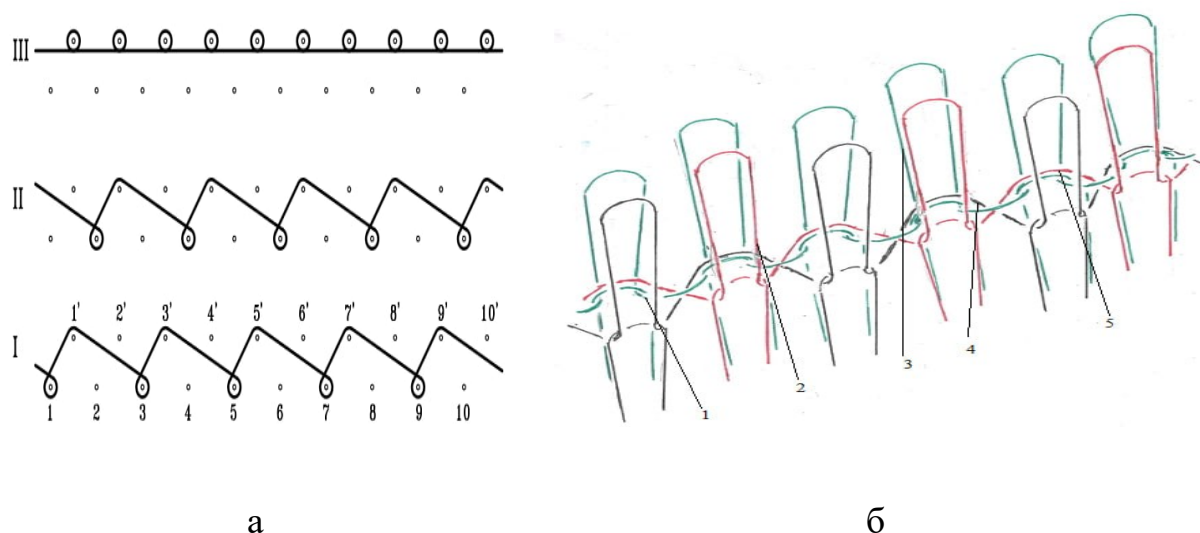
Расм 5. Икки қатламли 3-вариант трикотаж намунасининг график ёзуви ва тузилиши.

Расм 5,а да икки қатламли трикотаж тўқимаси икки алоҳида қатламдан ташкил топганлиги кўриниб турибди. Икки қатламли трикотаж тўқима раппорти икки қатор пресс ва икки қатор ҳосилали гладь тўқимасидан ташкил топган.

Икки қатламли трикотаж расм 5, б икки қаватли пресс ҳалқа қаторлари 1-2, бир қаватли ҳосилали гладь 3-4, пресс ва ҳосилали гладь қаторларини бирлаштирувчи ҳалқа ёйларидан 5-6 иборат.

Ясси игнаданли машинада икки қатламли трикотаж тўқима 3-вариант намунасини ишлаб чиқариш учун машина дастур буйича ишга тушади, унда биринчи қаторни тўқиш учун машинанинг ҳалқа ҳосил қилиш биринчи тизими чапдан ўнг томонга ҳаракати давомида олди игнадон 1, 3, 5, 7, 9 чи игналари тугаллаш жараёнига кўтарилиб тўлиқ ҳалқа қаторларини, орқа игнадон 1¹, 3¹, 5¹, 7¹, 9¹ чи игналари тўлиқмас тугаллаш жараёнига кўтарилиб пресс ҳалқа қаторлари тўқиб олинади. Иккинчи қаторда машинанинг иккинчи тизимида олди игнадон 2, 4, 6, 8, 10 чи игналар тўлиқ тугаллаш жараёнига кўтарилиб тўлиқ ҳалқа қаторларини, орқа игнадон 2¹, 4¹, 6¹, 8¹, 10¹ чи игналари тўлиқмас тугаллаш жараёнига кўтарилиб пресс ҳалқа қаторлари тўқиб олинади. Ҳалқа ҳосил қилиш биринчи тизимининг ўнгдан чапга қайтиши давомида орқа игнадон тоқ сонли игналарда игна оралаб гладь трикотаж қаторларини, иккинчи тизимида орқа игнадон жуфт сонли игналар тўлиқмас гладь ҳалқа қаторларини тўқилиши ҳисобига ҳосилали гладь қаторлари тўқиб олиш натижасида икки қатламли трикотаж тўқимаси пресс ҳалқа қаторлари билан бирлаштирилди расм 5,а.

ПАН ипларидан трикотаж технологиясида кенг фойдаланиш, икки қатламли трикотаж тўқималарини физик-механик ҳусусиятларини яхшилаш мақсадида янги тузилишли икки қатламли трикотаж тўқимасининг 4- вариант намунаси таклиф этилди.



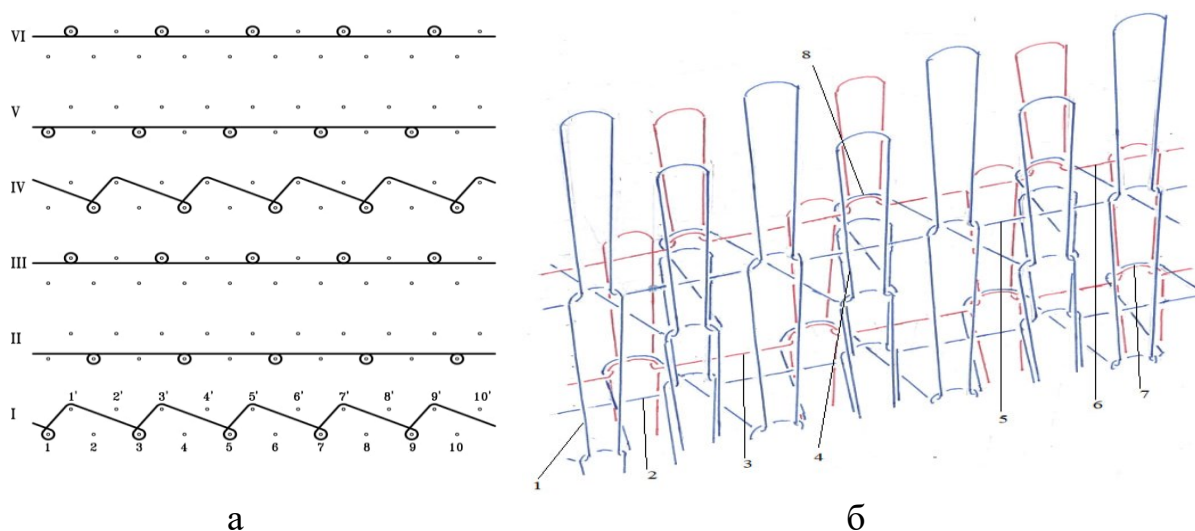
Расм 6. Икки қатламли 4-вариант трикотаж тўқима намунасининг график ёзуви ва тузилиши.

Расм 6,а график ёзувдан икки қатламли трикотаж тўқимаси икки алоҳида қатламдан ташкил топган. Икки қатламли трикотаж тўқима раппорти икки қатор пресс ва бир қатор гладь тўқимасидан ташкил топган.

Икки қатламли трикотаж тузилиши расм 6, б икки қаватли пресс ҳалқа қаторлари 1-2, бир қаватли гладь 3, пресс ва гладь қаторларини бирлаштирувчи ҳалқа ёйлари 4-5 иборат.

Ясси игнаданли машинада икки қатламли трикотаж тўқима 4-вариант намунасини ишлаб чиқариш учун машина шундай программалаштирилганки, унда биринчи қаторни тўқиш учун машинанинг ҳалқа ҳосил қилиш биринчи тизими чапдан ўнг томонга ҳаракати давомида олди игнадон тоқ сонли 1, 3, 5, 7, 9чи игналари тугаллаш жараёнига кўтарилиб тўлиқ ҳалқа қаторларини, орқа игнадон 1¹, 3¹, 5¹, 7¹, 9¹ игналари тўлиқмас тугаллаш жараёнига кўтарилиб пресс ҳалқа қаторлари тўқиб олинади. Иккинчи қаторда машинанинг иккинчи тизимида олди игнадон жуфт сонли игналар тўлиқ тугаллаш жараёнига кўтарилиб тўлиқ ҳалқа қаторларини, орқа игнадон жуфт сонли игналари тўлиқмас тугаллаш жараёнига кўтарилиб пресс ҳалқа қаторлари тўқиб олинади. Ҳалқа ҳосил қилиш тизимининг ўнгдан чапга қайтиши давомида орқа игнадон барча игналарида гладь қаторлари тўқиб олинади. 4-вариант намунаси пресс ҳалқа ёйлари 4,5 билан бирлаштирилиши ҳисобига икки қатламли трикотаж тўқимаси ишлаб чиқарилади расм 6,а,б.

Икки қатламли трикотаж тўқималарини шакл сақлаш хусусиятини ошириш мақсадида янги тузилишли икки қатламли трикотаж тўқималарининг 5-вариант намунаси таклиф этилди.



Расм 7. Икки қатламли 5-вариант трикотажа тўқима намунасининг график ёзуви ва тузилиши.

Расм 7,а да график ёзувда икки қатламли трикотаж тўқимаси икки алоҳида қатламдан ташкил топганлиги кўриниб турибди. Икки қатламли трикотаж тўқима раппорти биринчи қатор пресс I, иккинчи қатор тўлиқмас гладь олди игнадон игналарида II, учунчи қатор тўлиқмас гладь орқа игнадон игналарида III, тўртинчи қатор пресс IV, бешинчи қатор тўлиқмас гладь олди игнадон игналарида V, олтинчи қатор тўлиқмас гладь орқа игнадон игналарида VI шаклланган. Раппорт қаторларининг фарқи шахмат тариқасида игналарда ҳалқа қаторларини ташкил этган.

Икки қатламли трикотаж тузилиши расм 7, б икки қаватли пресс ҳалқа қаторлари 1-4, бир қаватли тўлиқмас гладь 2-3-5-6, пресс ва гладь қаторларини бирлаштирувчи ҳалқа ёйларида 7-8 иборат.

Ясси игнаданли машинада икки қатламли трикотаж тўқимасининг 5-вариант намунасини ишлаб чиқариш учун машина шундай программалаштирилганки, унда биринчи қаторни тўқиш учун машинанинг ҳалқа ҳосил қилиш биринчи тизими чапдан ўнг томонга ҳаракати давомида олди игнадон тоқ сонли 1, 3, 5, 7, 9 игналари тугаллаш жараёнига кўтарилиб тўлиқ ҳалқа қаторларини, орқа игнадон тоқ сонли 1¹, 3¹, 5¹, 7¹, 9¹ игналарида тўлиқмас тугаллаш жараёнига кўтарилиб пресс ҳалқа қаторри тўқиб олинади. Иккинчи қаторда машинанинг иккинчи тизимида олди игнадон жуфт сонли игналари тўлиқ тугаллаш жараёнига кўтарилиб тўлиқмас гладь ҳалқа қаторларини ҳосил қилади. Учунчи қаторда машинанинг биринчи ҳалқа ҳосил қилиш тизими ўнгдан чапга қайтиши давомида орқа игнадоннинг тоқ сонли игналарида тўлиқмас гладь қатори тўқиб олинади. 4-5-6 қаторлар ҳам худди шу тартибда ишлайди, фақат тўртинчи пресс ҳалқа қаторлари жуфт сонли игналарда, бешинчи тўлиқмас гладь қатори тоқ сонли ва олтинчи тўлиқмас гладь қатори орқа игнадон жуфт сонли игналарида тўқиб олиниши натижасида икки қатламли раппоти олти қаторни ташкил этган трикотаж тўқимасининг 5- намунаси ишлаб чиқилади расм 7а.

Ясси игнадонли “LONG-XING” LXA-252 русумли машинасининг технологик имкониятларини чуқур ўрганиш, машина имкониятини янада кенгайтириш натижасида икки қатламли трикотаж намуналарининг 5та намунасини ишлаб чиқариш имкониятига эришилди. Барча намуналар ПАН 31х2 текс ипидан ишлаб чиқарилди.

Ясси игнадонли машиналарда икки қатламли тўқима намуналарини ишлаб чиқариш трикотаж ассортиментларини кенгайтириш, сифат кўрсаткичларини ошириш, хомашё сарфини камайтириш, физик–механик хусусиятларини яхшилаш ва истеъмолчи талабларига жавоб беришига эришилади.

Таклиф этилган янги икки қатламли трикотаж тўқималар намуналари устки трикотаж маҳсулотларини ишлаб чиқаришга тавсия этилади.

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МЕРЫ СОЦИАЛЬНОЙ ПОДДЕРЖКИ НАСЕЛЕНИЯ В РЕСПУБЛИКЕ БАШКОРТОСТАН

Аннотация: Статья посвящена анализу системы социальной поддержки населения в Республике Башкортостан, уделяя особое внимание мерам, направленным на помощь различным категориям граждан. В тексте рассматриваются основные направления социальной политики региона, включая материальные выплаты, льготы и программы трудоустройства, а также деятельность Республиканского центра социальной поддержки населения. Описано финансовое обеспечение социальной помощи, направленной на поддержку старшего поколения и семей с детьми, отмечая рост числа получателей и объемов выплат в последние годы.

Ключевые слова: социальная поддержка, социальное обеспечение, меры социальной поддержки.

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SOCIAL SUPPORT MEASURES FOR THE POPULATION IN THE REPUBLIC OF BASHKORTOSTAN

Abstract: The article is devoted to the analysis of the system of social support for the population in the Republic of Bashkortostan, paying special attention to measures aimed at helping various categories of citizens. The text discusses the main directions of the social policy of the region, including material payments,

benefits and employment programs, as well as the activities of the Republican Center for Social Support of the Population. The financial provision of social assistance aimed at supporting the older generation and families with children is described, noting the increase in the number of recipients and the volume of payments in recent years.

Keywords: *social support, social security, social support measures.*

Республика Башкортостан активно развивает систему социальной поддержки своего населения, предоставляя широкий спектр мер и программ для тех, кто нуждается в помощи и поддержке. Ответственность за обеспечение благополучия граждан лежит как на государстве, так и на общественных организациях, которые работают совместно для создания более комфортной и безопасной жизни для всех жителей региона.

Вопрос социальной поддержки граждан является одной из ключевых тем в исследованиях, посвящённых социальному развитию Республики Башкортостан. Значительный вклад в изучение этой проблемы внесли такие учёные, как Гилязова Р.Р., Большакова Н.Л., Кадыров С.Х. и другие специалисты в области социальной политики [5]. В своих работах они анализируют различные аспекты социальной помощи, включая механизмы её реализации, эффективность государственных программ и влияние на уровень жизни населения [2]. Исследования показывают, что социальная поддержка играет важную роль в обеспечении стабильности и благополучия жителей региона [1]. Таким образом, изучение опыта и рекомендаций этих авторов помогает глубже понять особенности социальной политики в Башкортостане и выявить пути её совершенствования.

Среди основных мер социальной поддержки в Республике Башкортостан можно выделить выплаты по социальным программам, льготы и компенсации для различных категорий граждан, а также программы по трудоустройству и образованию. В данной статье мы рассмотрим ключевые аспекты социальной политики в регионе, оценим эффективность принимаемых мер и поговорим о перспективах дальнейшего развития системы социальной поддержки населения в Республике Башкортостан [3].

1. Деятельность государственного казенного учреждения Республиканский центр социальной поддержки населения.

Деятельность государственного казенного учреждения Республиканский Центр социальной поддержки населения в Республике Башкортостан нацелена на обеспечение социальной защиты населения в трудной жизненной или финансовой ситуации. Центр оказывает разнообразные виды поддержки гражданам, испытывающим затруднения, включая материальную помощь, медико-социальную поддержку, психологическую помощь, консультации по трудоустройству и другие виды социальных услуг. В своей работе Центр руководствуется законодательством и приоритетами региональной социальной политики.

Одним из основных направлений работы Республиканского Центра социальной поддержки населения является оказание адресной материальной помощи гражданам, находящимся в сложной жизненной ситуации. Помощь предоставляется как единовременно, так и в форме регулярных выплат по социальным программам. Центр также оказывает поддержку в организации лечебно-профилактических мероприятий, реабилитации и адаптации населения к новым условиям жизни.

В 2024 году на предоставление мер социальной поддержки выделено средств в объеме 25 200,8 млн. рублей, предоставлено – на сумму 24 794,8 млн. рублей порядка 1,1 млн. гражданам (с учетом членов семей) [3].

2. Меры социальной поддержки старшего поколения.

Меры социальной поддержки старшего поколения в Республике Башкортостан направлены на обеспечение достойной жизни пожилых людей и повышение их качества жизни. В рамках программ социальной помощи и поддержки существует ряд мер, ориентированных на старшее поколение.



Рисунок 1. Доля граждан пожилого возраста к общей численности населения, %

Согласно Рисунку 1, в 2020 году разница между процентами в Российской Федерации и Республике Башкортостан составляла 1,2%. В 2021 году разница увеличилась до 1,1%. В 2022 году разница сократилась до 1,1%, а в 2023 году достигла 0,2%, что говорит о том, что в республике уровень пожилого населения стал ближе к общероссийскому уровню. В 2024 году Республика Башкортостан все еще будет иметь долю пожилых людей ниже общероссийского показателя, но с несущественным отставанием.

Важную роль в повышении качества жизни играет социальная поддержка пожилых граждан, которую за счет средств республиканского бюджета получают 493,7 тыс. ветеранов.

В 2024 году на предоставление мер социальной поддержки старшему поколению из бюджета республики израсходовано порядка 4,4 млрд. рублей.

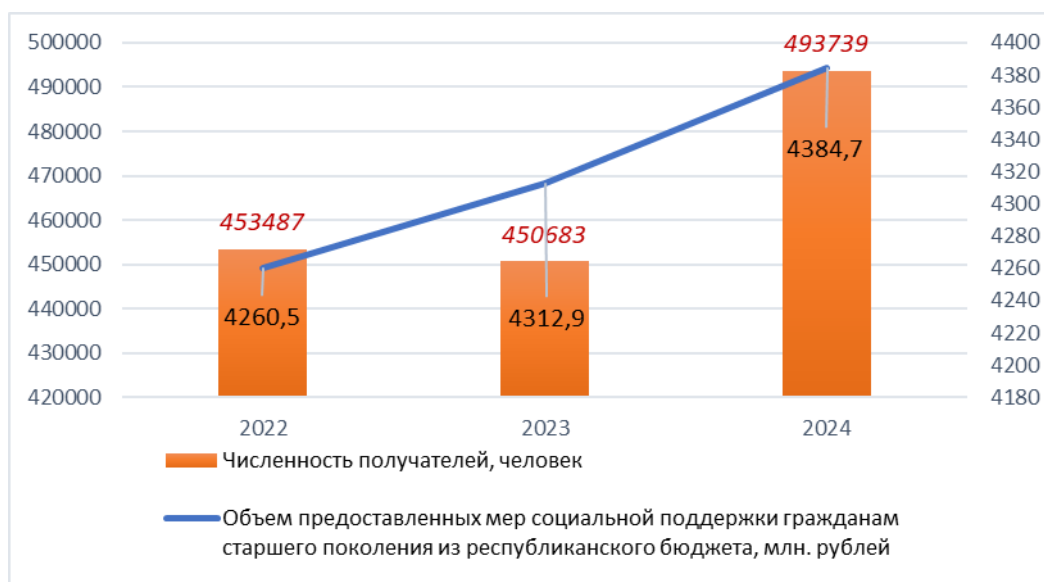


Рисунок 2 – Объем предоставленных гражданам старшего поколения мер социальной поддержки за счет республиканского бюджета и численность их получателей [4]

В целом, система социальной поддержки старшего поколения в Республике Башкортостан нацелена на создание условий для активной и здоровой старости, обеспечивая пожилым людям необходимую помощь, уход и внимание со стороны государства и общества.

3. Социальная поддержка играет ключевую роль в обеспечении благополучия граждан и стабильности общества в целом. Одним из важнейших направлений этой поддержки является финансирование различных программ социальной политики, которые направлены на улучшение качества жизни населения. В рамках социальной политики реализуются комплексные меры, включающие пенсионное обеспечение, которое гарантирует достойный уровень жизни пожилым людям, а также социальное обеспечение, направленное на поддержку уязвимых категорий граждан.

Важным аспектом анализа бюджетных расходов субъектов Российской Федерации является распределение средств на социальную политику. В данном контексте Республика Башкортостан занимает заметное место в структуре расходов, демонстрируя значительную долю инвестиций в социальные программы (см.рис.3)

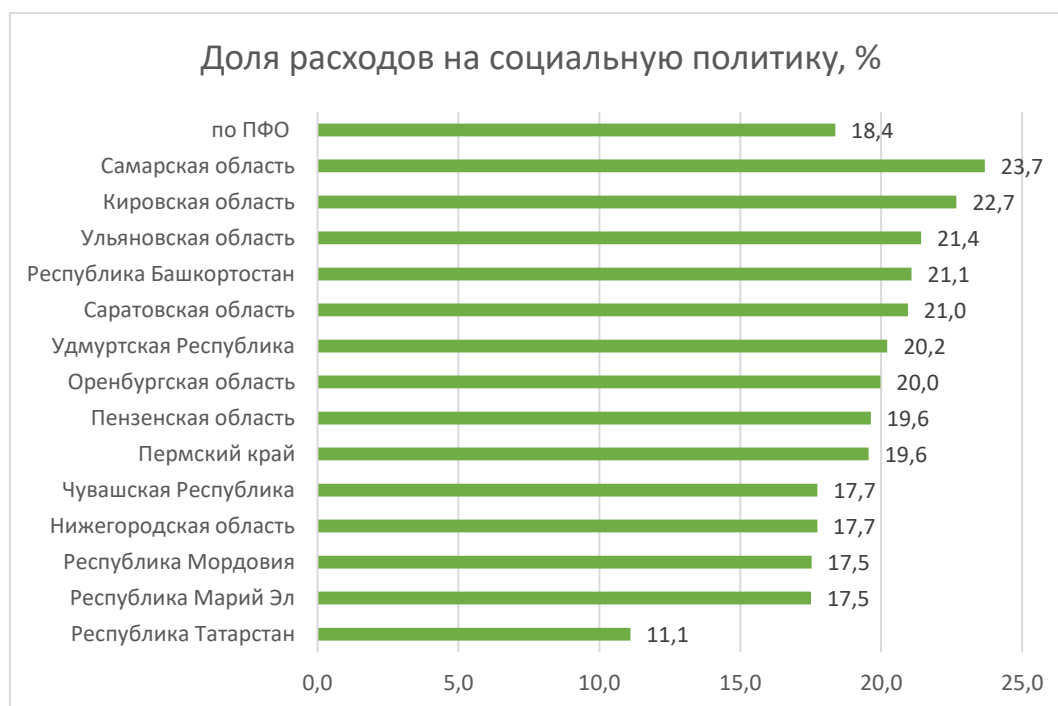


Рисунок 3 – Доля расходов на социальную политику в Республике Башкортостана и ПФО, % (составлено автором на основе)

Как видно из рисунка 3, Республика Башкортостан выделяет 21,1% своих расходов на социальную политику, что ставит её на одно из ведущих мест среди регионов Приволжского федерального округа. Это подчеркивает внимание властей региона к вопросам социальной поддержки и развития, что позволяет адресно реагировать на нужды населения.

Сравнение с другими регионами ПФО также позволяет сделать вывод о том, что Республика Башкортостан находится на уровне соседних субъектов, таких как Саратовская область и Ульяновская область, но при этом уступает по данному показателю более высокие значения, наблюдаемые в Самарской и Кировской областях.

Увеличение доли расходов на социальную политику может свидетельствовать о стремлении к улучшению жизненных условий граждан, развитию социального обеспечения, а также образованию и здравоохранению. Эти аспекты важны для поддержания устойчивого социального развития в регионе и повышения качества жизни его жителей.

Таким образом, меры социальной поддержки представляют собой широкий спектр действий, призванных обеспечить социальную защиту и улучшить качество жизни различных групп населения. Эффективная реализация этих мер способствует не только снижению уровня социального неравенства, но и укреплению социальной сплоченности и доверия в обществе.

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РЕЗУЛЬТАТИВНОСТЬ ФУНКЦИОНИРОВАНИЯ ТОРГОВЫХ ПЛОЩАДОК С ПОЗИЦИЙ КЛЮЧЕВЫХ СТЕЙКХОЛДЕРОВ

***Аннотация.** Электронная коммерция в последние годы быстро наращивает свою долю рынка, особенно в биржевой торговле, и в розничных продажах. Торговые платформы успешно конкурируют с традиционными офлайн и онлайн-магазинами. Лица, заинтересованные в их результатах, многообразны и многочисленны. В статье предпринята попытка установить все категории заинтересованных лиц (стейкхолдеров), и выявить особенности их экономических интересов, специфику восприятия развития торговых площадок.*

***Ключевые слова:** торговые платформы, ключевые стейкхолдеры, экономические интересы, результаты, оценка результативности.*

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PERFORMANCE OF TRADING PLATFORMS: VIEW OF KEY STAKEHOLDERS

***Abstract.** E-commerce has been rapidly increasing its market share in recent years, particularly in exchange trading and retail sales. Trading platforms successfully compete with traditional brick-and-mortar and online stores. The stakeholders involved in their development are diverse and numerous. This article attempts to identify all categories of stakeholders and identify the specifics of their economic interests and perceptions of trading platform development.*

***Keywords:** trading platforms, key stakeholders, economic interests, results, performance assessment.*

Торговые площадки в последнее десятилетие быстро и мощно развиваются как на национальном уровне, в пределах одной страны (в том числе в Китае), так и на интернациональном уровне. Их функционирование и развитие имеет важное значение для всех заинтересованных лиц (стейкхолдеров).

Ряд исследователей детально исследует роль каждой группы участников электронной торговли, в том числе на торговых платформах. Так, С.С. Фелеменюк, Л.Е. Воробьева исследуют «..проблемы, которые необходимо решать для привлечения новых участников и увеличения объемов сделок» на электронных торговых площадках [7]. Авторы утверждают: «..электронная торговля сама по себе имеет множество плюсов как для поставщиков, так и для потребителей. Современная электронная торговая площадка не только предоставляет своим клиентам возможность проводить различные виды электронных торгов (аукционы, тендеры, запросы цен и предложений), при условии оптимальных денежных и временных затрат, но и несет ряд важных дополнительных функций, направленных на информационную поддержку, как для заказчика, так и для поставщика». С.С. Фелеменюк, Л.Е. Воробьева рассматривают электронные торговые площадки «..как способ реализации электронной коммерции» – это спорное определение, на наш взгляд [7]. Кроме того, мы несогласны с формулировкой «оптимальных денежных и временных затрат». Но сам подход авторов считаем весьма перспективным, в том числе с точки зрения оценки результативности.

Н.В. Милова апробировала математическую модель целеполагания по ряду показателей организации с учетом мнения заинтересованных сторон. Исследование сводится к поиску устойчивых равновесных значений. Автор предлагает алгоритм определения параметров автономной системы дифференциальных уравнений по заданным целевым значениям показателя, требованиям заинтересованных сторон и времени, в течение которого достигается устойчивое равновесие [3].

Ю.М. Пантя, рассматривая цепочку «потребности-интересы-ценности» отмечает, что «..экономические интересы субъектов хозяйствования действуют не только в сфере производства и экономических отношений, но и в области социальной жизни» [4].

Т.И. Кузьмина, А.И. Духанин убеждены в том, что «..на торговых площадках эффективно организованная логистика и инфраструктура значительно упрощают управление для продавцов, покупателей, операторов. Правильно продуманная логистика и иные процессы, происходящие на внутренних платформах онлайн-продаж, во многом определяют их успех» [2]. S. Lin также по-своему исследовал проблемы эффективности управления логистикой в бизнес-процессах в сфере электронной коммерции [8].

А.А. Пылаев, В.Н. Гришин среди ключевых проблем выделяют: «координацию распределенных команд, техническую интеграцию систем, глобальный масштаб операций, взаимодействие с клиентами и партнерами».

Авторы предлагают инструменты и лучшие практики для повышения эффективности управления проектами в электронной коммерции» [5].

А.К. Табышова рассматривает проблемы оптимизации цен при разработке стратегии ценообразования товара на маркетплейсе, и обоснованно утверждает: «Маркетплейсы – один из самых популярных каналов онлайн-продаж и точка роста для многих предпринимателей. Подключиться к существующей торговой системе существенно проще, чем создать с нуля собственную и привлечь трафик. Правильно спланированная программа продвижения и позиционирования продукции продавца позволяет в короткий срок выйти на большие объемы продаж при минимальных расходах» [6].

Г.В. Астратова в этом контексте исследует специфику китайской экономики, изучает разнообразные аспекты менеджмента и маркетинга в Китае, и утверждает, что современная экономика Китая – феномен глобального масштаба. Г.В. Астратова выявила ряд особенностей национального менеджмента и предложила авторскую периодизацию развития эволюции концепции маркетинга в Китае. Автор сделал обоснованный вывод о том, что «..наиболее сильными инструментами маркетинга в Китае будут Интернет-технологии, урбанизация и акцент на отдельные возрастные сегменты рынка» [1].

Проведенный нами анализ позволил выявить ряд лиц, заинтересованных в функционировании и развитии торговых площадок e-коммерции.

В первую очередь, к ним следует отнести инвесторов, вложивших средства в платформы электронной коммерции, торговые площадки. Это также юридические лица – операторы виртуальных торговых площадок, где покупатели и продавцы совершают транзакции. Они предоставляют инструменты для размещения товаров, обработки заказов, оплаты, проверки безопасности и поддержки клиентов, в том числе занимаясь вопросами соблюдения нормативных требований и предотвращения мошенничества.

В числе ключевых стейкхолдеров следует выделить поставщиков, продавцов – это компании, частные лица, предлагающие товары или услуги через платформу электронной коммерции. Они предоставляют информацию о товарах, управляют запасами, выполняют заказы и обрабатывают возвраты.

Важно отметить, что их функционал может быть различным, в зависимости от модели работы с маркетплейсом. Возможны три основных типичных варианта:

1. FBO, когда товар хранится на складе маркетплейса, площадка занимается упаковкой и доставкой.

2. FBS, когда товар хранится на складе продавца, который сам упаковывает и передает заказы в службу доставки маркетплейса.

3. DBS, когда продавец сам отвечает за доставку, упаковку, логистику до клиента.

От выбора одной из трех моделей зависит распределение доходов и издержек по транзакции.

К числу ключевых стейкхолдеров, безусловно, следует отнести покупателей – это потребители, приобретающие на платформе товары, продукты и услуги. Они формируют спрос, и играют важную роль в осуществлении обратной связи.

Другая категория стейкхолдеров – поставщики услуг и логистических мощностей, осуществляющие физическую транспортировку, доставку товаров, обеспечивая выполнение заказов.

Важную роль в ряду стейкхолдеров играют платежные операторы и финансовые учреждения, обеспечивающие платежные транзакции между участниками е-коммерции, покупателями и продавцами.

Другая группа стейкхолдеров – поставщики технологий: компании, предоставляющие необходимую технологическую инфраструктуру и инструменты, включая хостинг, кибербезопасность, аналитику данных, автоматизацию, и т.п.

Важную регулирующую и контрольную функции выполняют стейкхолдеры – представители государства, в лице федеральных и региональных органов: налоговых, таможенных, антимонопольных, иных. Среди них особое значение имеют органы по обеспечению соответствия, контролирующие соблюдение законов о защите прав потребителей, конфиденциальности данных, налогообложения, регламентов трансграничной торговли.

Вместе эти заинтересованные стороны образуют сложную взаимосвязанную систему, с частично совпадающими и частично противоречащими экономическими интересами.

На следующем этапе нашего исследования мы планируем на примере кейсов китайских компаний электронной коммерции попытаться оценить количественное распределение доходов и затрат между стейкхолдерами, при выборе модели FBO, FBS, DBS, оказывающих влияние на роль селлеров и операторов торговых площадок.

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ПОТЕНЦИАЛ РАЗВИТИЯ БИЗНЕС-АНАЛИТИКИ В ЭЛЕКТРОННОЙ КОММЕРЦИИ

***Аннотация.** Электронная коммерция в XXI веке стремительно развивается, меняя свою структуру, формы, лидирующие площадки, технологии. Одновременно в экономике накапливаются масштабные конкретные данные, информация о поведении потребителей, их запросах, структуре товарного предложения со стороны продавцов, ассортименте и ценах, логистических системах, товарных запасах. Бухгалтерские и статистические базы данных, базы клиентов (CRM), иные, часто оказываются обособленными, они не консолидируются. В таких условиях существенно повышается практическое значение средств бизнес-аналитики, позволяющие структурировать и интегрировать информацию разных баз данных, используя специальные технологии, в том числе большие данные и искусственный интеллект. В статье рассматриваются направления и потенциал развития бизнес-аналитики в структуре электронной коммерции.*

***Ключевые слова:** электронная коммерция, бизнес-аналитика, инструменты, развитие, потенциал, маркетинг-плейсы.*

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THE DEVELOPMENT POTENTIAL OF BUSINESS ANALYTICS IN E-COMMERCE

***Abstract.** E-commerce is rapidly evolving in the 21st century, changing its structure, forms, leading platforms, and technologies. At the same time, the economy is accumulating large-scale, specific data, including information on consumer behavior, their demands, the structure of sellers' product offerings, product range and prices, logistics systems, and inventory. Accounting and*

statistical databases, customer relationship management (CRM), and other resources are often isolated and not consolidated. Under these conditions, the practical value of business analytics tools, which allow for the structuring and integration of information from various databases using specialized technologies, including big data and artificial intelligence, is significantly increased. This article examines the trends and potential for the development of business analytics in e-commerce.

Keywords: *e-commerce, business analytics, tools, development, potential, marketplaces.*

Электронная коммерция, в том числе трансграничная, интенсивно развивается. Многие авторы сосредоточили внимание на соответствующих тенденциях, факторах, и проблемах. Нам трудно согласиться с мнением С.Р. Семенова, А.И. Сатарбекова, А.С. Сатыбалдиева о том, что электронная торговля представляет собой «форму маркетинга» [3]. Но прикладные результаты их анализа деятельности крупных платформ е-коммерции безусловно заслуживают внимания.

Бизнес-аналитика (далее сокр. ВІ) в современной электронной коммерции (e-commerce) выполняет важные функции. Прежде всего это связано со сбором, обработкой и интерпретацией данных о взаимодействиях продавцов и покупателей с маркетплейсами (торговыми площадками, интернет-магазинами, и пр.), для обоснованного принятия управленческих решений и оптимизации распределения ресурсов. Ключевые функции ВІ включают отслеживание трафика, поведения клиентов, истории покупок, эффективности рекламы, показателей конверсии, отказа от покупок. Эти данные помогают повысить эффективность маркетинга, оптимизировать управление запасами, улучшить персонализацию, повысить эффективность ресурсов, прогнозировать спрос.

Л.С. Климченя, А.В. Запольский исследовали торговые площадки как «программно-аппаратный комплекс в информационной системе, с помощью которого происходит поддержание взаимных коммуникаций и заключение сделок купли-продажи товаров (работ, услуг) между организациями, а также предоставление сведений о товарах, услугах посредством Интернета. Процесс взаимодействия между участниками торговых площадок – это электронные торги. Заказчики получают возможность проводить электронные торги, оптимизируя затраты, а поставщики – участвовать в проводимых закупках, размещая информацию о предлагаемой продукции и услугах» [2].

С.В. Вандышева исследует значимость и проблемы развития мобильных приложений в электронной коммерции: «Развитие информационно-коммуникационных технологий и изменение потребительского поведения явились импульсами появления нового формата электронного бизнеса - электронной мобильной торговли. Увеличение числа пользователей мобильным интернетом и, как следствие, рост числе заказов товаров и услуг через интернет, побуждают компании переходить к

разработке собственных мобильных приложений. Формат электронной мобильной торговли позволяет формировать адресные предложения потребителям на основе аналитики их предпочтений и создавать возможности для максимально быстрого приобретения продукта компании» [1].

На основе этих работ обоснованно можно утверждать: формы и технологии электронной коммерции стремительно развиваются. Одновременно наблюдается стремительное развитие разнородных баз данных в этой сфере. Янцзе Линь, в числе других авторов, рассматривает проблемы интеграции больших данных и искусственного интеллекта (ИИ) в формировании современных маркетинговых стратегий электронной коммерции. Автор утверждает: «Конвергенция таких технологий позволяет компаниям глубже понимать поведение потребителей, прогнозировать будущие тенденции и предоставлять персонализированный опыт в широких масштабах. ИИ и большие данные преобразуют взаимодействие с клиентами, оптимизируют маркетинговые усилия и повышают рентабельность инвестиций (ROI) в секторе электронной коммерции [4].

Особую роль методы и инструменты бизнес-аналитики призваны сыграть в интеграции разнородных данных. Kiran Hiremath, Jyoti Ranjan Das, Mukesh Parashar утверждают: «Системы бизнес-аналитики (BI) позволяют организациям анализировать данные для принятия обоснованных решений, повышения эффективности, управляемости и производительности бизнеса. ..Существующие BI-системы имеют ряд недостатков, таких как слабая интеграция данных, отсутствие аналитики в реальном времени, ограниченный доступ пользователей, неспособность информационно поддерживать меняющуюся бизнес-среду. Преодоление этих проблем играет ключевую роль в улучшении бизнес-процессов и совершенствовании функций принятия решений. Авторы исследуют подход, основанный на модели IFP-EGRU, направленной на повышение точности прогнозирования временных рядов, особенно при прогнозировании продаж и принятии стратегических бизнес-решений. Набор данных включает временные ряды данных о продажах, активности клиентов, рыночных тенденциях, запасах, финансовых транзакциях и прогнозировании спроса. Предлагаемые усовершенствования повышают оперативность и эффективность BI-систем при обработке сложных бизнес-кейсов» [5].

Проведенный анализ показал, что потенциал развития бизнес-аналитики в сфере электронной коммерции значителен, особенно благодаря достижениям в обработке данных в режиме реального времени, сегментации клиентов, поведенческом анализе, предиктивной инструментари, интеграции искусственного интеллекта. Эти возможности позволяют компаниям предоставлять персонализированный клиентский опыт, прогнозировать рыночные тенденции, оптимизировать цепочки поставок, корректировать стратегии в соответствии с меняющимися параметрами рынка – по структуре и ценам. Интеграция данных электронной коммерции с базами клиентов (CRM), маркетинговыми платформами, социальными сетями

позволяет консолидировать данные (в форме полноценных информационных панелей), визуализируя результаты анализа, обеспечивая целостный мониторинг эффективности.

Бизнес-аналитика в электронной коммерции развивается в сторону предоставления детальной и практической информации, которая позволяет быстрее принимать решения (на основе интегрированных данных из разных источников), и способствует росту бизнеса. Потенциал ВІ заключается в более глубоких возможностях прогнозирования, реагирования в режиме реального времени, автоматизации на основе искусственного интеллекта, что обеспечивает конкурентное преимущество компаний на динамичном рынке.

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ОСОБЕННОСТИ ЦИФРОВОГО МАРКЕТИНГА С ПОЗИЦИЙ АДАПТАЦИИ БИЗНЕСА К УСЛОВИЯМ СРЕДЫ

***Аннотация.** Сложность и подвижность среды бизнеса в современных условиях возрастают, растет число внешних переменных, и скорость их изменения. Традиционные технологии маркетинга зачастую консервативны, как и значительная часть менеджеров, их применяющих, в то время как потребности адаптации компаний возрастают. В таких условиях на первый план выходит так называемый «цифровой» (англ. digital) маркетинг, технологии которого позволяют автоматизировать значительную часть работы маркетологов, направленную на повышение адаптивности компании в целом, и ее корпоративного «портфеля». В статье рассмотрены проблемы развития корпоративного цифрового маркетинга с позиций повышения степени адаптивности бизнеса.*

***Ключевые слова:** среда, маркетинг цифровой, технологии, инструменты, адаптация, адаптивность бизнеса, корпоративный портфель.*

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FEATURES OF DIGITAL MARKETING FROM THE POINT OF BUSINESS ADAPTATION TO ENVIRONMENTAL CONDITIONS

***Abstract.** The complexity and volatility of the business environment in today's world are increasing, as are the number of external variables and the speed of their change. Traditional marketing technologies are often conservative, as are many of the managers who employ them, while the need for companies to adapt is growing. In this environment, so-called "digital" marketing is becoming increasingly important. Its technologies enable the automation of a significant portion of*

marketers' work aimed at improving the adaptability of the company as a whole and its corporate portfolio. This article examines the challenges of developing corporate digital marketing from the perspective of increasing business adaptability.

Keywords: *environment, digital marketing, technologies, tools, adaptation, business adaptability, corporate portfolio.*

Маркетинг, исходя из его функций и возможностей, играет важную роль в обеспечении адаптивности компаний, позволяя им быстро и эффективно реагировать на меняющиеся рыночные условия, поведение потребителей и технологический прогресс. Адаптивный цифровой маркетинг в свою очередь нацелен на применение анализа данных в режиме реального времени, гибкие стратегии и понимание потребностей клиентов, помогая компаниям адаптировать свои подходы, гарантируя актуальность и конкурентоспособность.

В специальной литературе не утихает дискуссия о самостоятельности цифрового маркетинга, в том числе вопроса о том, как маркетинговые команды или компании могут действовать автономно, планируя, реализуя и оптимизируя свои цифровые кампании.

Независимость в цифровом маркетинге означает наличие контроля и возможности управлять маркетинговыми стратегиями, анализировать данные и корректировать кампании в режиме реального времени, используя внутренние ресурсы и цифровые инструменты. Подобная независимость позволяет быстрее принимать решения в соответствии с информацией об аудитории и бизнес-целями, обеспечивает лучший контроль и гибкость, позволяя командам быстро реагировать на изменения на основе данных и рыночной конъюнктуры.

Технологии, включая искусственный интеллект бизнес-аналитику, усиливают такую независимость, упрощая анализ данных, создание контента и персонализированный таргетинг (хотя человеческий контроль по-прежнему необходим для обеспечения стратегической координации и взаимодействия с клиентами).

Достижение такой независимости требует квалифицированных маркетологов, инвестиций в технологии и организационной поддержки. Некоторые компании сочетают автономию с аутсорсингом определенных функций для оптимизации эффективности.

Автономность данных, или возможность контролировать и анализировать данные клиентов независимо от сторонних платформ, является важным конкурентным преимуществом в условиях динамично развивающегося цифрового маркетинга.

В то же время на автономию цифрового маркетинга оказывают влияние правовые требования, касающиеся конфиденциальности данных, что требует от маркетологов соблюдения требований, сохраняя при этом операционную независимость.

Многие авторы сосредоточили внимание на соответствующих тенденциях, факторах, и проблемах. Так, Колосова Д.М., Кузьмин К.А., Лебедь В.Е. утверждают: «термин «цифровой маркетинг» объединяет способы, процессы и функции продвижения товара или услуги через использование электронных, Интернет и других цифровых каналов, необходимых для большего охвата потребителей» [2].

А.В. Трачук, Н.В. Линдер исследовали проблемы адаптации фирм к изменениям внешней среды, с позиций использования инструментов электронного бизнеса для сохранения компаниями стратегической устойчивости в условиях сокращающегося рынка. Авторы акцентируют «особенности построения бизнес-модели с использованием электронного бизнеса, возможности трансформации, направленной не только на повышение эффективности и конкурентоспособности, но и на создание новой ценности для потребителей, углубление кастомизации с помощью использования инструментов Big Data» [6].

Отдельные исследователи сосредоточили свое внимание на проблемах развития цифрового маркетинга. Так, А.В. Минаков, А.Е. Суглобов утверждают: «Цифровой маркетинг стал одной из основ современного продвижения товаров и услуг в сети Интернет, с учетом роста числа пользователей, замещения интернет-сервисами традиционных сервисов, роста объемов интернет-торговли. При этом важно, как именно компания обеспечивает себе конкурентные преимущества, используя возможности цифрового маркетинга» [3].

Е.В. Татаренко обосновал вывод о том, что «...в условиях динамично-развивающейся технологической среды онлайн- взаимодействие и продвижение становятся критически важными факторами для конкурентоспособности и устойчивого развития компаний. Автор особое внимание уделил выбору и применению цифровых инструментов, которые «способны значительно повысить эффективность маркетинговых стратегий. потенциальные вызовы и риски, с которыми может столкнуться маркетинг в условиях цифровой трансформации. Для обеспечения успеха и устойчивого развития компании должны уметь адаптироваться к быстро меняющимся условиям рынка» [5].

Е. М. Азарян, Д.Э. Возиянов изучали «рынок как форум», и предложили авторскую «модель формирования цифрового следа, его использования в маркетинговых целях». Авторы глубоко изучили проблемы, связанные с «...кооптированием компетенций клиентов как инструмента цифрового маркетинга и управления поведением потребителей, распространением коллективных знаний клиентов, определения векторов формирования алгоритмов персонализации клиентов и потребителей в цифровом маркетинге» [1].

Д.И. Мисник утверждает: «Благодаря децентрализованности поставщиков информации, свободе и скорости ее передачи, круглосуточном обновлении контента, цифровой маркетинг становится передовой

экономической структурой развитых стран мира». Соглашаясь по содержанию с таким утверждением, отметим, что термин «структура» в рассматриваемом контексте – не самый удачный [4].

Ключевые преимущества адаптивности, основанной на маркетинге, включают в себя повышение вовлеченности клиентов (благодаря персонализированным сообщениям), повышение окупаемости инвестиций за счет оптимизации расходов на высокоэффективные каналы, и получение конкурентного преимущества за счет быстрого использования рыночных сдвигов, новых тенденций. Развивая культуру, основанную на данных, и инвестируя в современные технологии, компании могут быстрее принимать обоснованные решения, при необходимости менять не только тактику, но и стратегии, сохранять устойчивость на динамичных рынках. Такая гибкость помогает компаниям опережать конкурентов, уверенно выходить на новые рынки, постоянно совершенствовать свое ценностное предложение для удовлетворения меняющихся потребностей клиентов.

Таким образом, проведенный анализ показывает: цифровой маркетинг имеет решающее значение для адаптивности бизнеса, поскольку он предоставляет инструменты, информацию и гибкость, необходимые для навигации и достижения успеха в быстро меняющихся условиях, обеспечивая постоянный рост и актуальность на рынке.

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СТРУКТУРНЫЕ ИЗМЕНЕНИЯ ОРГАНОВ ЭНДОКРИННОЙ И ИММУННОЙ СИСТЕМ ПРИ СИСТЕМНЫХ НАРУШЕНИЯХ: СРАВНИТЕЛЬНЫЙ МОРФОЛОГИЧЕСКИЙ АНАЛИЗ

Аннотация: Эндокринная и иммунная системы формируют единую регуляторную сеть, чувствительно реагирующую на патологические воздействия. На основе анализа литературных данных обобщены ключевые морфологические изменения щитовидной железы, тимуса, печени и кишечного иммунного аппарата при эндокринных, инфекционных и метаболических нарушениях. Показано, что дезорганизация структуры любого из этих органов приводит к межсистемным функциональным сбоям.

Ключевые слова: Эндокринная система; иммунная система; морфология; щитовидная железа; тимус; печень; GALT; системные нарушения.

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STRUCTURAL CHANGES IN THE ORGANS OF THE ENDOCRINE AND IMMUNE SYSTEMS UNDER SYSTEMIC DISORDERS: A COMPARATIVE MORPHOLOGICAL ANALYSIS

Annotation: *The endocrine and immune systems form an integrated regulatory network that responds sensitively to pathological influences. Based on a review of the literature, the key morphological changes in the thyroid gland, thymus, liver, and intestinal immune apparatus under endocrine, infectious, and metabolic disorders are summarized. It has been shown that structural disorganization of any of these organs leads to intersystem functional disturbances.*

Key words: *Endocrine system; immune system; morphology; thyroid gland; thymus; liver; GALT; systemic disorders.*

Актуальность. Эндокринная и иммунная системы взаимосвязаны, и их нарушения взаимно влияют друг на друга. Изучение морфологии щитовидной железы, тимуса, печени и кишечного иммунного аппарата позволяет выявлять ранние признаки патологии и понимать механизмы межсистемных дисфункций.

Цель исследования. Представить сравнительный анализ структурных изменений органов эндокринной и иммунной систем при системных нарушениях на основе современных гистологических данных.

Методы исследования. Работа выполнена методом аналитического обзора научной литературы. Используются сравнительный морфологический анализ, оценка клеточных и тканевых перестроек, а также сопоставление данных об иммунной и эндокринной регуляции при патологических состояниях.

Результаты исследования.

Щитовидная железа

Тиреоидные расстройства сопровождаются изменением формы и размеров фолликулов, нарушением высоты тиреоцитов, коллоидными сдвигами и лимфоидной инфильтрацией. Эти изменения ослабляют гормональное влияние на иммунные процессы.

Тимус

При метаболических нарушениях снижается выраженность кортико-медуллярной зоны, уменьшается количество Т-лимфобластов и нарушается гормональная функция тимуса, что ограничивает созревание Т-клеток и снижает адаптивный иммунитет.

Печень

Фиброз и цирроз приводят к перестройке дольковой архитектоники, накоплению соединительной ткани и снижению числа иммунокомпетентных клеток в синусоидах. Это нарушает иммунно-метаболическую регуляцию и усиливает системные дисфункции.

Кишечный иммунный аппарат

При инфекциях и эндокринных нарушениях наблюдаются изменения эпителиального барьера, структуры ворсин, лимфоидных образований и микроциркуляции. Это приводит к ослаблению GALT-системы и ухудшению иммунной защиты слизистой.

Межсистемные взаимосвязи

Анализ показал дезорганизацию тканей, снижение активности клеток, истощение лимфоидных реакций и нарушение гормонально-иммунной регуляции, приводящее к каскадным реакциям в других органах.

Вывод.

Системные патологические факторы вызывают схожие изменения в органах эндокринной и иммунной систем. Дезорганизация щитовидной железы, тимуса, печени и кишечного иммунного аппарата отражает их гормонально-иммунную связь и приводит к межсистемной дисфункции, требующей комплексного подхода.

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УСТАНОВКА АВТОБУСНЫХ ОСТАНОВОК НА ДОРОГАХ

***Аннотация:** Автобусная остановка по-прежнему остаётся местом частого посещения для большинства граждан. В статье представлены предложения, нормативные положения и рекомендации по разработке мероприятий для создания многофункциональной остановки, отвечающей современным требованиям.*

***Ключевые слова:** автобусная остановка, универсальный дизайн, общественный транспорт, автопавильон, маломобильное население.*

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PROJECT FOR INSTALLATION OF BUS STOPS

***Abstract:** The bus stop remains a frequently visited place for most citizens. The article presents proposals, regulatory provisions, and recommendations for developing measures to create a multifunctional stop that meets modern requirements.*

***Keywords:** bus stop, universal design, public transport, bus shelter, people with limited mobility.*

Определена роль автобусных сообщений в обеспечении населения транспортными связями и во взаимодействии общего транспорта с другими его видами. С учётом пассажиропотока на автобусных остановках необходимо рассматривать расположение остановочных пунктов вдоль дорог таким образом, чтобы не снижать транспортно-эксплуатационные показатели автобусов и автомобилей, а также безопасность дорожного движения. С учётом поэтапного развития дорожной сети даны рекомендации по размещению остановок на участках с минимальными параметрами плана и профиля, обеспечивающих видимость, а также по взаимному расположению остановочных пунктов для встречных направлений, на перекрёстках и других участках. Приведены необходимые элементы и параметры размещения автобусных остановок, их конструктивные решения, основные размеры и

линии, включая разметку, оснащение и внешнее оформление. Приведены также примеры решений автобусных остановок.

Как указано в Постановлении Президента Республики Узбекистан «О дополнительных мерах по дальнейшему развитию системы общественного транспорта города Ташкента» от 2 февраля 2022 года № ПК-111, общественный транспорт — это сфера услуг, которая делает далёкие расстояния ближе и напрямую влияет на настроение населения. Исходя из требований жителей, предусмотрено открытие новых маршрутов, пересмотр существующих, реконструкция автобусных остановок [1-2].

Земельные участки, на которых размещаются автобусные остановки, передаются предпринимателям во временное пользование на основании права аренды посредством электронных онлайн-аукционов. В результате того, что предприниматели во время деятельности используют часть территории остановок под размещение своих торговых точек, пассажиры вынуждены находиться вне навесов остановок, что создаёт неудобства в неблагоприятных погодных условиях. По результатам изучений выявлена необходимость установки на остановках банкоматов и электронных библиотек [3-4].

Автобусные остановки, в первую очередь, должны учитывать потребности пользователей — пассажиров (рис. 1. Предлагаемая остановка). Они должны размещаться в местах, где проходят наиболее удобные и кратчайшие пути движения пешеходов к автобусным маршрутам, рядом с важными объектами или достопримечательностями, в местах пересечения с другими маршрутами общественного транспорта, а также на соответствующем расстоянии до следующей остановки (обычно 400–500 м), в местах расположения посадочных площадок [5-6].

Планирование местоположения и типа остановки часто пересекается с другими проектами. Необходимо учитывать, что проекты городского масштаба и транспортные стратегии играют важную роль при планировании и могут влиять на сроки реализации проекта [7].

Новый дизайн предусматривает установку специальных пандусов для лиц с ограниченными возможностями, «тактильных» плит для обеспечения безопасности на границе проезжей части, а также наличие на остановках бесплатного интернет-доступа (4G Wi-Fi), электронного табло с расписанием и временем прибытия автобусов, камер видеонаблюдения, скамеек национального ремесленного или современного дизайна, урн для мусора, источников питания для зарядки мобильных устройств.

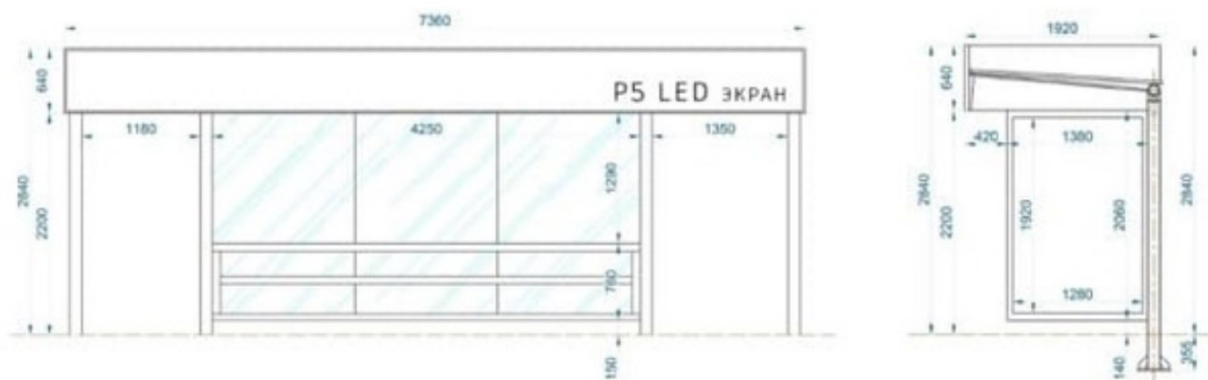


рис. 1. Предлагаемая остановка.

«Данные проекты остановок разработаны в согласовании с Министерством транспорта и Министерством строительства, и указано, что они подлежат утверждению городским хокимиятом.

В городе Ташкент имеется хороший опыт в организации остановок общественного транспорта: здесь была испытана первая «Умная остановка», на которой установлена интерактивная информационная панель, позволяющая пассажирам узнать не только местоположение автобуса, но и время его прибытия на остановку (рис. 2. Проект умной остановки). То есть пассажиры могут видеть время отправления и прибытия общественного транспорта.



рис. 2. Проект умной остановки.

Оснащение автобусных остановок камерами видеонаблюдения в новом дизайне не только предотвращает неприятные ситуации, но и позволяет контролировать движение автобусов, определять пассажиропоток и

оперативно анализировать полученную информацию, что обеспечивает качественное обслуживание пассажиров [8-9].

Рассмотрим страны, где на остановках установлены камеры: можно привести примеры России, Южной Кореи, США, Японии, Великобритании и других государств. Наличие камер открыто предотвращает нарушение правил и позволяет применять правильные и необходимые меры в различных неприятных ситуациях.

Время ожидания на автобусных остановках используется для получения различных услуг: например, торговых, финансовых, информационных и рекламных, связанных с основными транспортными услугами. Остановки общественного транспорта, являясь местами сбора и распределения пешеходов и пассажиров, превращаются в элемент социальной инфраструктуры, выполняющий не только коммерческие (торговля и услуги), но и социальные функции: образование (через социальную рекламу), личностное развитие (путём предоставления бесплатного доступа к Wi-Fi) [11].

В условиях города размещение автобусных остановок в наиболее удобном и современном виде является требованием сегодняшнего дня.

В заключение можно сказать, что наряду с ремонтом дорог и внедрением современных видов пассажирского транспорта, необходимо обновлять автобусные остановки и реконструировать устаревшие, поскольку основная часть населения пользуется именно автобусами и микроавтобусами для достижения своего пункта назначения.

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НЕКОТОРЫЕ АКТУАЛЬНЫЕ ПРОБЛЕМЫ ЗАГРЯЗНЕНИЯ АТМОСФЕРНОГО ВОЗДУХА ГОРОДОВ УЗБЕКИСТАНА

Аннотация. В статье рассматриваются некоторые актуальные вопросы загрязнения атмосферного воздуха городов Узбекистана. Дается краткий анализ причин длительного критического загрязнения атмосферного воздуха в городах Узбекистана. Особое внимание уделено вопросу загрязнения атмосферного воздуха в городе Ташкенте. Выявлены основные источники и оценён их вклад в загрязнении атмосферы городов. Для Ташкента определены меры по снижению загрязнения атмосферного воздуха.

Ключевые слова: загрязнение атмосферного воздуха, температурная инверсия, смог, частицы PM_{2.5}, заболеваемость, мониторинг, стратегия.

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SOME CURRENT ISSUES OF ATMOSPHERIC AIR POLLUTION IN UZBEKISTAN'S CITIES

Abstract. Abstract. The article discusses some topical issues of atmospheric air pollution in Uzbekistan's cities. It provides a brief analysis of the causes of prolonged critical atmospheric air pollution in Uzbekistan's cities. Particular attention is paid to the issue of atmospheric air pollution in the city of Tashkent. The main sources are identified and their contribution to urban air pollution is assessed. Measures to reduce atmospheric air pollution have been identified for Tashkent.

Key words: air pollution, temperature inversion, smog, PM_{2.5} particles, morbidity, monitoring, strategy.

В настоящее время загрязнение атмосферного воздуха городов является актуальной проблемой и для Республики Узбекистан экономика которой стремительно развивается.

Характерной особенностью территории Узбекистана является то, что она по метеорологическим параметрам предрасположена к повышенному уровню загрязнения атмосферы. Этому способствуют незначительное выпадение атмосферных осадков, что препятствует

процессу самоочищения атмосферного воздуха; плохая продуваемость большей части территории; большая повторяемость ясных дней с интенсивной солнечной радиацией, являющейся потенциальной причиной возникновения смогов.

Как известно, источники выбросов в атмосферу подразделяются на две группы: естественные и антропогенные.

Естественные, обусловлены природными процессами: пыльные бури, массивы зеленых насаждений в период цветения, степные и лесные пожары и др., В научной литературе утверждается, что уровень загрязнения атмосферы естественными источниками является фоновым и мало изменяется с течением времени. Но в Узбекистане в настоящее время участились пыльные бури, лесные пожары, засухи стали длительными. Исследование Всемирного банка показывает, что до 36% загрязнения воздуха частицами PM_{2,5} в Узбекистане связано с природной пылью, которая привносится ветрами из засушливых районов [3].

Антропогенные (техногенные), являются результатом деятельности человека. Они представляют главным образом выбросы промышленных предприятий и автотранспорта, отличаются многочисленностью и разнообразием видов.

Загрязнение атмосферного воздуха городов республики определяется поступлением вредных веществ, выбрасываемых промышленными предприятиями и передвижными источниками (ТЭС, отопление, автотранспорт, авиационный, железнодорожный транспорт, строительство и пр.). Наибольшее количество выбросов приходится на города Алмалык, Ташкент, Фергану, Ангрен, Навои, Ахангаран и Чирчик, поскольку большинство "грязных" производств расположено в сравнительно узких горных долинах и межгорных котловинах (Чирчикская, Ахангаранская, Ферганская и др.) с явно выраженной горно-долинной циркуляцией воздуха, где в течение суток и года происходит взаимообмен загрязнением между населенными пунктами [4]. Отмечается высокий уровень загрязнения и в городах Бухара, Самарканд, Карши, Термез.

Степень загрязненности атмосферного воздуха промышленно развитых городов республики можно отнести близкой к критической. Из-за явно проявляющихся последствий изменения климата, специфических природно-климатических условий и увеличения выбросов загрязняющих веществ в ряде крупных городов Узбекистана длительные смоговые ситуации становятся реальностью. Именно поэтому наиболее высокий уровень заболеваемости отмечается в гг.Ташкенте, Ангрене, Алмалыке, Чирчике, Навои, в ряде городов Ферганской долины.

За последние годы в Узбекистане усиление природных факторов загрязнения атмосферы совпало с ростом антропогенного влияния. Температура в Узбекистане повышается в среднем на 0,29 градуса каждые 10 лет. Узбекистан сегодня развивается высокими темпами. Среднегодовой рост ВВП составляет 6–7%. Только за 2024 год промышленность выросла почти

на 7%, строительный сектор — более чем на 14% [6].

Мониторинг состояния атмосферного воздуха осуществляется в 26 городах Узбекистана, на 66 стационарных станциях, 1 станции фоновом мониторинга (Чаткальский биосферный заповедник) и 2 автоматических станциях мониторинга, расположенных в Ташкенте. В середине 2023 г. было установлено 6 новых автоматических станций мониторинга качества воздуха, способных измерять содержание мелкодисперсных частиц PM_{2.5} и PM₁₀[2].

Ташкент-является крупнейшим городом Центральной Азии с населением более 3 миллионов жителей. В последние годы столица республики-Ташкент переживает масштабный процесс урбанизации. Вследствие данного необратимого процесса и по естественным причинам происходит усиление загрязнения атмосферного воздуха. Основные причины критического загрязнения атмосферного воздуха в Ташкенте — изменение климата, засуха, ускоренный рост экономики, расширение застройки без утвержденного Генплана, нарушение градостроительных норм, вырубки зелёных зон, увеличение выбросов от отопления (ТЭС, теплицы), транспорта и строительства.

Ташкент, в последнее время находится в группе лидеров-городов мира по уровню загрязнения атмосферы. Совместное влияние на качество воздуха природных и антропогенных факторов называют главными источниками образования мелкодисперсных частиц PM_{2,5} (диаметром до 2,5 микрометра) — наиболее опасного типа загрязнителей, влияющих на здоровье людей в Ташкенте.

В PM_{2,5} входят и пыль, и мелкие частицы продуктов сгорания, выбрасываемые в атмосферу, и они вредны именно из-за размера. Частицы крупнее — например, PM₁₀ — тоже могут вредить здоровью, но они оседают на поверхностях быстрее и в лёгкие проникают хуже. PM_{2,5} же ведут себя как вирусные частицы: они настолько малы, что легко проникают глубоко в дыхательную систему даже через маски и могут вызывать раздражение, аллергические реакции и усугублять хронические заболевания. Особенно чувствительно к ним реагируют люди с астмой, хроническими лёгочными заболеваниями, дети и пожилые [3].

После холодной зимы 2023 года часть социальных объектов в Ташкенте было переведено на мазут и уголь и до настоящего времени использовалось в больших количествах что стало одной из основных причин повышенного загрязнения атмосферного воздуха в 2024-2025 годы. Значимым фактором остаётся промышленный и строительный сектор, на которые приходится 6% и 7% загрязнения воздуха частицами PM_{2,5}. Выбросы промпредприятий в атмосферу в 2024 году составили 405,6 тысячи тонн. Среди причин — нехватка или отсутствие пылегазоочистного оборудования. В Ташкенте и Ташкентской области 750 предприятий не установили такое оборудование, у 94 компаний эффективность оборудования ниже 80%, 44 предприятия регулярно превышают нормативы выбросов. По последним данным, в городе и за её пределами насчитывается 6517 теплиц, из них

не работают 2925. Более 1800 теплиц работают без фильтров, только 100 — с фильтрами. 3592 теплицы отапливаются углём (некоторые используют раздробленные шины), 53 — газом[5].

Осенью 2025 года, после длительного смога в Ташкенте и Ташкентской области было принято постановление президента по переводу всех теплиц на газовое топливо.

В настоящее время ежедневно по городу передвигается около 1 миллиона транспортных средств: зарегистрировано 650–700 тысяч автомобилей, ещё 300–350 тысяч въезжают из регионов. Пять лет назад цифра была вдвое меньше: зарегистрировано около 300–350 тысяч машин, а из областей приезжало около 100 тысяч. По последним данным 40% машин в городе сейчас ездит на газе, 10% — электрические, Аи-80 используют менее 30%[5]. Регулярные пробки в городе существенно увеличивают концентрацию вредных веществ в воздухе. С 1 декабря 2025 года в республике прекращается использование бензина Аи-80.

В ноябре 2025 года мы были свидетелями длительного господства инверсии температуры и образования смога в Ташкенте и области, в других крупных городах республики. За последние десятилетия в Ташкенте наблюдаются изменение направления(роза ветров) и снижение скорости ветра(с 2м/с на 1.3 м/с), резкое уменьшение количества осадков что способствует увеличению дней с температурной инверсией и смогом.

Систематические гидрометеорологические наблюдения в Ташкенте ведутся с 1868 года. За более чем 170-летнюю историю наблюдений 2025-год стал самым засушливым после 1917 года[5].

Сложившаяся ситуация с загрязнением атмосферного воздуха городов Узбекистана и в частности города Ташкента формировалась в течении достаточно долгого времени и невозможно быстро оптимизировать положение. В настоящее время это серьезно беспокоит общественность. Необходимо принять своевременные и действенные меры по снижению загрязнения атмосферного воздуха в городе Ташкенте и в крупных городах Узбекистана в целях обеспечения нормальных, комфортных условий проживания населения. Для этого необходимо принять стратегию по уменьшению загрязнения атмосферного воздуха в городах, соблюдать требования моратория на стихийные строительство и рубку деревьев; полностью перевод всех объектов на газовое топливо, оптимизировать движение транспорта в городах, развивать общественный транспорт и др.

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ОСОБЕННОСТИ ТЕЧЕНИЯ ИНФАРКТА МИОКАРДА У ЖЕНЩИН

Аннотация: Данное исследование было направлено на оценку особенностей течения, клинических фенотипов, факторов диагностической задержки и динамики осложнений инфаркта миокарда (ИМ) на примере 32 пациенток женского пола. Полученные результаты показали, что ИМ у женщин часто характеризуется атипичными проявлениями, высокой диагностической задержкой и повышенной частотой постинфарктных осложнений.

Ключевые слова: инфаркт миокарда, женщины, атипичные проявления, поздняя диагностика, гормональные факторы, риск смерти

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SPECIFIC ASPECTS OF MYOCARDIAL INFARCTION PROGRESSION IN WOMEN

Abstract: This study was aimed at assessing the features of the course, clinical phenotypes, factors of diagnostic delay, and the dynamics of complications of myocardial infarction (MI) in the case of 32 female patients. The obtained results showed that MI in women is often characterized by atypical manifestations, a high diagnostic delay, and an increased frequency of post-infarction complications.

Keywords: myocardial infarction, women, atypical manifestations, late diagnosis, hormonal factors, risk of death

Введение. Некоторые современные эпидемиологические и клинические исследования показывают, что течение инфаркта миокарда (ИМ) у женщин в зависимости от многих факторов существенно отличается от мужского. Андерсон и соавторы (2022), анализируя распределение ИМ по полу, обнаружили, что несмотря на низкую частоту встречаемости ИМ у женщин, уровень смертности после госпитализации был значительно выше. Основной причиной этого является более высокая частота поздней диагностики, атипичных симптомов и сопутствующей патологии.

Shaw L.J. и др. (2020) отмечают, что ишемическая болезнь сердца у женщин чаще протекает с микроциркуляторной дисфункцией, а обструктивная болезнь эпикардиальных коронарных артерий встречается реже, чем у мужчин. Это приводит к легкому или неясному началу клинической картины ИМ.

Крупный метаанализ клинических фенотипов ИМ у женщин показал, что боль в грудной клетке является ведущим симптомом только в 45-55% случаев, в то время как у остальных пациентов преобладают такие атипичные симптомы, как боль в эпигастрии, нежные вегетативные симптомы, общая слабость, тошнота и одышка (Smilowitz et al., 2021). Эти атипичные симптомы приводят к задержке диагностики ИМ в среднем на 1,5-3 часа при отсутствии достаточной клинической бдительности со стороны врачей, что связано с ИМ.

Gulati M. (2021) описал ряд факторов риска, характерных для развития ИМ у женщин - менопауза, снижение уровня эстрогенов, микроангиопатии, аутоиммунные заболевания, психоэмоциональный стресс и инсулинорезистентность - на физиопатологической основе. Эти факторы способствуют развитию субклинической и неопределенной формы ИМ.

Многочисленными клиническими наблюдениями подтверждена высокая частота встречаемости не ST-элевационной формы ИМ (НСТЕМИ) у женщин. Рейнольдс и партнеры (2020) отмечают, что NSTEMI составляет 55-60% у женщин, что связано с гендерными различиями в их микроциркуляторной системе и функции эндотелия.

Также Vaccarino V. (2020) показал высокое влияние психосоматических факторов на ИМ у женщин, в частности, стресс-индуцированная дисфункция сердца (синдром Такоцубо) встречается в 9 раз чаще у женщин, чем у мужчин. Это приводит к клинической путанице в диагностике ИМ.

Согласно общему заключению вышеизложенной литературы, клиника ИМ у женщин характеризуется следующими аспектами:

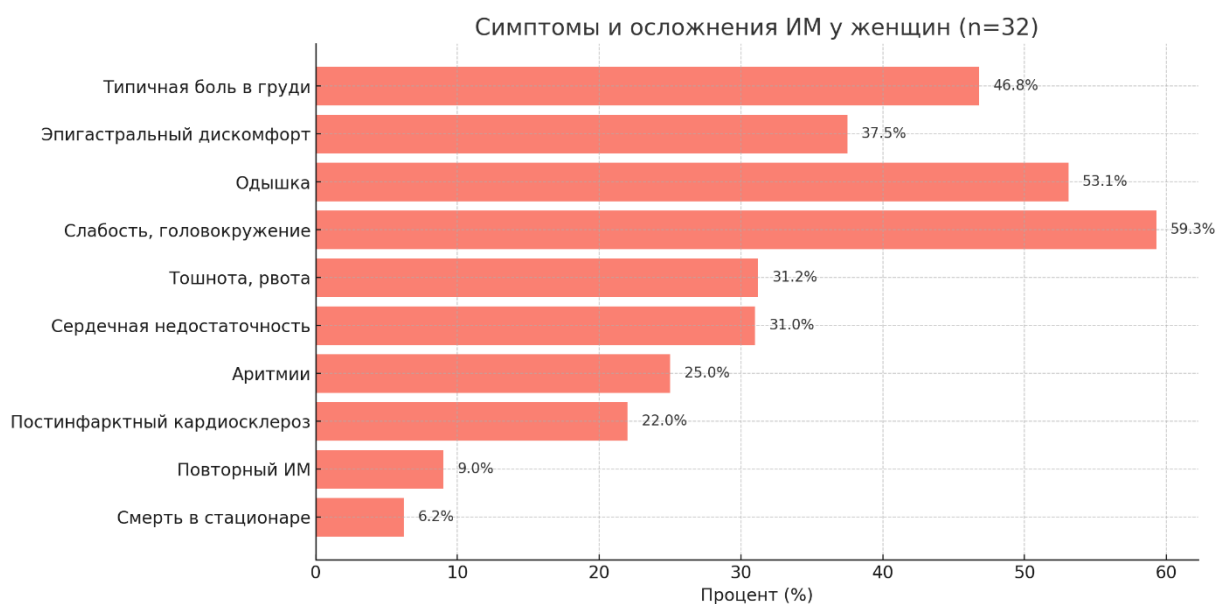
- Высокая доля атипичных симптомов - тошнота, боли в эпигастрии, одышка, слабость.
- Преобладание формы NSTEMI - характерно для недостаточности микроциркуляции.
- Диагностическая задержка - диагноз ставится в среднем на 2-4 часа позже.
- Высокая летальность связана с клинической задержкой и сопутствующими заболеваниями.
- Влияние постменопаузальных гормональных изменений - дефицит эстрогенов усугубляет эндотелиальную дисфункцию.

Приведенные научные источники подтверждают, что клиническое течение ИМ у женщин является многофакторным, сложным и специфичным, что требует высокой клинической бдительности в диагностике ИМ в этой группе.

Материалы и методы. Данное исследование проводилось ретроспективно-наблюдательным методом. В качестве участниц исследования были выбраны 32 пациентки в возрасте от 42 до 78 лет. Диагноз инфаркта миокарда (ИМ) ставился на основании диагностических критериев ESC (2022), с учетом клинических симптомов, изменений ЭКГ и динамики уровня тропонина I/T. В ходе исследования были проанализированы клинические симптомы пациентов, лабораторные показатели, уровень тропонина, типичные и атипичные изменения ЭКГ, результаты эхокардиоскопии, соотношение инфарктов с ST-элевацией (STEMI) и без ST-элевации (NSTEMI), тактика лечения и осложнения. В статистическом анализе качественные показатели выражались в процентах, а средние значения $\pm$ SD.

В исследовании приняли участие 32 женщины со средним возрастом $59,8 \pm 8,4$ лет, из них 68,7% находились в постменопаузальном периоде. Сердечно-сосудистые факторы риска: гипертония - 75%, дислипидемия - 53%, диабет 2 типа - 34%, ожирение (ИМТ >30) - 41%.

Симптомы ИМ были атипичными, только у 46,8% пациентов наблюдалась типичная боль в груди; эпигастральный дискомфорт - 37,5%, одышка - 53,1%, слабость и головокружение - 59,3%, тошнота и рвота - 31,2%. Атипичные симптомы привели к диагностической задержке (среднее время обращения 3,8 часа).



По типам инфарктов NSTEMI - 59,4%, STEMI - 40,6%. Средний уровень тропонина составил $3,1 \pm 1,4$ нг/мл. ST-элевация на ЭКГ - 40%, ST-депрессия и T-инверсия - 57%, нормальная ЭКГ - 9%. При эхокардиоскопии пациенты с пониженной ЭФ - 28%, регионарной гипокинезией - 63%, диастолической дисфункцией - 56%.

Лечение: тромболитическая терапия - 28%, PCI - 53%, консервативное лечение (NSTEMI) - 47%. Осложнения: сердечная недостаточность - 31%,

аритмии - 25%, постинфарктный кардиосклероз - 22%, повторный ИМ - 9%, госпитальная летальность - 6,2%.

Заключение. Результаты проведенного исследования на примере 32 пациенток показали, что инфаркт миокарда (ИМ) у женщин имеет специфические клинические особенности. У женщин ИМ часто проявляется атипичными симптомами, что приводит к диагностическим задержкам. Старческий возраст, менопауза и нейрогормональные нарушения вызывают нетрадиционное ощущение боли в сердце.

Анализ показал, что форма NSTEMI преобладает у женщин, что объясняется меньшим образованием полностью проводящего тромба в эпикардиальных сосудах, но высокой частотой микроциркуляторной дисфункции и спазма. Также позднее начало лечения снижает эффективность реканализации и увеличивает риск осложнений. Диастолическая дисфункция и HFrEF были определены как один из основных механизмов острой сердечной недостаточности, сопровождающейся ИМ у женщин.

Результаты исследования подчеркивают необходимость повышения комплексной клинической бдительности по поводу ИМ у женщин, раннего выявления атипичных симптомов и своевременного инвазивного лечения. Вместе с тем, глубокое знание клиническими специалистами особенностей симптомов ИМ у женщин способствует ранней диагностике и обеспечению эффективного лечения.

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О ПОЛНОТЕ СОБСТВЕННЫХ ФУНКЦИЙ НЕСИММЕТРИЧНОЙ ЗАДАЧИ ШТУРМА–ЛИУВИЛЛЯ

Аннотация. В статье изучаются две классические задачи Штурма–Лиувилля с различными краевыми условиями. Доказывается полнота систем собственных функций в пространстве $L_2(0, \pi)$. Приводятся собственные значения и соответствующие собственные функции, а также обсуждаются ортонормированность и полнота данных систем.

Ключевые слова. Штурм–Лиувиль, собственные функции, полнота системы, ортонормированность, спектральный анализ.

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ON THE COMPLETENESS OF EIGENFUNCTIONS OF AN ASYMMETRIC STURM–LIOUVILLE PROBLEM

Abstract. This article studies two classical Sturm–Liouville problems with different boundary conditions. The completeness of the systems of eigenfunctions in the space $L_2(0, \pi)$ is proved. The eigenvalues and corresponding eigenfunctions are presented, and the orthonormality and completeness of these systems are discussed.

Keywords: Sturm–Liouville, eigenfunctions, system completeness, orthonormality, spectral analysis

Введение. Задачи Штурма–Лиувилля занимают центральное место в теории дифференциальных уравнений с частными производными, спектральном анализе и математической физике. Собственные функции таких задач образуют ортонормированные системы, которые используются для разложения функций, решения краевых задач и построения математических моделей. Особый интерес представляет исследование полноты систем собственных функций в несимметричных вариантах задач Штурма–Лиувилля, где классические методы требуют уточнения. В данной статье, на основе представленного материала, рассматривается одна из таких задач, а также приводятся дополнительные литературные источники, расширяющие теоретическую основу.

Рассмотрим следующую задачу Штурма–Лиувилля:

$$\begin{cases} Y'' + \lambda Y = 0 \\ Y(0) = Y'(l) = 0 \end{cases} \quad (1)$$

Собственные функции задачи (1) имеют вид

$$Y_n(y) = \sqrt{\frac{2}{q}} \sin\left(\frac{(2n-1)\pi}{2q} y\right), \quad n = \overline{1, \infty} \quad (2)$$

Лемма. Система функций (2) ортонормирована и полна в L_2 .

Доказательство. Вычислением проверяем ортонормированность системы функций. При $n \neq m$:

$$\begin{aligned} \int_0^q Y_n(y) Y_m(y) dy &= \frac{2}{q} \int_0^q \sin\left(\frac{(2n-1)\pi}{2q} y\right) \sin\left(\frac{(2m-1)\pi}{2q} y\right) dy = \\ &= \frac{1}{q} \int_0^q \left(\cos\left(\frac{(n-m)\pi}{q} y\right) - \cos\left(\frac{(n+m-1)\pi}{q} y\right) \right) dy = \\ &= \frac{1}{q} \left(\frac{q}{(n-m)\pi} \sin\left(\frac{(n-m)\pi}{q} y\right) - \frac{q}{(n+m-1)\pi} \sin\left(\frac{(n+m-1)\pi}{q} y\right) \right) \Bigg|_0^q = 0, \end{aligned}$$

Для доказательства полноты воспользуемся следующей теоремой:

Теорема. Необходимым и достаточным условием полноты ортонормальной системы L_2 -функции $\{\varphi(x)\}$ во всем классе L_2 является выполнение соотношения [1]

$$\sum_{n=1}^{\infty} \int_a^b \left[\int_a^{\xi} \varphi_n(x) dx \right]^2 d\xi = \frac{1}{2} (b-a)^2.$$

Тогда необходимо доказать равенство

$$\sum_{n=1}^{\infty} \frac{2}{q} \int_0^q \left[\int_0^{\xi} \sin\left(\frac{(2n-1)\pi}{2q} y\right) dy \right]^2 d\xi = \frac{1}{2} (q-0),$$

сначала вычисляем этот интеграл

$$\sqrt{\frac{2}{q}} \int_0^{\xi} \sin\left(\frac{(2n-1)\pi}{2q} y\right) dy = -\sqrt{\frac{2}{q}} \frac{2q}{(2n-1)\pi} \left(\cos\left(\frac{(2n-1)\pi}{2q} \xi\right) - 1 \right),$$

находим квадрат полученного результата

$$\begin{aligned} &\left(-\sqrt{\frac{2}{q}} \frac{2q}{(2n-1)\pi} \left(\cos\left(\frac{(2n-1)\pi}{2q} \xi\right) - 1 \right) \right)^2 = \\ &= \frac{8q}{(2n-1)^2 \pi^2} \left(\cos^2\left(\frac{(2n-1)\pi}{2q} \xi\right) - 2 \cos\left(\frac{(2n-1)\pi}{2q} \xi\right) + 1 \right), \end{aligned}$$

теперь находим значение внешнего интеграла

$$\begin{aligned} & \frac{8q}{(2n-1)^2 \pi^2} \int_0^q \left(\cos^2 \left(\frac{(2n-1)\pi}{2q} \xi \right) - 2 \cos \left(\frac{(2n-1)\pi}{2q} \xi \right) + 1 \right) dy = \\ & = \frac{12q^2}{(2n-1)^2 \pi^2} - \frac{32q^2 (-1)^{n+1}}{(2n-1)^3 \pi^3}, \\ & \sum_{n=1}^{\infty} \left(\frac{12q^2}{(2n-1)^2 \pi^2} - \frac{32q^2 (-1)^{n+1}}{(2n-1)^3 \pi^3} \right) = \frac{12q^2}{\pi^2} \sum_{n=1}^{\infty} \frac{1}{(2n-1)^2} - \frac{32q^2}{\pi^3} \sum_{n=1}^{\infty} \frac{(-1)^{n+1}}{(2n-1)^3}, \\ & \text{Используя формулы} \quad \sum_{n=1}^{\infty} \frac{1}{(2n-1)^2} = \frac{\pi^2}{8}, \quad \sum_{n=1}^{\infty} \frac{(-1)^{n+1}}{(2n-1)^3} = \frac{\pi^3}{32} [6] \quad \text{и} \end{aligned}$$

стандартные преобразования, получаем требуемое равенство.

$$\sum_{n=1}^{\infty} \frac{2}{q} \int_0^q \left[\int_0^{\xi} \sin \left(\frac{(2n-1)\pi}{2q} y \right) dy \right]^2 d\xi = \frac{12q^2}{\pi^2} \cdot \frac{\pi^2}{8} - \frac{32q^2}{\pi^3} \cdot \frac{\pi^3}{32} = \frac{3q^2}{2} - \frac{2q^2}{2} = \frac{q^2}{2}$$

Следовательно, система собственных функций задачи (1) является полной.

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РОЛЬ ФУНКЦИОНАЛЬНЫХ ПРОДУКТОВ ПИТАНИЯ ПРИ ЗАБОЛЕВАНИЯХ РОТОВОЙ ПОЛОСТИ

***Аннотация:** Основопологающими пунктами стратегии HACCP являются ее ориентирование на обеспечение населения продуктами питания, способствующими профилактике алиментарно-зависимых заболеваний, увеличению продолжительности и повышению качества жизни населения. Данным требованиям отвечают продукты функционального, диетического профилактического и лечебного питания.*

***Ключевые слова:** международная система HACCP, кондитерские изделия, полость рта.*

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THE ROLE OF FUNCTIONAL FOOD PRODUCTS IN THE MANAGEMENT OF ORAL CAVITY DISEASES

***Abstract:** The fundamental points of the strategy are its focus on providing the population with food products that contribute to the prevention of nutrition-related diseases, increasing the duration and improving the quality of life of the population. Functional, dietary preventive and therapeutic nutrition products meet these requirements.*

***Key words:** international HACCP system, confectionery products, oral cavity.*

Актуальность темы: В настоящее время ключевым вопросом является производство здоровых и высококалорийных продуктов питания для населения. В этой связи важной задачей является наладка производства функциональных пищевых продуктов. Внедрение международной системы НАССР (анализ рисков и критические контрольные точки) в пищевую промышленность становится одной из главных задач.

В условиях Узбекистана, при производстве кондитерских изделий, используется разнообразное качественное сырье: мука, сахар, молоко, яйца, масла, какао-бобы, орехи и фрукты. Это позволяет создавать высококачественные, калорийные и легко усваиваемые сладости.

Все производимые кондитерские изделия классифицируются в соответствии с государственными стандартами на основе сырья, механизмов переработки и готовой продукции. Это включает шоколадные и какао-продукты, сахарные кондитерские изделия (конфеты, карамель, халва, драже и мармелад), а также мучные изделия (печенье, вафли, кексы и торты).

Сейчас существует более 3000 наименований кондитерских изделий, что позволяет удовлетворить любые потребности населения. Однако применение системы НАССР для снижения факторов, угрожающих здоровью полости рта и зубов в результате потребления сладостей, остается недостаточно изученным. Влияние национальных кондитерских изделий, таких как новвот, халва и пашмак, на здоровье полости рта также требует исследования.

Каждый вид продукта обладает уникальными свойствами, которые формируются в процессе технологической переработки сырья и его химического состава. Проблема, вызывающая наибольшее беспокойство у эпидемиологов и специалистов по пищевой гигиене, заключается в том, что скоропортящиеся кондитерские изделия подвержены высокой бактериальной загрязненности.

В условиях теплого климата потребление таких продуктов может привести к патологическим изменениям в полости рта и даже к пищевым отравлениям.

Цель работы: Изучение влияния функциональных пищевых продуктов на профилактику заболеваний полости рта и облегчение их течения, а также разработка и внедрение системы контроля критических точек для оценки факторов риска.

Объект и методы исследования: В качестве объекта исследования были выбраны четыре кондитерские фабрики в Самаркандской области. Для проведения гигиенических и бактериологических исследований использовались общепринятые методы.

Полученные результаты: Основные принципы использования международной системы НАССР включают рекомендации по технологическим процессам, описание продуктов и определение критических контрольных точек.

Результаты проведенных исследований показали, что санитарные требования, установленные в Узбекистане по стандарту СанПиН №0257-08 для производства хлеба и кондитерских изделий, не основаны на оценке и анализе рисков загрязнения продуктов. В связи с этим технологические рекомендации и нормы, принятые местными производителями, были внедрены без научного обоснования и часто в произвольной форме.

Лабораторные проверки и радиологические исследования по содержанию токсичных элементов в сырье и готовой продукции не показали значительных отличий от требований, установленных в СанПиН №0366-19 «Гигиенические нормы пищевой безопасности». Однако, по микробиологическим показателям, были выявлены заметные различия между нормами безопасности готовой продукции и установленными нормативами (см. таблицу 1).

Исследования также продемонстрировали, что после внедрения международной системы НАССР, уровень микробиологического загрязнения в сладких кондитерских изделиях, произведенных с использованием традиционной технологии, снизился с 5×10^3 КОЕ/г до $0,6 \times 10^3 \pm 0,02$, что соответствует нормам безопасности.

Таблица 1

Микробиологические показатели готовой продукции

Наименование продукта	Показатели	Допустимые показатели, мг / кг	Показатели исследования
Конфеты и сладости: шоколадные, молочные	Микробиологические показатели:		
	КМАФАнМ, КОЕ/г	5×10	5×10^4
	БГКП (колиформ) в 1,0г	Не разрешено	Не выявлено
	Патоген салмонелл 25 г	Не разрешено	Не выявлено
	Дрожжи, КОЕ/г,	10	14
	Грибы, КОЕ/г,	50	55
Халва:	КМАФАнМ, КОЕ/г	1×10	1×10^5
	БГКП (колиформы) в 0,01г	Не разрешено	Не выявлено
	Патоген салмонелл 25 г	Не разрешено	Не выявлено
	Дрожжи, КОЕ/г,	50	55
	Грибы, КОЕ/г,	50	50
Восточные сладости	КМАФАнМ, КОЕ/г	5×10	4 5×10
	БГКП (колиформ) 0,1г	Не разрешено	Не выявлено
	Патоген салмонелл 25 г	Не разрешено	Не выявлено
	Дрожжи, КОЕ/г,	50	60
	Грибы, КОЕ/г,	50	50
Нават	КМАФАнМ, КОЕ/г	Не норматируется	4

			5x10
	БГКП (колиформ) в 0,1г		Не выявлено
	Патогены и сальмонеллы		Не выявлено

Вывод: Можно заключить, что для обеспечения безопасности пищевых продуктов необходимо внедрение международной системы НАССР. Прежде всего, следует изучить динамику микрофлоры в процессе производства, определить этапы, на которых происходит снижение или увеличение численности микроорганизмов, а также выяснить, какие процессы способствуют их развитию или, наоборот, прекращают их жизнедеятельность. Правильная оценка этих процессов позволит предотвратить загрязнение продуктов патогенными бактериями и снизить риск возникновения заболеваний.

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ВЛИЯНИЕ ЗАМЕНИТЕЛЕЙ САХАРА НА ОБМЕН ВЕЩЕСТВ В КРОВИ

Аннотация: Избыточный вес и ожирение являются одними из самых серьёзных проблем среди населения развитых стран. Вопрос, связанный с заменителями сахара, имеет несколько подходов. Один из них — это химические аналоги, то есть искусственные вещества со сладким вкусом. Однако существует серьёзная проблема: организм человека не всегда способен адаптироваться к ним. Проведённые научные исследования показывают, что они могут быть вредны для здоровья.

Согласно данным Всемирной организации здравоохранения (ВОЗ), сахарный диабет 2-го типа — это метаболическое заболевание, которое возникает вследствие хронической гипергликемии, вызванной нарушением взаимодействия между инсулином и тканевыми клетками. Изменения в образе жизни и принципах питания способствуют росту числа заболеваний, таких как ожирение, метаболический синдром (МС), инфаркт миокарда, сахарный диабет (СД), а также увеличивают количество факторов, представляющих угрозу для жизни.

Показатели заболеваемости СД в 2014–2015 годах среди населения мира в возрасте от 18 лет и старше составляли 8,5–9%. В 2012 году в результате осложнений, вызванных сахарным диабетом, умерли 1,7 миллиона человек, а в 2017 году — уже 2,3 миллиона человек.

Ключевые слова: инфаркт миокарда, сахарный диабет, ожирение, метаболический синдром, гипергликемия, углеводный обмен, переедание.

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THE EFFECT OF SUGAR SUBSTITUTES ON METABOLISM IN THE BLOOD

Abstract: *Overweight and obesity are among the most serious problems among the population of developed countries. The issue related to sugar substitutes has several approaches. One of them is chemical analogues, that is, artificial substances with a sweet taste. However, there is a serious problem: the human body is not always able to adapt to them. Scientific studies have shown that they may be harmful to health.*

According to the World Health Organization (WHO), type 2 diabetes is a metabolic disease that arises as a result of chronic hyperglycemia caused by impaired interaction between insulin and tissue cells. Changes in lifestyle and dietary principles contribute to the increase in the number of diseases such as obesity, metabolic syndrome (MS), myocardial infarction, diabetes mellitus (DM), and also increase the number of life-threatening risk factors.

The incidence rates of diabetes mellitus in 2014–2015 among the global population aged 18 years and older were 8.5–9%. In 2012, 1.7 million people died due to complications caused by diabetes mellitus, and in 2017 — already 2.3 million people.

Key words: *myocardial infarction, diabetes mellitus, obesity, metabolic syndrome, hyperglycemia, carbohydrate metabolism, overeating.*

Актуальность темы: Как всем нам известно, в последние годы в Узбекистане проводятся масштабные работы по развитию сферы медицины и приведению медицинской системы в соответствие с требованиями международных стандартов, разрабатываются и реализуются конкретные меры. Известно, что суточная норма потребления сахара составляет 25–30 граммов. Превышение этой нормы приводит к ожирению и развитию опасных заболеваний. На самом деле, такие подсластители, как сахарин, аспартам, ацесульфам калия, сукралоза, неотам, адвантам, стевия и её производные, применяемые для придания сладкого вкуса пищевым продуктам и напиткам, сначала могут способствовать снижению массы тела, но этот процесс длится недолго. Наоборот, регулярное потребление таких продуктов со временем приводит к ожирению. В результате риск развития сахарного диабета 2-го типа у людей увеличивается до 34%. Следует также отметить, что у лиц, часто использующих сахарозаменители, вероятность развития сердечно-сосудистых заболеваний выше на 32% (инсульт - на 19%, гипертония - на 13%). Эти факторы способствуют увеличению риска смертельных исходов до 10%.

Цель работы: Снизить количество вредных веществ, оказывающих негативное влияние на человека, путем оценки влияния подсластителей и заменителей сахара, широко используемых в пищевой промышленности, на обмен углеводов и удовлетворения потребности населения в сахаре. Помимо

больных сахарным диабетом, привлечь к этим мероприятиям также и другие слои населения.

Полученные результаты: Результаты проведенных исследований, касающиеся влияния таких заменителей сахара, как фруктоза и стевия, на углеводный обмен, были использованы в качестве основной информации. Из полученных данных стало известно, что резкое повышение уровня глюкозы в организме человека наблюдается в результате длительного и постоянного введения фруктозы в кровь. На 30-й день эксперимента уровень глюкозы повысился на 59,8% по сравнению с исходным показателем, а на 60-й день — уже на 74,8% (см. таблицу 1).

Таблица 1

Влияние природных заменителей сахара на показатели углеводного обмена в крови ($M \pm m$)

ДНИ	ЗС	Глюкоза, ммоль/л	HbA1C, %	Инсулин, mU/l
Первоначальные дни	Фруктоза	$4,25 \pm 0,10$	$3,23 \pm 0,11$	$10,49 \pm 0,22$
30-й день эксперимента		$6,78 \pm 0,15^*$	$5,37 \pm 0,14^*$	$17,54 \pm 0,34^*$
60-й день эксперимента		$7,48 \pm 0,18^*$	$5,50 \pm 0,07^*$	$16,71 \pm 1,01^*$

Примечание: здесь и во всех таблицах: * — $P < 0,05$ по сравнению с исходным показателем;

В результате проведенных исследований также было установлено, что количество инсулина в организме на первоначальных, то есть на 30-й и 60-й дни эксперимента соответственно, увеличилось на 68,7% и 58,8%, тогда как уровень гликированного гемоглобина возрос на 67,0% — 69,8%.

При длительном и постоянном введении стевии в организм наблюдались изменения углеводного обмена в крови (см. таблицу 2).

Таблица 2

Влияние природных заменителей сахара на углеводный обмен в крови ($M \pm m$)

ДНИ	ЗС	Глюкоза, ммоль/л	HbA1C, %	Инсулин, mU/l
Первоначальные дни	Стевия	$4,57 \pm 0,12$	$3,65 \pm 0,08$	$12,42 \pm 0,46$
30-й день эксперимента		$6,37 \pm 0,13^*$	$5,374 \pm 0,13^*$	$18,54 \pm 0,45^*$
60-й день эксперимента		$7,60 \pm 0,22^*$	$6,00 \pm 0,08^*$	$14,48 \pm 0,46^*$

Примечание: здесь и во всех таблицах: * — $P < 0,05$ по сравнению с исходным уровнем;

На 30-й день эксперимента уровень глюкозы увеличился на 37,9% по сравнению с исходным показателем, а на 60-й день — на 68,1%; уровень инсулина повысился на 49,9% и 17,0%, соответственно; уровень гликированного гемоглобина возрос на 48,0% и 66,1%.

На 60-й день эксперимента введение фруктозы в организм показало, что количество глюкозы и гликогена в ткани печени почти в 2 раза уменьшилось по сравнению с первоначальным уровнем. При введении стевии изменений в количестве глюкозы и гликогена в печени по сравнению с исходными показателями практически не наблюдалось. Из этого ясно, что по результатам исследования фруктоза нарушает углеводный обмен в печени, снижая синтез гликогена. Основываясь на полученных данных, можно сделать вывод, что длительное и постоянное введение фруктозы и стевии в организм может способствовать развитию таких заболеваний, как гипергликемия и гиперинсулинемия.

Вывод: По результатам проведённого исследования установлено, что при постоянном введении в организм человека заменителей сахара (фруктозы и стевии) в допустимых суточных дозах происходит резкое повышение уровня глюкозы и гликированного гемоглобина в крови. Введение заменителей сахара и подсластителей в организм в разрешённых суточных дозах является целесообразным.

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РЕГРЕССИОННЫЙ АНАЛИЗ ВЛИЯНИЯ СОЦИАЛЬНО-ЭКОНОМИЧЕСКИХ ФАКТОРОВ НА КАЧЕСТВО ЖИЗНИ РЕГИОНОВ ЮФО

Аннотация: В статье представлены результаты моделирования зависимости качества жизни населения от комплекса социально-экономических факторов. На основе панельных данных по регионам Южного федерального округа за 2021–2024 гг. построена множественная регрессионная модель, обладающая высокой объясняющей способностью. Выявлены ключевые драйверы роста интегрального рейтинга качества жизни: плотность автодорог, охват дошкольным образованием, оборот розничной торговли и благоустройство жилья. Установлено, что инфраструктурные и социальные показатели оказывают более значимое статистическое влияние, чем номинальные доходы населения. Определены приоритетные направления региональной политики.

Ключевые слова: региональная экономика, качество жизни, регрессионный анализ, Южный федеральный округ, социально-экономическое развитие, инфраструктура, социальная политика.

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REGRESSION ANALYSIS OF THE INFLUENCE OF SOCIO-ECONOMIC FACTORS ON THE QUALITY OF LIFE IN THE REGIONS OF THE SOUTHERN FEDERAL DISTRICT

Abstract: The article presents the results of modeling the dependence of the population's quality of life on a complex of socio-economic factors. Based on panel data for the regions of the Southern Federal District for 2021–2024, a multiple regression model with high explanatory power was built. The key drivers of the integral quality of life rating growth were identified: road density, preschool education coverage, retail turnover, and housing amenities. It was established that infrastructure and social indicators have a more significant statistical influence than nominal household incomes. Priority areas for regional policy are defined.

Keywords: regional economy, quality of life, regression analysis, Southern Federal District, socio-economic development, infrastructure, social policy.

Введение. В современных условиях пространственного развития оценка качества жизни населения выступает ключевым индикатором эффективности регионального управления. Рейтинговые оценки (в частности, методика РИА Рейтинг) играют важную роль в бенчмаркинге субъектов РФ, предоставляя итоговую ранжировку территорий. Однако, предоставляя интегральную оценку, данные рейтинги часто оставляют открытым вопрос о детерминантах: какие именно фундаментальные факторы оказывают наибольшее статистическое влияние на формирование итогового благополучия. Понимание этих драйверов необходимо для перехода от простой констатации места региона в списке к управлению развитием. Целью данного исследования является построение регрессионной модели для количественного анализа влияния широкого спектра социально-экономических предикторов на интегральный показатель качества жизни (на примере регионов Южного федерального округа) и выявление приоритетных направлений региональной политики.

Материалы и методы Эмпирическую базу исследования составили панельные данные по 8 субъектам Южного федерального округа (ЮФО) за период 2021–2024 гг. Общий объем выборки составил 32 наблюдения, что является достаточным для проведения разведочного регрессионного анализа. В качестве зависимой переменной (Y) использован интегральный рейтинг социально-экономического положения (качества жизни) регионов, рассчитываемый агентством «РИА Рейтинг»⁶⁰. Значения рейтинга в исследуемой выборке варьируются в диапазоне от 32,5 до 76,1 балла, где более высокое значение соответствует лучшему положению региона.

В качестве независимых переменных (предикторов) был отобран массив из 22 показателей, охватывающих ключевые сферы жизнедеятельности (демография, экономика, инфраструктура, социальная сфера). Источником данных послужили официальные отчеты Росстата⁶¹. Полный перечень исследуемых факторов представлен в Таблице 1.

Группа факторов	Состав показателей (переменных)
Доходы и занятость	X ₁ – Среднедушевые доходы; X ₂ – Уровень бедности; X ₃ – Интегральный уровень безработицы.
Жилищные условия	X ₄ – Доля благоустроенного жилья; X ₅ – Обеспеченность жильем (кв. м/чел.).
Демография и безопасность	X ₆ – Смертность в ДТП; X ₇ – Миграционный прирост; X ₈ – Рождаемость; X ₁₃ – Общая смертность; X ₁₄ – Младенческая смертность.
Экология	X ₉ – Расходы на охрану среды; X ₁₀ – Качество воздуха (доля проб с превышениями) ⁴ .

⁶⁰ Рейтинг регионов по качеству жизни – 2024 [Электронный ресурс] - Режим доступа: URL: <https://riarating.ru/infografika/20250217/630276667.html>

⁶¹ Росстат [Электронный ресурс] - Режим доступа: URL: <https://bi.gks.ru/biportal/contourbi.jsp?allsol=1&solution=Dashboard&lang=ru>

Группа факторов	Состав показателей (переменных)
Наука и образование	X_{11} – Затраты на науку (% ВРП); X_{12} – Численность аспирантов; X_{16} – Охват дошкольным образованием.
Здравоохранение и инфраструктура	X_{17} – Число больничных коек; X_{18} – Инвестиции в основной капитал; X_{22} – Плотность автодорог с твердым покрытием.
Экономика	X_{19} – Оборот розничной торговли; X_{20} – Объем платных услуг; X_{21} – Доля МСП в ВРП; X_{15} – Затраты на цифровые технологии.

Таблица 1. Система независимых переменных (предикторов) регрессионной модели

Для обеспечения сопоставимости масштабов разнородных признаков (рубли, проценты, коэффициенты) перед моделированием была проведена процедура стандартизации данных: все переменные были приведены к нулевому среднему значению и единичному стандартному отклонению. Данный методологический подход позволяет нивелировать различия в единицах измерения и корректно сравнивать силу влияния («вес») различных факторов в итоговом уравнении регрессии. Кроме того, стандартизация частично смягчает проблему мультиколлинеарности, характерную для социально-экономических данных. Анализ проводился методом множественной линейной регрессии (МНК).

Результаты Построенная регрессионная модель продемонстрировала чрезвычайно высокую аппроксимирующую способность. Коэффициент детерминации (R^2) составил 0,999, а скорректированный R^2 – 0,997. Это свидетельствует о том, что выбранный набор из 22 факторов практически полностью (на 99%) объясняет вариацию интегрального рейтинга качества жизни в регионах ЮФО. Статистическая значимость модели в целом подтверждена высоким значением F-критерия ($p < 0,001$). Однако следует учитывать риск переобучения модели (overfitting), связанный с большим количеством предикторов относительно объема выборки. В связи с этим основной акцент в анализе был сделан на интерпретации только тех коэффициентов, которые продемонстрировали статистическую значимость на уровне $p < 0,05$.

Из 22 рассмотренных факторов значимое независимое влияние на интегральный рейтинг оказали шесть ключевых драйверов. Анализ стандартизированных коэффициентов (β) позволяет ранжировать их по силе воздействия и интерпретировать характер связи:

Плотность автодорог с твердым покрытием (X_{22}). Данный фактор оказался наиболее влиятельным позитивным предиктором ($\beta \approx +0,44$). Высокая плотность дорожной сети обеспечивает транспортную доступность населенных пунктов, связность территорий и мобильность населения. Это облегчает ведение бизнеса и доступ граждан к социальным услугам, что является фундаментом комфортной среды обитания.

Охват дошкольным образованием (X16). Второй по силе фактор ($\beta \approx +0,39$). Увеличение числа детей в дошкольных учреждениях положительно коррелирует с ростом качества жизни. Данный показатель выступает индикатором развитости социальной инфраструктуры и эффективности демографической политики поддержки семей, позволяя родителям совмещать воспитание детей с трудовой деятельностью.

Оборот розничной торговли (X19) и благоустройство жилья (X4). Оба фактора показали значимое положительное влияние ($\beta \approx +0,23$). Высокая потребительская активность (X19) отражает реальную платежеспособность населения и уровень развития потребительского рынка точнее, чем номинальные доходы. Коммунальная обеспеченность жилья (X4) – наличие водопровода, канализации, отопления – напрямую формирует базовый бытовой комфорт населения.

Уровень безработицы (X3). Выявлена значимая отрицательная связь ($\beta \approx -0,15$). Снижение интегрального показателя безработицы и неиспользованной рабочей силы на одно стандартное отклонение приводит к росту рейтинга на 0,15 ст. отклонения. Это подтверждает тезис о том, что возможность трудоустройства является базовым условием социального благополучия.

Младенческая смертность (X14). Фактор продемонстрировал устойчивую отрицательную связь ($\beta \approx -0,06$). Несмотря на небольшой по модулю коэффициент, его статистическая устойчивость высока. Снижение младенческой смертности служит интегральным маркером эффективности региональной системы здравоохранения и качества социальной среды.

Важно отметить результаты анализа факторов, не показавших статистической значимости. Вопреки ожиданиям, традиционные показатели материального благосостояния – среднедушевые доходы (X1) и уровень бедности (X2) – не продемонстрировали значимого независимого влияния в рамках данной модели. Это объясняется эффектом мультиколлинеарности: данные показатели тесно коррелируют с оборотом розничной торговли (X19) и уровнем занятости (X3). В процессе моделирования факторы реального потребительского поведения и занятости «перехватили» объясняющую силу номинальных доходов, оказавшись более точными предикторами качества жизни. Аналогично, влияние показателей абсолютного масштаба (инвестиции в цифру, экологию) оказалось вторичным по сравнению с инфраструктурными параметрами.

Заключение Проведенный регрессионный анализ позволил подтвердить гипотезу о том, что качество жизни является многомерной категорией, зависящей от комплекса инфраструктурных и социальных условий. Для регионов ЮФО драйверами роста интегрального рейтинга выступают не просто номинальные доходы, а конкретные параметры среды обитания, поддающиеся управленческому воздействию. Результаты моделирования показывают, что наиболее значимый вклад в повышение позиций региона вносят: развитие транспортной связности (дорожная сеть),

поддержка семей (доступность детских садов), модернизация жилищно-коммунального хозяйства и стимулирование потребительского рынка. Практическая значимость исследования заключается в определении приоритетов региональной политики. Для повышения социально-экономического благополучия органам власти следует сместить фокус с простого мониторинга номинальных показателей на реализацию инфраструктурных проектов и создание условий для эффективной занятости, так как именно эти факторы демонстрируют наиболее сильную связь с итоговым качеством жизни населения.

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РОЛЬ КАРТЫ РЕЛЬЕФНОЙ ПЛАСТИКИ В АНАЛИЗЕ СТРУКТУРЫ РЕЛЬЕФА

Аннотация. Статья рассматривает роль карты рельефной пластики в анализе структуры рельефа дельт рек, с акцентом на современную дельту Амударьи. Обсуждается учение о единстве лито-морфо-педогенетических процессов, разработанное В.М. Боровским, и его применение для изучения почвообразования, отложений и водного стока. Предлагается использование крупномасштабных топографических карт (1:25000) для создания карт рельефной пластики, что позволяет выявить древообразную структуру малых дельт и их влияние на гидроморфные почвы. Анализ показывает, как энергия рукавов дельты влияет на механический состав почв и глубину грунтовых вод.

Ключевые слова: рельефная пластика, лито-морфо-педогенез, дельта Амударьи, структура рельефа, почвообразование, поверхностный сток, гидроморфные почвы, топографические карты.

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THE ROLE OF THE RELIEF PLASTICITY MAP IN ANALYZING THE RELIEF STRUCTURE

Abstract: *The article examines the role of the relief plasticity map in analyzing the relief structure of river deltas, with a focus on the modern Amu Darya delta. It discusses the doctrine of the unity of litho-morpho-pedogenetic processes developed by V.M. Borovsky and its application to studying soil formation, sediments, and surface water runoff. The use of large-scale topographic maps (1:25000) is proposed for creating relief plasticity maps, which reveal the tree-like structure of small deltas and their impact on hydromorphic soils. The analysis shows how the energy of delta branches affects the mechanical composition of soils and the depth of groundwater.*

Keywords: *relief plasticity, litho-morpho-pedogenesis, Amu Darya delta, relief structure, soil formation, surface runoff, hydromorphic soils, topographic maps.*

Введение. Для всестороннего анализа любого объекта в первую очередь уделяется большое внимание истории его происхождения. Соответственно, изучение происхождения дельт и их специфических природно-географических закономерностей всегда привлекало ученых-натуралистов. В.М. Боровский на основе научных исследований, проведенных в дельте Сырдарьи в 1942-1945 годах, разработал учение о «единстве лито-морфопедогенетических процессов» в дельте. Это учение нашло отражение в монографии «Древняя дельта Сырдарьи и Северные Кызылкумы», написанной им в соавторстве с М.А. Погребинским в 1958 году. В научной литературе понятие лито-морфопедогенеза впервые было использовано в 1947 году [1]. Прежде чем рассуждать об этом учении, мы считаем целесообразным остановиться на специфических особенностях процесса почвообразования в дельте. Анализ закономерностей почвообразования в дельтах является чрезвычайно сложной задачей. Почвообразование в дельтах в первую очередь зависит от отложений, приносимых рекой, и их механического состава. Именно поэтому в почвах наблюдаются значительные литологические различия в вертикальном и горизонтальном направлениях. Кроме того, большинство почв в дельте являются гидроморфными, а некоторые из них имеют реликтовые гидроморфные свойства. Дальнейшее развитие образовавшихся почв связано с близко расположенными грунтовыми водами. В почвенных горизонтах преобладает вертикальный тип водо- и солевого обмена. Наличие большого количества солей в составе грунтовых вод, в свою очередь, напрямую влияет на водно-солевой режим почв. В почвенных горизонтах дельты очень трудно выделить генетические горизонты, выделенные В.В. Докучаевым [2].

Анализ литературы и методология. Исследователи при изучении специфических почв дельты основное внимание уделяли морфологическим признакам отдельных почв и факторам почвообразования. Процессы почвообразования в дельте подробно освещены в работах ученых [3, 4, 6].

Результаты исследований В.М. Боровского в дельте Сырдарьи нашли отражение в учении о единстве лито-морфопедогенетического процесса в дельте. Основная задача этих исследований — изучение динамики и структуры лито-морфопедогенетического процесса. Этот метод ранее не применялся в мелиоративном ландшафтоведении и был использован с точки зрения изучения природных систем. В условиях дельты река разделяется на множество рукавов, в результате чего происходит отложение илистых пород и их непрерывное поднятие. Образовавшиеся возвышенности берут на себя инициативу доминирования над окружающими территориями, то есть состояние окружающих низменностей напрямую зависит от возвышенностей вокруг русла. В результате образования естественных насыпей вокруг русла

формируются прирусловые возвышенности и межрусловые низины между ними. В годы с обильным водным стоком происходит подмыв прирусловых возвышенностей и разлив воды. В результате изменения поверхностных водных потоков происходит разделение отложений на разные группы, то есть пространственная стратификация аллювиальных отложений. Если на прирусловых возвышенностях накапливаются крупные пески и песчаники, то в межрусловых низинах накапливаются мелкие илистые отложения [7].

Методология исследования. Исследование проводилось на территории современной дельты Амударьи (Республика Каракалпакстан, Узбекистан). Основной объект изучения — структура рельефа и лито-морфогенетические процессы в аккумулятивных ландшафтах дельты.

Использованные материалы и источники:

1. Топографические карты масштаба 1:25 000 (всего 250 листов, из них 120 — правобережная часть, 130 — левобережная), изданные Государственным комитетом Республики Узбекистан по земельным ресурсам, геодезии, картографии и государственному кадастру в 1980–2010 гг. Высота сечения рельефа — 2,5 м.

2. Топографические карты масштаба 1:50 000 и 1:100 000 (для сравнительного анализа).

3. Аэрокосмические снимки среднего и высокого разрешения (Landsat-8, Sentinel-2, 2018–2024 гг.).

4. Полевые материалы автора и ранее опубликованные экспедиционные данные (1952–2022 гг.).

5. Архивные и современные данные о положении русел, паводковых разливах и глубине грунтовых вод.

6. Литературные источники по ландшафтоведению, почвоведению и геоморфологии дельт (список литературы в конце статьи).

Все картографические материалы обрабатывались в ГИС-пакетах QGIS 3.28 и ArcGIS Pro 3.2. Полученные карты и схемы использованы как для анализа, так и для иллюстрации выводов статьи.

Таким образом, методология исследования представляет собой комплексный картографо-геоморфологический подход с преобладанием метода рельефной пластики крупного масштаба, что позволило впервые детально раскрыть скрытую древообразную структуру рельефа современной дельты Амударьи и установить её прямую связь с процессами почвообразования.

Результаты и обсуждение. Разливы паводковых вод приводят к изменению направления многих рукавов дельты. В результате высыхания старых русел и образования новых ранее сформированные литолого-морфологические комплексы закапываются, то есть под новыми отложениями оказываются ранее образовавшиеся отложения. Все эти процессы усложняют изучение литоморфогенетических закономерностей в дельте. В дельтах в период близкого залегания грунтовых вод в основном развиваются гидроморфные почвы (луговые и болотные). Образование луговых почв тесно

связано с наличием паводков и близко расположенными пресными грунтовыми водами. Процессы образования луговых почв происходят на прирусловых возвышенностях. В образовании болотных почв основную роль играют паводки. Таким образом, в дельтах образование, развитие и пространственная стратификация почв происходит в связи с лито-морфопедогенетическим процессом. Именно поэтому этот процесс называется лито-морфопедогенезом. Иными словами, образование, развитие и пространственная стратификация почв в дельтах зависят от отложений, приносимых рукавами дельты, и их географического распределения в связи с рельефом. Учение о единстве лито-морфопедогенетического процесса в дельтах принадлежит академику В.М. Боровскому.

Развитие этого учения в природной географии связано с именем М.Ш. Ишанкулова. По мнению ученого, лито-морфопедогенетический процесс широко распространен в природе и характерен для всех аккумулятивных ландшафтов. При изучении единства лито-морфопедогенетического процесса в дельте на основе метода рельефной пластики мы уделили большое внимание природно-географическим факторам формирования ландшафта, в частности поверхностному водному стоку. Лито-морфопедогенетический процесс в дельте напрямую зависит от динамики поверхностного стока. Нам известно, что С.Д. Муравейский в своей теоретической статье 1948 года «Роль географических факторов в формировании географических комплексов» научно обосновал, что поверхностный водный сток играет такую же роль в формировании ландшафта, как климат и рельеф, то есть древообразная структура рельефа дельты, образованная в результате поверхностного водного стока, резко отличается от ландшафтов других типов. Кроме того, уделяя большое внимание поверхностному водному стоку, С.Д. Муравейский приходит к следующему выводу: «Без транспорта, без перемещения невозможно движение, невозможно взаимодействие, невозможно взаимовлияние. Эта важная роль транспорта, перемещение веществ на поверхности Земли в первую очередь и в основном ложится на процесс поверхностного водного стока» [5; с. 91-125.].

Если мы проанализируем, то здесь особое место занимает учение В.М. Боровского и М.А. Погребинского о «единстве лито-морфопедогенетического процесса». В этом учении особый акцент делается на формирование рельефа дельтовых геосистем, их литологического состава и педосистем в результате деятельности поверхностных водных потоков. Здесь также особое значение придается теории С.Д. Муравейского (1948) «Роль поверхностного водного стока в формировании ландшафтов». Метод «рельефной пластики», разработанный И.Н. Степановым (1984), всесторонне применяя теорию С.Д. Муравейского, служит всесторонней научной основой для анализа «структуры поверхностного водного стока» с помощью карты рельефной пластики. На последнем этапе — этапе рационального использования природных ресурсов малых дельт и коллекторных бассейнов на основе учения о структуре — занимает особое место. Иными словами,

учение В.М. Боровского занимает особое место в анализе истории происхождения дельтовых геосистем. Это, в свою очередь, требует указания роли метода рельефной пластики в решении этой проблемы.

Согласно мнениям В.М. Боровского и М.Ш. Ишанкулова, лито-морфопедогенетические процессы в дельтах Сырдарьи и Или зависят от энергии рукавов дельт и литологического состава приносимых ими отложений. Однако, на наш взгляд, все научные выводы, полученные в географических исследованиях, должны быть в форме карты. Учитывая это, мы считаем целесообразным применение метода рельефной пластики при изучении лито-морфопедогенетического процесса в дельтах. Иными словами, древообразная структура малых дельт, показанная на карте рельефной пластики, является результатом лито-морфопедогенетического процесса в дельте, и все эти объекты имеют ветвящуюся структуру, то есть ветвящаяся структура является результатом поверхностных водных потоков, формирующих систему. При изучении лито-морфопедогенетического процесса в дельте мы предлагаем использовать крупномасштабные карты рельефной пластики, составленные на основе топографических карт масштаба 1:25000. Анализ крупномасштабных карт рельефной пластики показывает, что общая форма дельты и структура составляющих ее малых дельт является древообразной, и эта структура напрямую зависит от отложений, приносимых рукавами дельты. Многолетние исследования А.К. Уразбаева (1979-2002) в современной дельте Амударьи свидетельствуют о том, что дельта, будучи целостной дельтой, состоит из 9 малых дельт, то есть сумма малых дельт образует целостную большую дельту.

Независимо от исследований В.М. Боровского в дельте Сырдарьи, ученые Института почвоведения Академии наук Республики Узбекистан в 1952-1954 годах под руководством Н.В. Богдановича впервые провели экспедиционные исследования для специального изучения почв современной дельты Амударьи. Результаты проведенных исследований нашли отражение в статье Н.В. Богдановича (1955) «Некоторые особенности почвообразования в дельте Амударьи». Н.В. Богданович на основе своих исследований разделил рельеф дельты на три группы: 1. Прирусловые возвышенности; 2. Склоны прирусловых возвышенностей; 3. Межрусловые низины. Выделенные три группы рельефа полностью соответствуют группам элементарных ландшафтов, выделенным Б.Б. Полюновым (1956) (элювиальные, транс-элювиальные, супераквальные). Н.В. Богданович также анализирует географическое распределение механического состава почв, относящихся к трем группам рельефа, которые он отметил во время исследований в современной дельте Амударьи. В анализе он учитывает верхний горизонт почвы 0-3 м: 1. В прирусловых отложениях в основном песок, частично песчаник. Эти отложения занимают 20% территории в современной дельте Амударьи; 2. На склонах прирусловых возвышенностей встречаются песчаники, песчаники и пески вместе, то есть они занимают 25% территории; 3. В межрусловых низинах преобладают суглинки и тяжелые песчаники. Эти

отложения занимают 55% территории. Известно, что поскольку лито-морфопедогенетический процесс в дельте напрямую связан с поверхностным водным стоком, роль структуры, образованной в результате активности стока, велика. Древообразная структура малых дельт, показанная на карте рельефной пластики, должна служить основой для изучения лито-морфопедогенетического процесса в дельте. Поскольку энергия рукавов дельты различна, все образовавшиеся малые дельты имеют древообразную структуру, но их площади различны.

В малых дельтах разной площади механический состав почв, площадь прирусловых возвышенностей и связь различных типов почв с разным механическим составом с структурой рельефа различны. Например, анализ самой большой по площади «Кизкеткен-Чимбой» и самой маленькой по площади «Шортамбой» малых дельт в современной дельте Амударьи показывает, что в дельте «Кизкеткен-Чимбой» прирусловые возвышенности занимают большую площадь, поэтому в этой малой дельте преобладают легкие отложения. В малой дельте «Шортамбой» же наоборот, преобладают тяжелые илистые отложения. Таким образом, в малых дельтах, образованных рукавами дельты с разной энергией, механический состав различен. Различие механического состава отражается в почвообразовании, то есть поскольку возвышенности и низины в каждой малой дельте не одинаковы, генетические типы почв и их площади также не одинаковы. В зависимости от энергии рукавов дельты, прирусловые возвышенности, образованные в результате отложения приносимых отложений, различны в разных малых дельтах. Например, в рассмотренной выше малой дельте «Кизкеткен-Чимбой» прирусловые возвышенности занимают большую площадь, в малой дельте «Шортамбой» прирусловые возвышенности занимают малую площадь. Таким образом, большое или малое количество прирусловых возвышенностей напрямую влияет на глубину грунтовых вод. Поэтому, поскольку глубина грунтовых вод различна, лито-морфопедогенетические процессы в вышеуказанных малых дельтах Кизкеткен-Чимбой и Шортамбой происходят по-разному. По этой причине в настоящее время в малой дельте Кизкеткен-Чимбой преобладают лугово-тапырские почвы, в малой дельте Шортамбой из-за близкого залегания грунтовых вод в основном встречаются луговые, в некоторых случаях болотные почвы.

В условиях дельты близкое или глубокое залегание грунтовых вод связано с прирусловыми возвышенностями и междурусловыми низинами и оказывает большое влияние на почвообразование. Таким образом, образование возвышенностей и низин в результате отложения отложений, приносимых рукавами дельты, влияет на глубину грунтовых вод, то есть грунтовые воды также играют большую роль в лито-морфопедогенетическом процессе в дельте. Иными словами, глубина грунтовых вод связана с рельефом и закономерно изменяется в древообразной структуре малых дельт в упорядоченном виде от верхней части дельты к нижней. Если взглянуть на историю образования рукавов дельты, образование старых русел напрямую

связано с энергией поверхностного водного стока, то есть это изменение рукавов дельты оказывает большое влияние на механический состав почв. Отложения в нижней части малой дельты Кизкеткен-Чимбой покрыты отложениями более молодой малой дельты Кохнадарья-Козакдарья, то есть отложения малой дельты Кизкеткен-Чимбой остались под отложениями малой дельты Кохнадарья-Козакдарья. Поэтому в смежных территориях этих двух малых дельт происходит очень сложный лито-морфо-педогенетический процесс.

Все вышеуказанные древообразные структуры малых дельт четко показаны на крупномасштабных картах рельефной пластики. Иными словами, чем четче показаны древообразные структуры малых дельт, тем точнее результаты лито-морфо-педогенетического процесса, происшедшего в этих малых дельтах, показаны на специальных тематических картах. Для анализа структуры рельефа малых дельт и коллекторных бассейнов в современной дельте Амударьи и их картографирования мы использовали крупномасштабные (1:25000) топографические карты и аэрокосмические снимки. Топографические карты составляются на основе обработки аэрофотоснимков, а также прямых наблюдений и измерений на местности. Кроме того, существующие крупномасштабные карты также составляются с помощью метода картографической генерализации (Гедымин и др., 1973). Полевые природно-географические, геологические, почвенные, ботанические и многие другие исследования природной среды, а также социально-географические исследования могут быть эффективными только при всестороннем использовании топографических карт. Кроме того, продуктивность научно-исследовательских работ также зависит от масштаба топографических карт. Топографические карты также служат путеводителем для исследуемой территории.

Следует особо отметить, что топографические карты служат основой для различных тематических карт, в том числе карты рельефной пластики. Одним словом, поскольку все природные и экономико-географические объекты всесторонне правильно показаны на топографических картах, все полевые исследования проводятся на основе топографических карт, то есть качество топографических карт правильно отражает экономику страны. Топографические карты предназначены для получения различных характеристик рельефа, и изображение рельефа на них должно быть полным, точным и измеримым, то есть рельеф ни на каких других картах не отражается так правильно, как на топографических картах. Этим требованиям соответствует изображение рельефа горизонталями. Для оценки структуры рельефа одной горизонтали недостаточно. Поэтому для описания структуры объекта необходима система дополнительных линий. Полнота системы контурных линий определяется высотой сечения рельефа. Выбор сечения зависит от масштаба карты, а также от структуры рельефа. В настоящее время горизонтали следует рассматривать не только как элемент основы, но и как неотъемлемый основной компонент карты рельефной пластики, то есть

горизонталей, описывающие вид поверхности Земли, необходимы для составления карты рельефной пластики, и без этих линий составление карты рельефной пластики вообще невозможно. При изучении отдельных территорий современной дельты Амударьи рассмотрим роль топографических карт и аэрокосмических снимков в зависимости от структуры рельефа. В таком случае основная часть дельты состоит из аккумулятивной равнины, то есть из малых дельт. Анализ аккумулятивных равнин на крупномасштабных топографических картах показывает, что в территориях с незаметными возвышенностями горизонталей встречаются редко. В таких случаях при анализе структуры рельефа аккумулятивных равнин также используются дополнительные горизонталей, то есть прерывистые линии. По мере перехода к анализу междуречных низин информационное содержание топографической карты еще больше увеличивается.

Здесь мы считаем необходимым особо отметить, что перед составлением карты рельефной пластики современной дельты Амударьи И.Н. Степанов предложил рисовать на топографических картах масштаба 1:50000. Однако при анализе топографических карт масштаба 1:50000 стало ясно, что горизонталей проведены через каждые 5 м, то есть для современной дельты Амударьи, состоящей из аккумулятивных пород, создание карты рельефной пластики на этих топографических картах вообще невозможно. Именно поэтому мы выбрали топографические карты масштаба 1:25000 для рисования карты рельефной пластики. Топографические карты масштаба 1:25000 соответствовали всем требованиям для составления карты рельефной пластики, то есть с помощью составления карты рельефной пластики на этих топографических картах мы впервые смогли показать реальную структуру рельефа современной дельты Амударьи. Кратко говоря, показ реальной структуры рельефа современной дельты Амударьи, которая до сих пор считалась абсолютно ровной, был осуществлен только с помощью карты рельефной пластики, то есть древообразная структура малых дельт может служить основой для изучения естественной формы рукавов в истории дельты. На среднемасштабных (1:100000) топографических картах невозможно изобразить все формы поверхности Земли, существующие в природе, поскольку высота сечения на этих картах составляет 20 м. В целом, чем ниже высота сечения, тем точнее изображается рельеф. В связи с этим для изучения и картографирования структуры поверхности Земли современной дельты Амударьи мы использовали крупномасштабные (1:25000) топографические карты, то есть общее количество этих топографических карт составляет 250 листов, из которых 120 относятся к правому берегу, 130 — к левому. Высота горизонталей на этих топографических картах составляет 2,5 м. Крупномасштабные топографические карты служат не только для познания мелких элементов рельефа, но и для изменения нашего общего представления о структуре рельефа объекта. На среднемасштабных топографических картах малые дельты показаны как абсолютно ровные, то есть рельеф вообще не

расчленен. Однако анализ крупномасштабных топографических карт показывает, что аккумулятивные равнины, считавшиеся ровными, в свою очередь состоят из древообразной структуры малых дельт. Одним словом, дельтовые геосистемы, состоящие из суммы древообразных структур малых дельт, в свою очередь очень сложны по строению, и использование крупномасштабных топографических карт не бесполезно для видения реальной структуры рельефа в них.

Заключение. Настоящая статья посвящена роли карты рельефной пластики в анализе структуры рельефа дельт, в частности современной дельты Амударьи. Установлено, что лито-морфо-педогенетический процесс в дельтах напрямую зависит от энергии рукавов, литологического состава отложений и поверхностного водного стока. Крупномасштабные карты рельефной пластики (на основе топографических карт 1:25000) позволяют раскрыть древообразную структуру малых дельт, что является ключом к пониманию эволюции почв и рельефа. Это способствует рациональному использованию природных ресурсов дельт и коллекторных бассейнов. Рекомендуется дальнейшее применение метода рельефной пластики для детального картографирования и анализа аккумулятивных ландшафтов.

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ОСОБЕННОСТИ КЛИНИЧЕСКИХ ПРОЯВЛЕНИЙ ЮВЕНИЛЬНОГО ИДИОПАТИЧЕСКОГО АРТРИТА У ДЕТЕЙ В БУХАРСКОЙ ОБЛАСТИ

***Аннотация:** В статье описаны клинические особенности ювенильного идиопатического артрита у детей, проживающих в Бухарской области. Клинические особенности болезни, результаты лабораторного анализа имеют важное значение при постановке диагноза и при выборе эффективного метода лечения. Эффективный метод лечения характеризуется более быстрым наступлением ремиссии, продлением ее продолжительности и уменьшением побочных эффектов медикаментозного лечения.*

***Ключевые слова:** дети, ювенильный артрит, сустав, диагностика.*

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FEATURES OF CLINICAL MANIFESTATIONS OF JUVENILE IDIOPATHIC ARTHRITIS IN CHILDREN IN THE BUKHARA REGION

***Abstract:** The article describes the clinical features of juvenile idiopathic arthritis in children living in the Bukhara region. The clinical features of the disease and the results of laboratory analysis are important when making a diagnosis and choosing an effective treatment method. An effective treatment method is characterized by a faster onset of remission, prolongation of its duration and reduction of side effects of drug treatment.*

***Key words:** children, juvenile arthritis, joint, diagnosis.*

Введение. Ювенильный идиопатический артрит — артрит неустановленной природы длительностью более 6 недель, развивающийся у детей не старше 16 лет при исключении другой патологии суставов. Заболеваемость ювенильным идиопатическим артритом составляет от 2 до 16 на 100 тыс. детского населения до 16 лет. Распространенность ювенильного идиопатического артрита в разных странах колеблется от 0,05 до 0,6%. Чаще болеют девочки. [1]. Ювенильный идиопатический артрит вызывает

деструктивно воспалительное заболевание суставов с неизвестной этиологией, сложным иммуноагрессивным патогенезом, характеризующееся симметричным хроническим артритом, системным поражением внутренних органов, приводящая к инвалидизации больных детей. Патогенетически в результате презентации чужеродного антигена Т-лимфоцитам происходит их активация и пролиферация с выработкой провоспалительных цитокинов – интерлейкинов-1, 6, 8, 17, фактора некроза опухоли альфа и др. Существует множество факторов, запускающих механизм развития болезни. Наиболее частыми являются вирусная или смешанная бактериально-вирусная инфекция, травма суставов, чрезмерная инсоляция или переохлаждение, профилактические прививки, проведенные на фоне или сразу после перенесенной острой респираторной инфекции (ОРИ) вирусной или бактериальной природы. ЮИА – гетерогенное заболевание, клинические проявления которого зависят от пола, возраста начала заболевания, наличия маркеров наследственной предрасположенности [2]. Ведущий синдром ЮИА – суставной. Для данного заболевания характерны типичные признаки воспаления: отечность (припухлость), гиперемия, локальное повышение температуры, боль, нарушение функции (ограничение подвижности в суставе). Отечность или сочетание боли и ограничения подвижности являются признаками активного процесса. Могут поражаться все суставы, имеющие синовиальную оболочку [2]. К внесуставным проявлениям ЮИА относится поражение глаз в виде переднего увеита (ирит, передний циклит, иридо циклит). Увеит, как правило, характеризуется бессимптомным подострым или хроническим течением и диагностируется при значительном снижении зрения, формировании катаракты, слепоты. При остром начале увеит сопровождается выраженным покраснением глаз, светобоязнью, отеком, болью в глазу, слезотечением, изменением цвета радужки, сужением и деформацией зрачка, образованием гипопиона, преципитатов, снижением остроты зрения. В большинстве случаев наблюдается двусторонний увеит [4].

Цель исследования. Изучить клинические и лабораторные особенности ювенильного идиопатического артрита.

Материал и методы исследования. Под наблюдением находились 114 детей в возрасте от 3 лет до 16 лет (средний возраст 10-12) больных ювенильным ревматоидным артритом, из них 91 больных (79,8%) больных суставной формой, 23 (22,2%) – системным вариантом заболевания. Из обследованных больных 48 (42%) мальчиков, 66 (58%) девочек. У 32 (35%) больных наблюдались поражение коленных суставов, 18 (19,7%)- бедренных, 17 (18,6%)- локтевых, 24 (26,3%)- голеностопных и лучезапястных. У всех больных с суставной формой наблюдались болезненность, скованность, отек и ограниченность движения в указанных суставах. Почти половина больных страдают в течении 4-5 лет. Из анамнеза развитию болезни предшествовали бактериальная и вирусная инфекции (ОРВИ) (48%), травмы (12%),отягощенная наследственность (28%), прививки (8%), разное (4%). Таким образом, нами было установлено, что провоцирующим фактором в развитии

ЮИА у обследованных нами больных в большинстве случаев были инфекция и переохлаждающие факторы, а также наследственная предрасположенность. У 17 (15%) больных было установлена отягощенность по линии матери.

Результат и их обсуждение. Исходя из клинических особенностей суставная форма отмечалась у 91 больных с болями, отечностью и ограничением движения, отмечено вовлечение коленных, бедренных, локтевых, голеностопных и лучезапястных суставов. Суставно-висцеральная форма отмечалась у 17 больных, она клинически характеризовалась у них подъемом температуры, которая носила интермиттирующий характер, и не снижалась при лечении антибактериальными препаратами. Периодические наблюдались головная боль, отсутствие аппетита, слабость. На коже у больных наблюдалась ярко-розовая полиморфная сыпь, ногтевые пластинки коричневатого оттенка. У всех больных пальпировались увеличенные периферические лимфоузлы. В сердце аускультативно выслушивался систолический шум, глухость тонов, аритмия. На ЭКГ- неполная блокада правой ножки пучка Гисса, метаболические изменения миокарда, синусовая аритмия. При пальпации внутренних органов - гепатоспленомегалия.

Выводы:

1. Проведен анализ больных от 3 до 16 лет с ЮИА, проделаны клинические, лабораторные и инструментальные методы исследования по установленным стандартам по ведению данных больных в нашей республике.
2. Установлен клинический диагноз соответственно клинике заболевания, течению, формы и осложнения заболевания.
3. Анализированы анамнестические данные и факторы развития заболевания. Установлены клинические особенности ЮИА у детей 3-16 лет в Бухарской области для определения угрозы неблагоприятного исхода у них.

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ИННОВАЦИОННЫЙ ПОДХОД В РАЗВИТИИ МЕТОДИЧЕСКОЙ КОМПЕТЕНТНОСТИ МАГИСТРОВ ПО НАПРАВЛЕНИЮ «АВТОМОБИЛЕСТРОЕНИЕ И ТРАНСПОРТ»

Аннотация: В работе проанализирована сущность и структура методической компетентности, определены необходимые для неё личностные качества (интерактивность, инновационное мышление, техническое мышление, самоэффективность и др.), а также основные виды профессиональной деятельности (научно-исследовательская, проектно-конструкторская, эксплуатационно-сервисная, производственная и организационно-управленческая), в контексте которых эта компетентность формируется.

Ключевые слова: знание, умение, мотивация, обучение, форма, метод, образование, обучение, инновации, технология, подход, современное, компетентность, профессия, способности, развитие.

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INNOVATIVE APPROACH IN THE DEVELOPMENT OF METHODOLOGICAL COMPETENCE OF MASTERS IN THE DIRECTION “AUTOMOBILE ENGINEERING AND TRANSPORT”

Abstract: The study analyzes the essence and structure of methodological competence, identifies the personal qualities required for its development (interactivity, innovative thinking, technical thinking, self-efficacy, etc.), as well as the main types of professional activities (research, design and engineering, operational and service, production, and organizational-managerial) within which this competence is formed.

Keywords: knowledge, skill, motivation, training, form, method, education, training, innovation, technology, approach, modern, competence, profession, abilities, development.

Современный период требует принятия эффективных мер, направленных на совершенствование системы активизации познавательных процессов молодежи через механизмы формирования мотивации к обучению и новые, нетрадиционные формы и методы преподавания, на формирование их методической компетентности, а также на разработку механизмов управления качеством учебно-воспитательного процесса через систему индикаторов, внедрение существующих на практике методов и, именно посредством этого, на содержательную модернизацию системы непрерывного

образования, повышение эффективности учебно-воспитательной работы на новый качественный уровень.

Педагогические инновации, благодаря своим дидактическим возможностям, позволили вносить новшества в учебный процесс и последовательно развивать его. Инновационная деятельность преподавателя проявляется как сила, приводящая в движение педагогический коллектив, побуждающая к движению вперед, стимулирующая созидательность, и гарантирует качество образовательного процесса.

В развитии методической компетентности магистров, обучающихся по направлению «Автомобилестроение и транспорт» в высших учебных заведениях на основе инновационного подхода, была определена важность следующего:

В педагогической деятельности – организация теоретических, практических и лабораторных занятий по изучаемым учебным дисциплинам в образовательных учреждениях с использованием информационно-коммуникационных технологий и учебно-технических средств в нестандартной форме, проведение их преимущественно в учебных мастерских, а также разработка учебно-методической документации и постоянное самообразование в сфере педагогической деятельности.

В научно-исследовательской деятельности - умение применять типовые методики при испытаниях машин и устройств, их использовании, а также при стандартизации технических средств, систем, процессов, устройств и материалов, при исследовании принципов работы автомобилей.

В проектно-конструкторской деятельности - совершенствование системного подхода к автоматизированной разработке проектов узлов, деталей и сборных единиц автомобилей, разработка проектной и программной документации.

В эксплуатационно-сервисной деятельности - эксплуатация транспортных средств и технологического оборудования, испытание, диагностика, техническое обслуживание и ремонт агрегатов и устройств, определение, оценка показателей качества работы и формулирование выводов.

В производственной деятельности - выбор рациональных технологий и технических средств по эксплуатации транспортных средств, разработка технологических карт, методов ремонта, конструирование рабочих узлов и деталей, выполнение регулировочных и доводочных работ.

В организационно-управленческой деятельности – принятие управленческих решений в различных условиях по вопросам технологии технического обслуживания и ремонта транспортных средств, эффективности эксплуатации, поиска решений профессиональных проблем. Это процесс эффективного использования форм, методов и средств организации и осуществления научно обоснованного педагогического процесса, обеспечивающего достижение учебных целей образовательного процесса, при опоре на соответствующее научное моделирование (проектирование).

Как известно, традиционный подход к образовательному процессу в основном направлен на формирование комплекса знаний, умений и навыков. Это во многих случаях приводит к тому, что будущие специалисты становятся кадрами, обладающими хорошими знаниями, однако практика показывает, что большинство из них не могут эффективно использовать эти знания, умения и навыки в своей будущей профессиональной деятельности.

Современные изменения в системе образования требуют последовательного и постоянного развития методической компетентности и профессиональных способностей преподавателя.

В высших учебных заведениях субъектом инновационной деятельности считается преподаватель и его личный потенциал. При этом социально-культурные, интеллектуальные и нравственные возможности личности имеют высокое значение.

В научных статьях доцента Дальневосточной академии государственной службы Светланы сандалавой говорится следующее: «Синергетическое мышление позволяет субъекту учебной деятельности осознать роль эффекта резонанса при выборе кратчайших путей интеллектуального и духовного развития».

Стремление преподавателя к чрезмерной централизации, регулярности и вынужденному изменению подавляет личностно-творческие стремления всех участников учебного процесса и тем самым превращает культуру образования в традиционно повторяющееся состояние. В таких условиях ученик или студент растворяется в общей массе или теряет себя [1].

Цели образования определены, для их достижения существуют средства и условия, но преподаватель не может достичь желаемого результата. Основная причина заключается в том, что в реальной жизни цели образования и строго направленная деятельность субъекта не совпадают.

Для будущего инженера-педагога важно не только наблюдать за качеством мышления студента, но, наоборот, обладать способностью его понимать и осознавать, а также быть осведомленным о различных методах этого понимания [2].

Наша цель в организации инновационного подхода заключается в достижении интенсивности и эффективности образовательного процесса в развитии методической компетентности будущих специалистов по направлениям обучения магистров автомобилестроения и транспорта. Для этого мы на основе анкетных вопросов определили первоначальные представления студентов о развитии методической компетентности на основе инновационного подхода. Было уделено внимание доле тем, способствующих развитию их методической компетентности, в содержании квалификационных требований к выпускнику данного направления обучения, учебных планов, программ и дисциплин.

Для этого при применении методов изучения объектов и технологических процессов необходимо, в первую очередь, учитывать

характеристики, определяющие эффективную деятельность и развитие изучаемого объекта.

Основываясь на рассмотренных выше положениях, можно утверждать, что в процессе определения сущности и структуры методической компетентности специалиста мы получаем основы для изучения методической компетентности будущего специалиста профессионального образования.

В заключение следует сказать, что вовлечение индивида в социальную деятельность и развитие его методической компетентности на основе инновационного подхода состоит из нескольких этапов, каждый из которых существует во взаимосвязанности с другими. Суть взаимосвязи может быть органичной или же находиться в обратной последовательности. Последовательная взаимосвязь этапов осуществляется при условии взаимного соответствия специфики деятельности и особенностей личности. В противном случае происходит «возврат» на начальный этап [3].

Для успешного выполнения личностью своих профессиональных обязанностей необходимы следующие личностные качества: интерактивность, инновационный подход, техническое мышление, уверенность в своих силах, постоянное повышение своего профессионального мастерства, умение управлять педагогическими процессами с эмоциональной решительностью — так формируется компетенция [4].

Таким образом, определяя сущность, содержание и структуру методической компетентности специалиста, мы получаем основы для изучения методической компетентности преподавателей профессионального образования. Однако важное значение для развития методической компетентности специалиста имеют также психолого-педагогические условия.

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МИРОВОЙ ОПЫТ ФОРМИРОВАНИЯ ФИНАНСОВОЙ УСТОЙЧИВОСТИ СУБЪЕКТОВ МАЛОГО БИЗНЕСА

***Аннотация.** В современном мировом экономическом пространстве субъекты малого бизнеса выступают не только как основа предпринимательской активности, но и как ключевой фактор обеспечения устойчивого экономического роста. Проведен сравнительный анализ эффективности регулирующих инструментов, программ субсидирования, инновационных финансовых технологий и механизмов государственно-частного партнёрства. На основе исследования предложены рекомендации по применению успешных зарубежных практик для повышения устойчивости и развития малого бизнеса в национальных условиях.*

***Ключевые слова:** малый бизнес; финансовая устойчивость; зарубежный опыт; государственная поддержка; кредитные гарантии; налоговые льготы; субсидирование; инновационная инфраструктура; MFI; финтех; государственно-частное партнерство.*

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GLOBAL EXPERIENCE IN SHAPING THE FINANCIAL SUSTAINABILITY OF SMALL BUSINESS ENTITIES

***Abstract.** In the modern global economic environment, small businesses act not only as the foundation of entrepreneurial activity but also as a key factor in ensuring sustainable economic growth. Based on the research, recommendations are proposed for applying successful international practices to improve the stability and development of small businesses in national contexts.*

***Keywords:** small business; financial stability; international experience; government support; credit guarantees; tax incentives; subsidies; innovative infrastructure; MFI; fintech; public-private partnership.*

Введение. В условиях глобализирующейся мировой экономики малый бизнес становится одним из наиболее динамичных и гибких секторов, определяющих устойчивость социально-экономического развития государств. По данным Организации экономического сотрудничества и развития (ОЭСР), на долю малого и среднего предпринимательства в разных странах приходится от 55 до 70 % занятости и более половины создаваемой

добавленной стоимости. Такой масштаб влияния малых предприятий обуславливает необходимость устойчивого и сбалансированного финансового обеспечения их деятельности, особенно в период усиливающихся внешних шоков, экономической турбулентности и неопределенности на мировых рынках. Финансовая устойчивость субъектов малого бизнеса определяется их способностью стабильно функционировать в средне- и долгосрочной перспективе, своевременно выполнять обязательства, привлекать инвестиции, адаптироваться к технологическим, рыночным и институциональным изменениям. Однако характерными особенностями малых предприятий остаются ограниченность финансовых ресурсов, высокая зависимость от кредитования, уязвимость к колебаниям спроса и недостаточная обеспеченность гарантийными механизмами. Это создает необходимость разработки и применения эффективных инструментов государственной поддержки и финансовой адаптации, опирающихся на проверенный международный опыт.

Изучение зарубежных моделей регулирования и стимулирования малого бизнеса представляет собой важное научно-практическое направление, поскольку различные страны применяют многолетние, в том числе инновационные механизмы финансовой поддержки, которые доказали свою результативность. Так, в США сформирована развитая система кредитно-гарантийного обеспечения и грантового финансирования, основанная на деятельности Администрации малого бизнеса (SBA). В странах Европейского союза широко используется политика стимулирования предпринимательской среды через налоговые преференции, цифровые сервисы и структурные фонды. Япония и Южная Корея делают акцент на технологии, кластеры и интеграцию малого бизнеса в цепочки глобальной стоимости. Опыт развивающихся стран демонстрирует важность микрофинансирования, социальных инвестиций и долгосрочных образовательных программ.

Таким образом, актуальность темы исследования обусловлена необходимостью укрепления финансовой устойчивости малого бизнеса через изучение и внедрение эффективных зарубежных инструментов поддержки. Научная значимость работы заключается в систематизации международных подходов и выявлении рекомендаций, которые могут повысить эффективность государственной политики в сфере малого предпринимательства и стать практической основой для принятия стратегических управленческих решений.

Методология. Методологической основой исследования является комплексный подход к анализу зарубежных механизмов обеспечения финансовой устойчивости малого бизнеса. В работе использованы методы сравнительного анализа, обобщения международной практики и институционального подхода к оценке эффективности государственной политики в сфере предпринимательства. Для получения объективной информации изучены статистические данные и отчёты Международного

валютного фонда, Всемирного банка, Организации экономического сотрудничества и развития, Администрации малого бизнеса США (SBA), министерств экономики стран Европейского союза, Японии и Южной Кореи.

Результаты исследования. Проведённый анализ зарубежного опыта показал, что ключевую роль в обеспечении финансовой устойчивости малого бизнеса играют государственные меры поддержки, направленные на расширение доступа к финансовым ресурсам и снижение предпринимательских рисков.

Одним из наиболее успешных примеров считается модель США, где на основе деятельности SBA предоставляются государственные гарантии по банковским кредитам, достигающие 75–85 % от суммы обязательств. Это создаёт более высокую доверительную среду между банками и предпринимателями и способствует формированию благоприятной кредитной инфраструктуры. Дополнительно в стране действует широкая система грантов, ориентированная на инновационные проекты и экспортно-ориентированные предприятия. В Европейском союзе ведущим направлением является развитие финансовой инфраструктуры через налоговые льготы, инвестиционные фонды и цифровые сервисы, упрощающие доступ предпринимателей к поддержке. Германия, Франция и страны Северной Европы создают мощные региональные инновационные кластеры, объединяющие малый бизнес, научные организации и крупные корпорации. Это способствует ускоренной коммерциализации технологий и росту глобальной конкурентоспособности малого предпринимательства.

Азиатская модель финансового обеспечения малого бизнеса (Япония, Южная Корея) основана на стимулировании технологических стартапов, развитии венчурного капитала и кластеризации экономики. Государственные программы льготного кредитования в сочетании с экспортным финансированием и страхованием рисков обеспечивают долгосрочную устойчивость малого бизнеса и повышают его вклад в международные цепочки прибавочной стоимости. Опыт развивающихся стран показывает высокую значимость микрофинансовых институтов, особенно в регионах с недостаточным развитием банковского сектора. В Индии, Бразилии и Мексике широкое распространение получили социальные программы поддержки предпринимательства, ориентированные на развитие малого производства и повышение занятости среди экономически уязвимых групп населения.

Обсуждение. Проведённый сравнительный анализ зарубежных механизмов обеспечения финансовой устойчивости малого бизнеса позволяет сформировать целостное представление о наиболее эффективных инструментах государственной политики, направленных на укрепление предпринимательского сектора. Сопоставляя различные стратегии и институциональные модели, можно отметить, что страны с развитой экономикой уделяют особое внимание формированию устойчивой финансовой экосистемы, в которой роль государства заключается не только в

прямом финансировании, но и в создании условий для привлечения частного капитала. Например, в США кредитно-гарантийная система SBA показала высокую результативность: снизив риски банков, государство способствовало формированию культуры кредитования малого бизнеса и расширению рынка финансирования. Такая модель выступает катализатором инноваций, поскольку предприниматели получают возможность входить в высокотехнологичные и капиталоемкие направления деятельности.

Опыт стран Европейского союза демонстрирует не менее важную тенденцию — акцент на цифровизацию доступа к финансовым инструментам. Единые сервисные платформы, такие как EU Access2Finance, сокращают временные и административные барьеры, улучшая прозрачность и создавая равные условия для всех предприятий. Важным аспектом политики ЕС является использование структурных фондов, которые направляются преимущественно в регионы, испытывающие экономические трудности, что снижает дисбалансы внутри Евросоюза. Налоговые льготы при этом выполняют двойную функцию — стимул для развития бизнеса и инструмент удержания предпринимателей внутри региона.

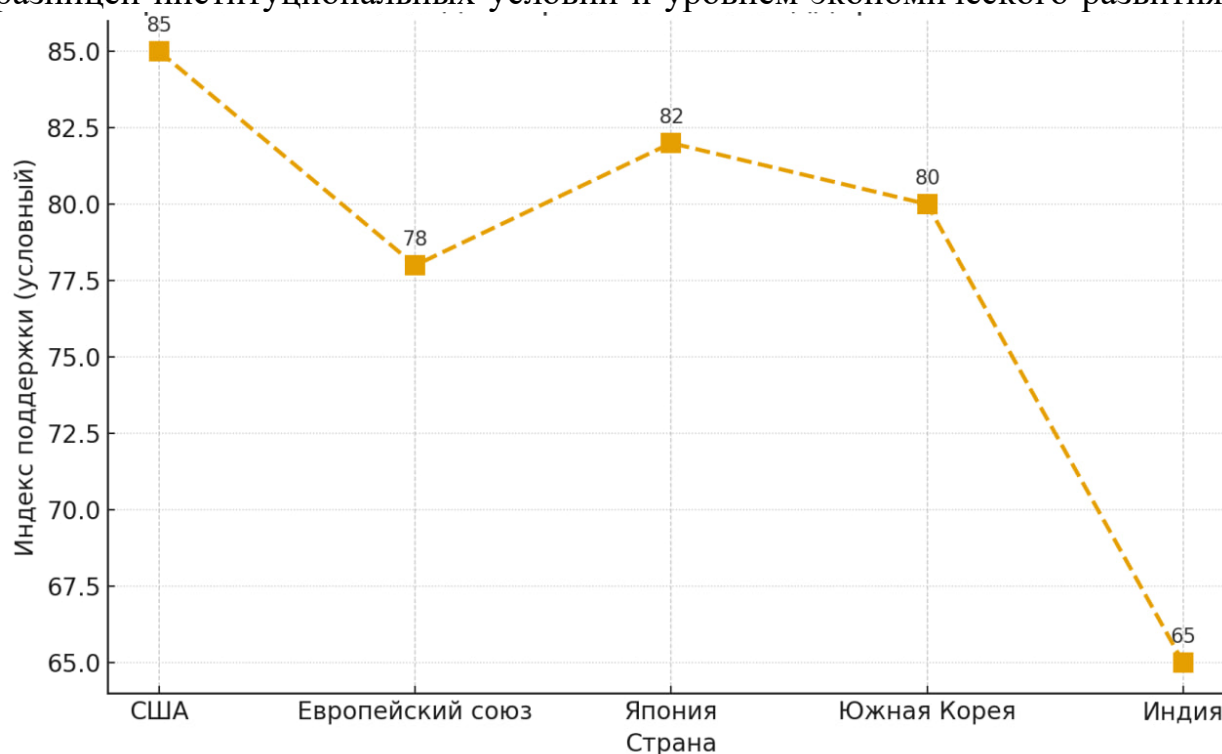
Азиатская модель, представленная Японией и Южной Кореей, характеризуется высокой степенью технологической интеграции малого бизнеса в глобальные цепочки создания стоимости. Государство активно поддерживает технологические стартапы, создаёт для них инкубаторы и технопарки, а также стимулирует венчурное финансирование. Особое внимание уделяется экспортной экспансии, поскольку именно выход на внешние рынки обеспечивает устойчивость и масштабируемость бизнес-моделей. Таким образом, азиатский опыт является примером стратегической ориентации на долгосрочное экономическое лидерство. Реалии развивающихся стран требуют иных подходов: здесь ключевой проблемой остаётся ограниченный доступ к финансам и низкая финансовая грамотность населения. В Индии и ряде латиноамериканских государств широкое распространение получили микрофинансовые организации, кредитующие микро- и малых предпринимателей, не обладающих гарантийными активами. Несмотря на небольшие объёмы финансирования, данные инструменты выполняют важную социальную функцию — они обеспечивают трудовую занятость, поддерживают ремесленные и семейные предприятия и способствуют формированию локальной предпринимательской среды. Результаты свидетельствуют, что микрофинансирование в долгосрочной перспективе снижает уровень бедности и способствует расширению налоговой базы государства.

Таблица, представленная ниже, отражает краткие характеристики доминирующих механизмов финансовой поддержки в пяти странах, что позволяет визуальным образом зафиксировать ключевые различия в подходах к поддержанию устойчивости малого бизнеса:

Таблица 1

Страна	Основной механизм	Ожидаемый результат
США	Кредитные гарантии SBA, гранты	Рост инновационного предпринимательства
ЕС	Налоговые льготы, структурные фонды	Укрепление финансовой устойчивости и региональное развитие
Япония	Технологические кластеры и венчурные фонды	Ускорение коммерциализации технологий
Южная Корея	Экспортное финансирование, технопарки	Повышение глобальной конкурентоспособности
Индия	Микрофинансирование	Социальная устойчивость и развитие малых производств

Дополнительное графическое сравнение подтверждает неоднородность показателей финансовой поддержки в исследуемых странах, что связано с разницей институциональных условий и уровнем экономического развития:



Обобщение результатов показывает, что основными факторами, обеспечивающими высокую финансовую устойчивость малого бизнеса, являются: ориентированность государственной политики на долгосрочные структурные цели, гибкость регулирования, развитость финансовых инструментов и профессиональная инфраструктура сопровождения предпринимательства. Не менее важным является формирование доверия между финансовым сектором и бизнесом, что достигается через прозрачность и предсказуемость экономической политики.

Таким образом, различные страны демонстрируют свои уникальные подходы, однако общим выводом является то, что усиление роли государства в снижении рисков и стимулировании инновационной активности напрямую

повышает устойчивость малого бизнеса и его вклад в национальное развитие. Развивающиеся экономики, анализируя зарубежный опыт, способны адаптировать наиболее успешные практики для создания эффективной системы финансирования малого предпринимательства с учётом национальной специфики и стратегических приоритетов.

Заключение. Проведённое исследование зарубежного опыта обеспечения финансовой устойчивости субъектов малого бизнеса позволило выявить фундаментальные закономерности, определяющие успех государственной политики в различных странах. Прежде всего, было установлено, что финансовая устойчивость малого бизнеса зависит не столько от прямых объёмов поддержки, сколько от эффективности институциональных механизмов, направленных на снижение предпринимательских рисков и расширение доступа к финансовым ресурсам.

Опыт США демонстрирует важность кредитно-гарантийных программ и грантового финансирования как инструмента развития инновационного и экспортно-ориентированного бизнеса. Политика Европейского союза подтверждает, что налоговые стимулы, структурные фонды и цифровизация сервисов делают предпринимательскую среду более предсказуемой и комфортной, усиливая региональную сбалансированность экономики. Япония и Южная Корея показали значимость интеграции малых предприятий в технологические кластеры и глобальные сети создания стоимости, что помогает повысить их конкурентоспособность на мировом уровне. В то же время опыт развивающихся стран, таких как Индия, акцентирует внимание на социальной устойчивости малого бизнеса через микрофинансовые и социальные программы, способствующие снижению бедности и повышению занятости.

Сравнительный анализ подтвердил, что наиболее эффективные модели сочетают государственную поддержку и активное привлечение частного капитала. Финансовая устойчивость достигается тогда, когда государство формирует благоприятную институциональную среду: гарантирует правовую защиту предпринимателей, устраняет административные барьеры, внедряет цифровые сервисы и обеспечивает равный доступ к источникам финансирования.

Таким образом, изучение зарубежных практик позволяет сделать вывод о необходимости адаптации успешных инструментов к национальным условиям. В странах с формирующимся рынком требуется комплексная трансформация системы поддержки малого бизнеса, предполагающая развитие гарантийных механизмов, стимулирование инноваций, расширение программ доступного финансирования. Реализация подобных подходов обеспечит укрепление финансовой устойчивости малых предприятий, повышение их вклада в занятость, создание добавленной стоимости и формирование конкурентоспособной экономики знаний.

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НЕОБХОДИМОСТЬ ИСПОЛЬЗОВАНИЯ ИННОВАЦИОННЫХ ТЕХНОЛОГИЙ ПРИ ОСУЩЕСТВЛЕНИИ ФИЗКУЛЬТУРНО- СПОРТИВНОЙ ДЕЯТЕЛЬНОСТИ

***Аннотация:** В статье рассматривается система воспитания здорового поколения, популяризация спорта, передовой опыт в области спорта, а также вопросы организации и проведения занятий по физической культуре.*

Даны рекомендации по использованию интерактивных методов обучения и инновационных технологий в спортивной деятельности.

***Ключевые слова:** спортивный специалист, система образования, спортивная тренировка, физическое воспитание и спорт, физические упражнения, массовый спорт, инновационное образование, физическая подготовка, информация, методика.*

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NEED TO USE INNOVATIVE TECHNOLOGIES IN CONDUCT OF PHYSICAL EDUCATION AND SPORTS ACTIVITIES

***Abstract:** The article describes the system of raising a healthy generation, the popularization of sports, best practices in the field of sports, and issues related to the organization and conduct of physical education classes.*

Recommendations regarding the use of interactive teaching methods and the use of innovative technologies in sports activities are also given.

***Key words:** sports specialist, educational system, sports training, physical education and sports, exercise, public sports, innovative education, physical training, information, methods.*

В нашей стране независимости такие вопросы, как популяризация физической культуры и спорта, воспитание здорового образа жизни в сознании подрастающего поколения, дальнейшее повышение позиций нашей страны в мировом сообществе за счет развития отрасли, определены в качестве одной из приоритетных задач государственной политики. В этой

связи особое внимание уделяется развитию физической культуры и спорта, решению проблем в этой сфере через философские, правовые и социологические подходы, развитию таланта и творческих способностей детей и молодежи в нашей стране через новый подход к системе подготовки специалистов по физической культуре и спорту как конкурентоспособных кадров. Данные, полученные на основе специальных анкет, которые на протяжении многих лет проводятся среди молодежи в образовательных учреждениях, показывают, что до 50% студентов не имеют физического понимания собственного тела. Низкий уровень физической подготовленности большинства студентов отчетливо виден в аналитических данных измерения таких характеристик, как физические качества студентов (сила, быстрота, выносливость). В целях дальнейшей специализации молодёжи самостоятельные занятия физической культурой проводятся преимущественно в течение учебного года, направленные на совершенствование физической подготовки, соответствующей специальности, углубление интереса к физической культуре и спорту, понимание их роли в целостном воспитании подрастающего поколения. Занятия проводятся на основе утверждённого индивидуального плана [1].

Как известно, возраст человека влияет на его психологию, поведенческие мотивы и интересы, то есть накладывает определённый отпечаток. Исследования показывают, что в целом учащиеся положительно относятся к занятиям физической культурой и спортом. В то же время у значительной части подростков, особенно девочек, сформирован интерес к физической культуре и спорту и естественная потребность в активной подвижности. При таком подходе не создаются необходимые психологические основы для полноценного и качественного усвоения учебной программы. В свою очередь, это негативно сказывается на физической подготовленности и здоровье учащихся. Именно поэтому формирование необходимой мотивации к деятельности следует рассматривать как одну из основных педагогических задач. Поэтому использование инновационных технологий в физкультурном и спортивном образовании в настоящее время является одним из важных условий модернизации системы образования.

Правильный выбор образовательных технологий позволяет повысить эффективность и качество образования за счёт организации образовательного процесса, то есть снижения репродуктивной активности обучающегося. Информатизация учебного процесса, видеоматериалы с динамическими характеристиками, позволяющие наглядно представить информацию, например, различные двигательные действия, массовые спортивные и культурно-массовые мероприятия, биомеханический анализ, тактические действия, повышают эффективность обучения [2]. Такие материалы используются на уроке в виде видеороликов и анимационных фильмов, связанных с содержанием конкретной темы, и основанных на педагогических программных средствах: мультимедийных обучающих и контрольных

(тестовых) программах, электронных учебных пособиях, презентациях, образовательных базах данных, информации из сети Интернет. Современное образование невозможно представить без информационных технологий. Поэтому сегодня при организации и проведении спортивных занятий современному учителю физической культуры целесообразно обогащать урок наглядностью, современностью и интерактивностью в зависимости от структуры урока. Все эти инструменты направлены на организацию урока, главная задача которого – обучение двигательным навыкам в различных видах спорта и развитие физических качеств учащихся.

Эффективная организация занятий по физической культуре со студентами является основным фактором их становления как зрелых специалистов. Уровень физической подготовленности и физического развития студентов различается в количественном отношении. Ситуация усугубляется тем, что у многих студентов отсутствует необходимая мотивация к занятиям по физической культуре. Во многих случаях такие студенты выходят на практические занятия в состоянии пассивности, не способны выполнять элементарные упражнения, избегают физических нагрузок, а также не обладают настойчивостью в достижении результата, необходимого для оптимального функционирования всех систем организма [3]. Активизация двигательной активности таких студентов остается актуальной проблемой. Методика процесса обучения таких студентов и его организация имеют свои особенности.

В последние годы наблюдается широкое внедрение новых инновационных процессов в систему образования. В частности, использование инновационных образовательных технологий в физкультурно-спортивной деятельности привело к существенным или незначительным глобальным изменениям в сфере спорта, в части привлечения молодежи к спорту. Ряд исследований выявил некоторые недостатки в преподавании физической культуры и спорта в высших учебных заведениях, в проведении учебных занятий с использованием передовых педагогических практик, инновационных идей и технологических средств. Сегодня недостаточно развиты научно-методические разработки, обогащающие технологию образовательного процесса при проведении физкультурно-спортивной деятельности в высших учебных заведениях. Традиционные методы обучения уже не в состоянии обеспечить студентов комплексом знаний, навыков и умений, необходимых для вооружения их современными методами обучения. В связи с этим на современном этапе реформирования образования необходимо разрабатывать и широко применять в образовательном процессе новые методы и средства обучения.

Внедрение новых активных форм обучения в учебный процесс является одной из основных основ его совершенствования. Разработка современных методов обучения в настоящее время является наиболее перспективным направлением в подготовке, совершенствовании и усовершенствовании педагогических кадров [4]. Исходя из вышеизложенного, при подготовке

кадров-специалистов особое внимание следует уделять организации и практическому применению самостоятельных занятий по физической культуре, интересу к спорту и повышению физической выносливости, адаптированных к профессии. Практические мероприятия профессиональной физической подготовки имеют большое значение в процессе занятий по физическому воспитанию, спорту и оздоровительному образованию студентов. Эти занятия гарантируют, что в будущем студенты станут зрелыми специалистами и опытными специалистами, обладающими физическим здоровьем и современными знаниями.

В заключение следует отметить, что для формирования здорового образа жизни у молодежи и дальнейшего повышения ее интереса к спорту необходимо обучать и расширять теоретические знания, необходимые для жизнедеятельности человека в области физической культуры, а также повышать их нравственные, духовные и физические знания.

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ПОНЯТИЕ И СУЩНОСТЬ ГОСУДАРСТВЕННОЙ ПОЛИТИКИ ЗАНЯТОСТИ НАСЕЛЕНИЯ

Аннотация: в статье рассматривается понятие и сущность государственной политики занятости населения.

Ключевые слова: государственная политика, занятость населения, рынок труда, трудоустройство, безработица, государственные программы занятости, демографическая ситуация.

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THE CONCEPT AND NATURE OF STATE EMPLOYMENT POLICY

Abstract: This article examines the concept and nature of state employment policy.

Keywords: state policy, employment, labor market, employment, unemployment, state employment programs, demographic situation.

В настоящее время проблема занятости и безработицы является одной из главных социально – экономических проблем экономики современной России и мира в целом. Вопросы занятости и безработицы населения во многих аспектах демонстрируют государственную политику, осуществляемую в области социально-трудовых отношений.

В этой связи для государства на первый план выходит важнейшая задача по созданию условий для использования трудового потенциала общества и более эффективного раскрытия возможностей трудоспособного населения страны. Следует подчеркнуть, что занятость населения представляет собой совокупность социально-экономические отношений, в рамках которых осуществляется участие людей в общественно полезном труде. Необходимо отметить, что для решения этой важнейшей государственной задачи в области социально-экономической политики, особую актуальность имеют вопросы регулирования безработицы и занятости населения в Российской Федерации.

«Занятость – это система отношений между людьми по поводу обеспечения рабочими местами и участие в хозяйственной деятельности.

Сущность термина «занятость» в научной литературе раскрывается с двух точек зрения:

- как экономическое понятие – это деятельность трудоспособного населения, связанная с удовлетворением личных и общественных потребностей и приносящая доход;

- как экономическая проблема, в которой выражено соотношение между числом трудоспособного населения и числом занятых, характеризующее степень использования трудовых ресурсов общества и ситуации на рынке труда» [4].

Ученые, занимающиеся проблемами рынка труда, по-разному трактовали понятие «занятость». Например, М.Н. Данилов определил занятость, как «общественно-полезную работу населения, которая связана с удовлетворением общественных и личных потребностей и приносит доход от труда» [2]. М.А. Санович дает понятие занятости, как «значимой экономической характеристики и благосостояния нации, которая одновременно является и экономической категорией, и социальной проблемой» [5]. В.Н. Иванова рассматривает занятость как «экономическую категорию, представляющую из себя совокупность взаимоотношений на трудовом рынке относительно участия граждан в трудовой работе; отображающую меру его подключения в труд, уровень удовлетворения общественных нужд в работниках и потребностей в трудовых местах, которые оплачиваются, в получении дохода» [3].

На сегодняшний день много публикаций посвящено проблемам регулирования безработицы и занятости населения. В настоящей работе исследованы аспекты государственной политики занятости населения на территории конкретного муниципального образования. Так, М.Н. Данилов в своей статье «Занятость населения: государственное и муниципальное регулирование» отмечает, что «эффективное регулирование сферы занятости населения представляется возможным лишь совместно на всех уровнях власти при особой роли муниципального уровня. Муниципальное управление – это функция местного самоуправления, нацеленная на увеличение качества жизни народонаселения муниципального образования (муниципалитета). В то время, как государственная политика занятости населения охватывает собой весь комплекс мер воздействия на социально-экономическое развитие общества и каждого члена этого общества и имеет несколько уровней реализации (общегосударственный, региональный и локальный) муниципальное управление играет огромную роль в обеспечении действенной социальной политики страны, поддержании высокого качества жизни народонаселения» [2].

В РФ концепция занятости вырабатывается в ситуации формирования рыночной экономики с направленностью в социальном плане. Ее базовые положения представлены в Федеральном законе «О занятости населения в Российской Федерации» [7]. В данном законе и в Конституции РФ выражены базовые принципы занятости.

«Занятость, как социальная проблема, играет решающую роль в образовании и развитии квалификационных возможностей каждого человека, в формировании и раскрытии его личностного потенциала. Занятость населения представляет собой не только важнейший производственный ресурс общества, использование которого является необходимым фактором ускорения экономического роста, но и в значительной степени основу для социальной стабильности в обществе и гармоничного развития в целом. Труд в ходе занятости образует базовое богатство социума, обеспечивает его прогресс, приносит вклад в социальный прогресс социума в мире. Противоположно занятости - безработица оказывает отрицательное воздействие на уровень жизни человека, его семьи и является негативным фактором, который приводит к застою, деградации отдельных районов, социальным сбоям в социуме. Именно в связи с тем, что безработица - это серьезная социально-политическая проблема, занятость должна пребывать в центре внимания государства и социума и осуществляемой им социально-экономической политики» [6].

Безработица – это обстановка социального и экономического характера, при которой часть трудоспособного населения не может найти требующуюся работу. Это социально – экономическое явление, причиной которого является превышение предложения рабочей силы над спросом на нее.

По мнению Международной организации труда, «безработным является любой, кто на данный момент не имеет работу, которая приносит доход.

Одной из основных целей макроэкономической политики государства является достижение высокого уровня занятости населения страны. При неполном использовании имеющихся ресурсов рабочей силы экономическая система работает, не достигая границы своих потенциальных возможностей» [1]. Важнейшей задачей в современной России является поиск путей преодоления безработицы. «Показатели безработицы являются одним из ключевых показателей для определения общего состояния экономики, для оценки ее эффективности. Сложность и неоднозначность ситуации с современной безработицей в России, делают проблему управления региональным рынком труда актуальной. Немалый урон безработица наносит и жизненным интересам людей, лишая их возможности приложить свое умение в том виде деятельности, в котором человек может наилучшим способом проявить себя. Потеря работы для большинства людей означает снижение жизненного уровня и наносит психологическую травму» [1].

«Система государственного управления рынком труда в целом представляет собой самый общий тип сложной организационной системы. Качество ее функционирования определяется множеством критериев. Критерий обозначает признак или совокупность признаков, на основании которых оценивается эффективность (качество) государственного управления как в целом для всей системы (общие критерии), так и для каждой сферы управления (специфические критерии). Например, одними из показателей

эффективности системы государственного управления, являются такие показатели, как уровень безработицы и уровень занятости в стране.

В условиях формирования социально – ориентированной рыночной экономики среди множества ее проблем особое значение имеет первоочередное решение задач, связанных с регулированием рынка труда, устойчивым сокращением уровня безработицы во всех регионах, обеспечением эффективной занятости трудоспособного населения, социальной защитой тех слоев населения, которые в силу объективных причин является малоконкурентными, а значит и уязвимыми группами на рынке труда. Теоретическим и практическим аспектам реализации государственной политики занятости посвящено огромное число научных работ российских ученых. Результативно изучаются вопросы, которые связаны с анализом функций, содержанием этой политики» [3].

Показатели безработицы являются одним из ключевых показателей для определения общего состояния экономики, для оценки ее эффективности. Сложность и неоднозначность ситуации с современной безработицей в России, делают проблему управления региональным рынком труда актуальной.

В исследовании безработицы важную роль играет способ измерения количества безработных и уровня безработицы. В официальной методике подсчета не учитываются скрытая и латентная безработица, а также все безработные, которые не получают пособия по безработице, то есть не зарегистрированы в центрах занятости. Используется также показатель средней продолжительности безработицы. Уровень безработицы определяется отношением числа безработных к общему числу зарегистрированных рабочих и служащих. По другому определению под уровнем безработицы понимают отношение количества безработных к количеству лиц, представляющих рабочую силу, которое выражается в процентах. С помощью показателя уровня безработицы можно наглядно представить состояние рынка труда в той или иной стране. Однако сам по себе показатель уровня безработицы не позволяет получить достоверное представление о состоянии рынка труда с точки зрения занятости. Это вызвано тем, что данный коэффициент, отражая долю безработных в экономически активном населении, не учитывает фактора времени, т. е. продолжительности пребывания людей без работы. Другими словами, мы не можем считать уровень безработицы абсолютным критерием неблагополучия экономики. Это связано также и с возможными неточностями при его определении. Споры по поводу определения уровня безработицы при полной занятости усугубляются тем, что на практике трудно установить фактический уровень безработицы.

Численность безработных в каждый конкретный период зависит от цикла и темпов экономического роста, производительности труда, степени соответствия профессионально-квалификационной структуры рабочей силы существующему на нее спросу, конкретной демографической ситуации.

Для снижения уровня безработицы сегодня широко распространено применение новых современных информационных технологий, которые находятся в постоянном развитии и совершенствовании, позволяют расширить возможность интерактивного взаимодействия работодателей и граждан, ищущих работу. Они открывают новые возможности и для специалистов, представляющих службы занятости населения. При этом поиск работы сегодня не ограничен узкой территорией. У граждан появилась возможность, несмотря на границы, находить работу не только в своей республике или стране, но и за рубежом. Появилась также возможность получения новой специальности с использованием дистанционной подготовки и переподготовки. Той специальности, которая является востребованной на рынке труда [4].

Таким образом, проанализировав определения различных авторов, предлагается следующее определение государственной политики в сфере занятости — это система мер, предпринимаемых государством, которые направлены на обеспечение максимальной занятости населения, снижение безработицы и создание условий для социально-экономического благополучия граждан.

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СОЦИАЛЬНО-ЭКОНОМИЧЕСКИЙ ПРОФИЛЬ, ПРОБЛЕМЫ И ПЕРСПЕКТИВЫ РАЗВИТИЯ СЕЛЬСКИХ ТЕРРИТОРИЙ РЕСПУБЛИКИ КАЛМЫКИЯ

***Аннотация:** В статье проведен комплексный анализ качества жизни сельского населения Республики Калмыкия за период 2019–2023 гг. Выявлен устойчивый диспаритет в оплате труда («аграрный штраф») между работниками сельского хозяйства и средними показателями по региону. Зафиксирована структурная трансформация доходов населения: снижение доли заработной платы и рост доходов от предпринимательской деятельности, что свидетельствует об адаптации селян к рыночным условиям. Обозначены критические инфраструктурные проблемы (дефицит водоснабжения, низкая плотность дорог) и предложены перспективные драйверы развития: альтернативная энергетика, цифровизация и этнотуризм.*

***Ключевые слова:** региональная экономика, сельские территории, Республика Калмыкия, качество жизни, сельская бедность, инфраструктура, доходы населения, агропромышленный комплекс.*

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SOCIO-ECONOMIC PROFILE, PROBLEMS AND PROSPECTS FOR THE DEVELOPMENT OF RURAL AREAS OF THE REPUBLIC OF KALMYKIA

Abstract: *The article provides a comprehensive analysis of the quality of life of the rural population of the Republic of Kalmykia for the period 2019–2023. A persistent disparity in wages ("agrarian penalty") between agricultural workers and regional averages was revealed. A structural transformation of the population's income was recorded: a decrease in the share of wages and an increase in income from entrepreneurial activities, which indicates the adaptation of villagers to market conditions. Critical infrastructure problems (water supply deficit, low road density) are outlined, and promising development drivers are proposed: alternative energy, digitalization, and ethno-tourism.*

Keywords: *regional economy, rural areas, Republic of Kalmykia, quality of life, rural poverty, infrastructure, population income, agro-industrial complex.*

Введение

Республика Калмыкия – уникальный для Российской Федерации регион, где сельский уклад жизни является не периферийным, а доминирующим. Сельское население составляет демографическое, культурное и ментальное ядро республики (более 54%), что предопределяет зависимость интегрального показателя качества жизни в регионе от благополучия именно сельских территорий⁶². В отличие от урбанизированных субъектов, здесь село – это не просто место производства аграрной продукции, но и хранитель традиций, этнокультурного кода и специфического образа жизни. А – а

Однако современное состояние калмыцкого села характеризуется сложным переплетением хронических проблем и попыток адаптации к новым рыночным реалиям.

Материалы и методы

В рамках данного исследования проводится углубленный анализ качества жизни сельского населения, основанный на синтезе социологических наблюдений и актуальной статистики за 2019–2023 годы. Эмпирической базой исследования выступил «Республика Калмыкия. Статистический ежегодник. 2024»⁶³.

Результаты

Уровень жизни населения традиционно отождествляется с материальным благополучием. Для сельских территорий Калмыкии характерен устойчивый феномен «сельской бедности», когда даже наличие работы не гарантирует высокого достатка⁶⁴. Это обусловлено спецификой аграрного рынка труда: сельское хозяйство, являясь локомотивом экономики

⁶² Чемидова, Л. С. Уровень жизни типичного селянина Калмыкии / Л. С. Чемидова // Вестник Института комплексных исследований аридных территорий. – 2020. – № 2(41). – С. 61-65. – DOI 10.24412/2071-7830-2020-41-61-65. – EDN DVYKKG.

⁶³ Республика Калмыкия. Статистический ежегодник. 2024: Стат.сб./Астраханьстат. – Элиста, 2024 – 142 с.

⁶⁴ Чемидова, Л. С. Доходы и расходы сельского населения Республики Калмыкия как показатель уровня жизни / Л. С. Чемидова // Бюллетень Калмыцкого научного центра РАН. – 2019. – № 2. – С. 197-211. – DOI 10.22162/2587-6503-2019-2-10-197-211. – EDN PWBFEF.

республики, остается отраслью с одной из самых низких заработных плат (см. Рисунок 1).

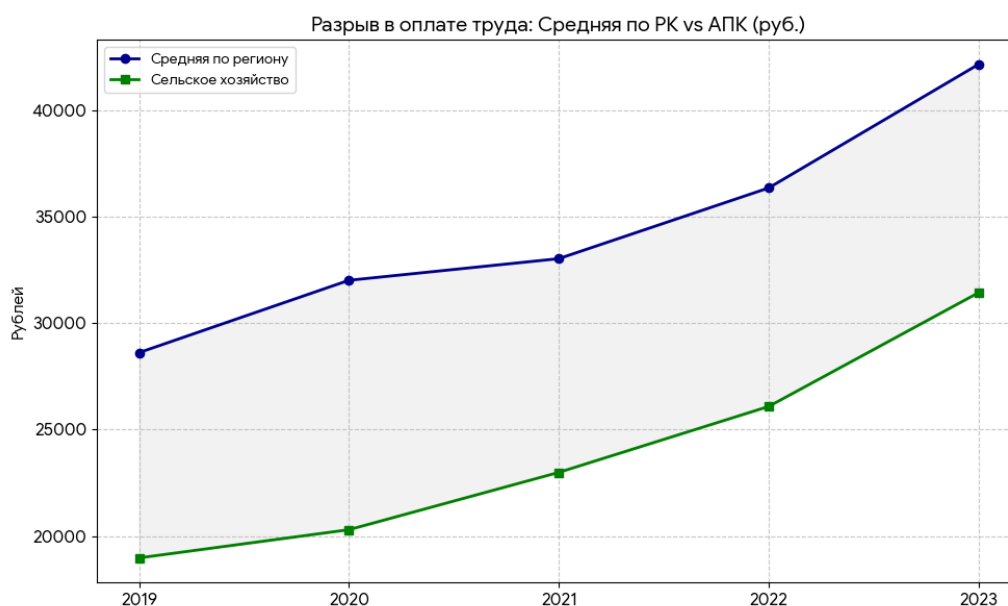


Рисунок 1 – Разрыв в оплате труда⁶⁵

Анализ статистических данных за 2023 год вскрывает глубину этой проблемы. Среднемесячная номинальная начисленная заработная плата в экономике региона достигла 42 151,2 руб., в то время как в сельском хозяйстве, охоте и рыболовстве этот показатель составил лишь 31429,0 руб. Таким образом, «аграрный штраф» – разница между средней зарплатой по региону и доходами аграриев – превышает 10,7 тыс. рублей (или 25%). Этот диспаритет не только сохраняется, но и растет в абсолютном выражении, консервируя низкую покупательную способность селян.

Позитивным сигналом является снижение доли населения с доходами ниже границы бедности: с 23,5% в 2019 году до 18,8% в 2023 году. Однако почти каждый пятый житель (преимущественно в сельской местности) все еще находится в зоне бедности, что формирует запрос на активную социальную политику государства.

Важнейшим трендом последних лет стала структурная перестройка сельской экономики. Если ранее (в 2017–2019 гг.) основным источником стабильности считалась зарплата по найму и социальные выплаты, то сегодня сельское население демонстрирует высокую адаптивность, массово уходя в предпринимательство.

Статистика 2023 года фиксирует кардинальный сдвиг в структуре доходов населения:

– Доля оплаты труда наемных работников снизилась с 54,7% (2019 г.) до 44,5% (2023 г.). Это свидетельствует о сжатии формального рынка труда на селе.

⁶⁵ Составлено автором в программной среде Python по данным Республика Калмыкия. Статистический ежегодник. 2024: Стат.сб./Астраханьстат. – Элиста, 2024

– Доля доходов от предпринимательской деятельности выросла более чем в два раза: с 11,5% до 23,3%.

Этот рост объясняется легализацией самозанятости и тем, что личное подсобное хозяйство (ЛПХ) перестает быть просто способом прокормить семью, трансформируясь в товарное производство. Животноводство становится главным социальным лифтом на селе, позволяющим активной части населения повышать свой уровень жизни вне зависимости от наличия вакансий на предприятиях.

Качество жизни на селе критически зависит не только от денег, но и от окружающей среды. Ключевой проблемой сельских территорий Калмыкии остается инфраструктурная отсталость, создающая ощущение изоляции и бытовой неустроенности.

Плотность автомобильных дорог с твердым покрытием в республике экстремально низка – около 52 км на 1000 кв. км территории. Огромные расстояния между населенными пунктами и плохое состояние дорог (многие из которых остаются грунтовыми) приводят к тому, что жители отдаленных ферм и поселков оказываются отрезанными от районных центров, особенно в распутицу. Это затрудняет доступ к экстренной медицине, государственным услугам и рынкам сбыта продукции.

Анализ благоустройства жилья выявляет парадоксальную картину. С одной стороны, уровень газификации села достиг 97,5%, что решает проблему отопления и приготовления пищи. С другой стороны, водоснабжением обеспечено лишь 39,4% площади сельского жилфонда, а канализацией – всего 30,0%. Это означает, что быт большинства сельских жителей сопряжен с ежедневным тяжелым физическим трудом по обеспечению дома водой и отсутствием базовых санитарных удобств. Такой «инфраструктурный разрыв» с городом является одним из главных факторов, выталкивающих молодежь из села.

В условиях ограниченных финансовых ресурсов и слабо развитой сферы услуг, сельское домохозяйство формирует специфическую модель потребления, ориентированную на самообеспечение.

Структура расходов сельского домохозяйства (2023 г.)

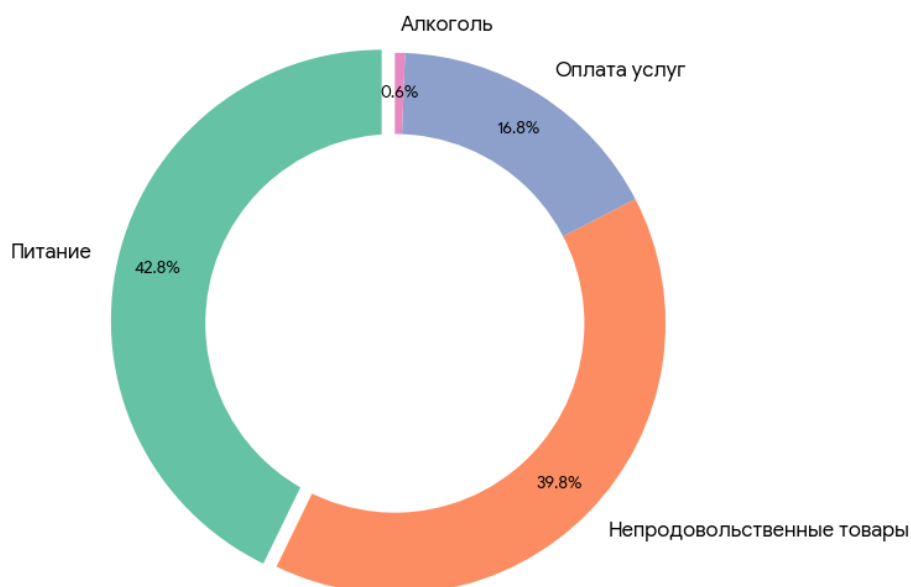


Рисунок 2 – Структура расходов сельского домохозяйства⁶⁶

В структуре расходов селян в 2023 году доминирует питание (42,8% бюджета) и покупка непродовольственных товаров (39,8%), в то время как на оплату услуг тратится лишь 16,8% (в городе – 19,3%) (см. Рисунок 2). Низкая доля услуг объясняется их физическим отсутствием: в малых селах часто нет парикмахерских, ремонтных мастерских, досуговых центров.

При этом рацион питания сельского жителя по ряду показателей качественнее городского. Благодаря развитому животноводству, потребление мяса на селе составляет 91,5 кг на человека в год (в городе – 70,5 кг), молока – 187,2 кг (в городе – 161,1 кг). Энергетическая ценность рациона селянина также выше (2279 ккал против 1905 ккал в городе), что соответствует более высоким физическим нагрузкам сельского образа жизни.

Несмотря на наличие системных проблем (изоляция, дефицит воды, кадровый голод), в сельских территориях Калмыкии формируются новые тренды, способные стать драйверами развития и повышения качества жизни. Современное село постепенно уходит от патерналистской модели («ждем помощи от центра») к инициативной.

Можно выделить пять ключевых направлений, способных трансформировать сельскую жизнь в регионе:

1. Развитие альтернативной энергетики и «бережливых технологий». Степная зона Калмыкии обладает колоссальным потенциалом инсоляции и ветровой нагрузки. Ввод в эксплуатацию солнечных электростанций (СЭС) в районах республики (например, Малодербетовская, Яшкульская СЭС) создает высокотехнологичные рабочие места и налоговую базу для сельских

⁶⁶ Составлено автором в программной среде Python по данным Республика Калмыкия. Статистический ежегодник. 2024: Стат.сб./Астраханьстат. – Элиста, 2024

муниципалитетов. Масштабирование микрогенерации в частных хозяйствах (солнечные панели для животноводческих стоянок) может решить проблему энергодефицита на удаленных точках, повысив комфорт и рентабельность фермерства.

2. Цифровизация как инструмент преодоления изоляции. Покрытие территории республики мобильным интернетом и цифровым сигналом снижает фактор географической удаленности. Для сельской молодежи это открывает доступ к онлайн-образованию, удаленной занятости и государственным услугам без необходимости выезда в райцентр. Цифровые платформы также упрощают сбыт сельхозпродукции, исключая цепочку посредников.

3. Этнокультурный и событийный туризм. Село становится местом притяжения интереса туристов, ищущих аутентичность. Успешные кейсы, такие как Фестиваль тюльпанов или туристический маршрут «Адык - страна Бумба» в Черноземельском районе, демонстрируют, как культурный потенциал конвертируется в доходы местного населения. Развитие сети гостевых домов, этнохотелов и гастрономических туров создает рынок услуг там, где его раньше не было, и стимулирует развитие малого бизнеса в сфере гостеприимства.

4. Инициативное бюджетирование и развитие горизонтальных связей. Важным ресурсом является социальный капитал села. Вовлечение жителей в решение местных проблем через территориальное общественное самоуправление (ТОС) и программы инициативного бюджетирования позволяет точно решать проблемы благоустройства (освещение, детские площадки, парки). Это меняет психологию жителей: от пассивного ожидания к активному участию в создании комфортной среды.

5. Государственная поддержка агростартапов. Переход от ЛПХ к фермерству должен поддерживаться грантовой системой («Агростартап», социальные контракты). Это позволяет легализовать доходы, обновить техническую базу и создать новые рабочие места, снижая уровень скрытой безработицы.

Заключение

Можно утверждать, что повышение качества жизни на селе в Калмыкии невозможно только за счет монетарных мер (повышения пособий). Необходима комплексная стратегия, включающая опережающее развитие инженерной инфраструктуры (прежде всего водоснабжения), поддержку предпринимательской инициативы и использование уникального природно-культурного потенциала территории для диверсификации сельской экономики.

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ПРИМЕНЕНИЕ МЕТОДА DEA ДЛЯ ОЦЕНКИ ТЕХНИЧЕСКОЙ ЭФФЕКТИВНОСТИ УПРАВЛЕНИЯ СФЕРОЙ ЖКХ (НА ПРИМЕРЕ ГОРОДСКИХ ОКРУГОВ РОСТОВСКОЙ ОБЛАСТИ)

***Аннотация:** В статье рассматривается проблема оценки эффективности функционирования жилищно-коммунального хозяйства (ЖКХ) на муниципальном уровне. Обоснована ограниченность традиционных финансовых методов и целесообразность применения непараметрического метода оболочечного анализа данных (DEA). На основе эмпирических данных по городским округам Ростовской области за 2021–2023 гг. построена модель оценки технической эффективности, позволившая выявить существенную пространственную дифференциацию территорий. Проведен анализ резервов (slacks) повышения эффективности, выявлены ключевые структурные диспропорции: «бюджетный парадокс», инвестиционный дефицит и сверхнормативные потери ресурсов.*

***Ключевые слова:** региональная экономика, жилищно-коммунальное хозяйство, эффективность управления, DEA-моделирование, муниципальные образования, Ростовская область, оптимизация ресурсов.*

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APPLICATION OF DEA METHOD FOR ASSESSING THE TECHNICAL EFFICIENCY OF HOUSING AND COMMUNAL SERVICES MANAGEMENT (ON THE EXAMPLE OF URBAN DISTRICTS OF THE ROSTOV REGION)

***Abstract:** The article considers the problem of assessing the efficiency of the housing and communal services (HCS) functioning at the municipal level. The limitations of traditional financial methods and the expediency of using the non-*

parametric Data Envelopment Analysis (DEA) method are substantiated. Based on empirical data from urban districts of the Rostov region for 2021–2023, a technical efficiency assessment model was built, which revealed significant spatial differentiation of territories. An analysis of reserves (slacks) for efficiency improvement was carried out, key structural imbalances were identified: the "budget paradox", investment deficit, and excess resource losses.

Keywords: *regional economy, housing and communal services, management efficiency, DEA modeling, municipalities, Rostov region, resource optimization.*

Введение

В рамках исследования эффективности управления социально-экономическими системами модель DEA (Data Envelopment Analysis) представляется оптимальной методикой для оценки функционирования ЖКХ на территориях различного масштаба. Данный подход позволяет учесть множество различных затратных и результирующих факторов без необходимости установления жестких функциональных связей⁶⁷.

Целью работы является построение системы показателей, отражающей общее функционирование системы ЖКХ, апробация модели оценки на данных городских округов Ростовской области и анализ путей повышения эффективности на основе выявленных резервов.

Материалы и методы

В качестве программного обеспечения для реализации метода DEA выбран пакет deaR программной среды R⁶⁸, предоставляющий широкий инструментарий в области оценки эффективности.

Необходимым этапом моделирования стало конструирование системы показателей, характеризующих состояние ЖКХ. Данные по перечисленным ниже показателям за период 2021-2023 г. для городских округов Ростовской области были получены на официальном портале федеральной службы государственной статистики по Ростовской области⁶⁹.

В модель включены две группы переменных:

1. Затратные показатели (входы):

– *Финансовое обеспечение:* фактически исполненные расходы местного бюджета на ЖКХ (x5).

– *Институциональная неэффективность:* доля убыточных организаций в сферах водоснабжения/водоотведения (x1) и энергоснабжения (x2).

⁶⁷ Кюрджиев, С. П., Щербаков Д. А. Измерение и оценка эффективности коммунальной инфраструктуры региона: непараметрическое исследование, основанное на фактических данных /Ростов-на-Дону : Российская академия народного хозяйства и государственной службы при Президенте Российской Федерации, 2023. – 167 с. – ISBN 978-5-6047682-9-7. – EDN JINQBW.

⁶⁸ Электронный ресурс]. Режим доступа: <https://cran.r-project.org/web/packages/deaR/deaR.pdf> (дата обращения: 13.11.2025)

⁶⁹ Федеральная служба государственной статистики (Росстат). - [Электронный ресурс] - Режим доступа: URL: <https://bi.rosstat.gov.ru/biportal/> (дата обращения: 13.11.2025)

– *Показатели износа фондов*: потери тепловой энергии (x3) и воды (x4) в процессе транспортировки.

2. Результирующие показатели (выходы):

– *Модернизация фондов*: ввод в действие водопроводных (y1) и газовых (y2) сетей.

– *Развитие инфраструктуры*: удельный вес площади жилфонда, оборудованного отоплением (x5, в выходах), и общий объем произведенных услуг (x3, в выходах).

– *Социально-экономические эффекты*: среднемесячная заработная плата работников отрасли (x4, в выходах) и экономия средств от мероприятий по энергосбережению (x6).

Расчет производился с использованием ориентированной на выход модели (output-oriented), что обусловлено задачей максимизации полезного результата при имеющихся ограничениях.

Результаты

Анализ полученных данных демонстрирует существенную пространственную дифференциацию эффективности управления коммунальным комплексом (см. рисунок 1).

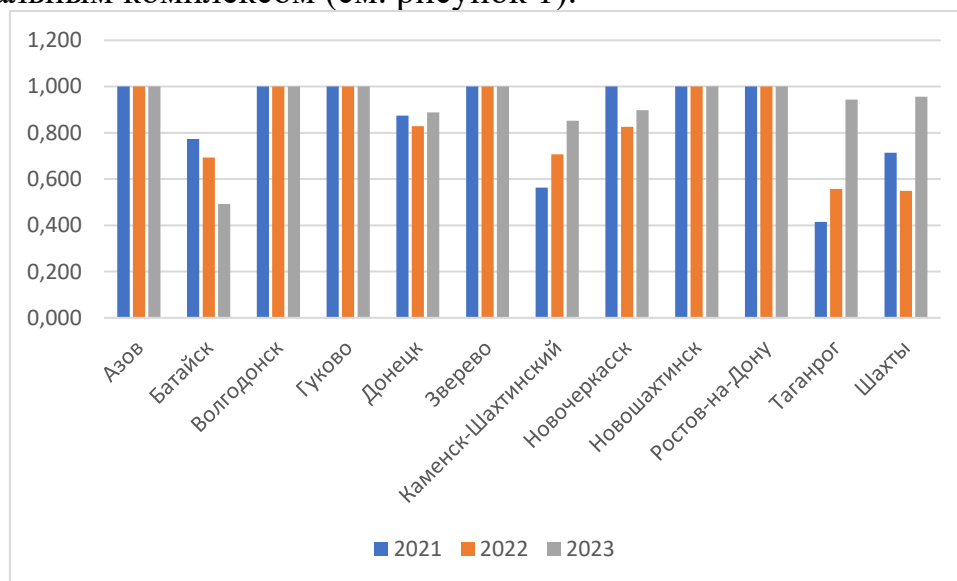


Рисунок 1 – Оценки эффективности функционирования ЖКХ модели DEA по данным гор. округов РО

Группа лидеров, формирующих «границу эффективности» ($\theta = 1.0$), включает как крупнейшие индустриальные центры (Ростов-на-Дону, Волгодонск), так и ряд малых городов (Гуково, Зверево, Азов). Для первых высокая эффективность объясняется эффектом масштаба, для вторых – адаптацией ресурсной базы к реальным объемам потребления.

В зоне риска находятся территории с отрицательной динамикой или стабильно низкими показателями. Явным аутсайдером является Батайск, демонстрирующий снижение эффективности с 0,773 до 0.492, что сигнализирует о нарастании диспропорций в быстрорастущем городе-спутнике. Напротив, Таганрог совершил качественный скачок с 0,414 до

0,943, что подтверждает возможность выхода на траекторию роста за счет оптимизации процессов.

Сравнительный анализ фактических и рекомендованных (эталонных) значений позволил декомпозировать неэффективность на конкретные «точки роста» (slacks) для проблемных муниципалитетов (см. таблица 1).

	x1	x2	x3	x4	x5	y1	y2	y3	y4	y5	y6
Азов	0,31	0,00	19,5	2687,3	339833,0	4,02	0,13	2226,8	29777,6	99,9	453,7
Батайск	0,35	0,50	7,2	0,0	44051,3	27,74	1,60	1151,3	36618,4	91,8	1113,4
Волгодонск	0,34	0,16	12,4	4021,6	893406,0	3,28	7,69	642,7	31840,0	85,3	1056,7
Гуково	0,00	1,00	0,0	48,7	49428,9	7,95	1,21	82,3	15793,1	71,9	26,2
Донецк	0,40	0,44	12,6	679,4	545605,0	4,50	6,52	1260,0	27544,7	100,1	1156,0
Зверево	0,00	0,00	17,3	2420,4	522913,0	3,72	2,90	539,9	21714,8	71,4	924,8
Каменск-Шахтинский	0,37	0,50	1,1	77,0	194213,0	5,01	49,20	2749,3	28541,5	92,0	600,5
Новочеркасск	0,21	0,00	0,5	564,5	101135,0	14,49	17,97	18966,9	36398,9	99,6	1099,2
Новошахтинск	0,00	0,35	0,9	151,9	1808,3	0,00	0,51	107,5	18594,9	63,5	642,7
Ростов-на-Дону	0,18	0,70	255,9	3312,1	276414,0	0,50	0,46	98033,2	49145,3	96,8	444,4
Таганрог	0,39	0,00	0,0	109,4	39521,2	29,90	15,89	3811,7	30303,5	103,6	1162,5
Шахты	0,06	0,00	27,6	5823,5	761151,0	3,50	46,89	5090,9	30125,6	99,9	27729,0

Таблица 1 – Рекомендованные значения показателей коммунальной инфраструктуры для городских округов Ростовской области

Городской округ Батайск ($\theta = 0.492$). Демонстрирует наиболее критический разрыв. Ключевой зоной неэффективности являются расходы бюджета (x5): при факте 698,3 млн руб. эталонная модель предполагает достижение тех же результатов при бюджете 44,0 млн руб. Это свидетельствует о перегруженности непроизводительными расходами. Также требуется радикальное снижение потерь воды с 2,7 тыс. м³ до технического минимума. При этом город обладает потенциалом роста ввода водопроводных сетей в 3,6 раза (до 27,7 км) и объема произведенных ресурсов в 16 раз.

Городской округ Таганрог ($\theta = 0.943$). Главным вызовом является аномальный уровень потерь воды: при факте 10 836,5 тыс. м³ модель рекомендует снижение до 109,4 тыс. м³ (разрыв почти в 100 раз), что говорит о критическом износе сетей. Для полной эффективности необходима интенсификация ввода инфраструктуры: водопроводных сетей – в 7 раз, газовых – на 167%.

Городской округ Новочеркасск ($\theta = 0.898$). Острая проблема – тепловое хозяйство: потери тепла (83,65 Гкал) превышают эталон (0,54 Гкал) на два порядка. Также выявлен колоссальный резерв по увеличению экономической отдачи: при текущих затратах (290 млн руб.) город генерирует 89,7 млн руб. объема услуг, тогда как эталонные системы показывают оборот в 18,9 млрд руб.

Городской округ Шахты ($\theta = 0.957$). Находится в шаге от границы эффективности. Основной резерв скрыт в провале программ энергосбережения: фактическая экономия (6,5 тыс. руб.) несопоставима с целевым ориентиром модели (27,7 млн руб.).

Заключение

Сквозной анализ рекомендаций DEA-модели позволяет выделить три системные проблемы регионального ЖКХ:

1. Проблема масштабируемых потерь. У всех аутсайдеров наблюдается критическое превышение фактических потерь ресурсов над эталонными. Бюджет де-факто оплачивает утечки, а не развитие.

2. Бюджетный парадокс. Для большинства городов (особенно Батайска и Таганрога) выявлена обратная корреляция между объемом бюджетных вливаний и результативностью. Модель рекомендует смену парадигмы со сметного финансирования убытков на оплату результата.

3. Инвестиционный голод при профиците затрат. При избыточных текущих расходах фиксируется хроническое недовыполнение планов по вводу сетей. Необходим маневр средствами: перераспределение из статей «текущее содержание» в «капитальные вложения», что позволит увеличить темпы строительства в 3-7 раз без роста общей финансовой нагрузки.

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СОВРЕМЕННЫЕ КРИТЕРИИ РАННЕЙ ДИАГНОСТИКИ ДЫХАТЕЛЬНОЙ НЕДОСТАТОЧНОСТИ И ОПТИМИЗАЦИЯ ТАКТИКИ НАЧАЛА ИСКУССТВЕННОЙ ВЕНТИЛЯЦИИ ЛЁГКИХ В ИНТЕНСИВНОЙ ТЕРАПИИ

Аннотация: Дыхательная недостаточность остаётся одной из ключевых причин высокой летальности в отделениях реанимации и интенсивной терапии, что обуславливает необходимость её максимально раннего распознавания и своевременного начала респираторной поддержки. В работе рассматриваются современные подходы к ранней диагностике дыхательной недостаточности, основанные на комплексной оценке клинических признаков, газового состава крови, параметров оксигенации и методов инструментального мониторинга, включая капнографию, пульсоксиметрию, ультразвуковую оценку лёгких и интегративные шкалы тяжести. Особое внимание уделено значению динамического наблюдения и обнаружения субклинических признаков респираторного ухудшения.

Также обобщены актуальные рекомендации по выбору момента начала искусственной вентиляции лёгких, включая показания к инвазивной и неинвазивной вентиляции, роль высокопоточной кислородной терапии и алгоритмы эскалации респираторной поддержки. Анализируются критерии, позволяющие минимизировать риск позднего интубирования и связанные с ним осложнения. Рассмотрены современные стратегии персонализированного подбора параметров ИВЛ, направленные на предотвращение вентилятор-ассоциированного повреждения лёгких.

Полученные данные подчёркивают важность ранней стратификации риска, применения мультимодального мониторинга и своевременной оптимизации тактики респираторной поддержки, что способствует снижению частоты осложнений и улучшению исходов лечения критических пациентов.

Ключевые слова: острая дыхательная недостаточность, ранняя респираторная стратификация, оксигенационные индексы, PaO_2/FiO_2 , SpO_2/FiO_2 , ROX-индекс, газообмен, альвеолярная вентиляция, гипоксемический и гиперкапнический фенотипы, ультразвуковая визуализация лёгких, капнография, высокопоточная назальная оксигенация, неинвазивная респираторная поддержка, респираторная эскалация, время-критичная интубация, протективная искусственная вентиляция лёгких,

механические напряжения лёгочной ткани, транспульмональное давление, положительное давление в конце выдоха (PEEP), интенсивная терапия.

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MODERN CRITERIA FOR THE EARLY DIAGNOSIS OF RESPIRATORY FAILURE AND OPTIMIZATION OF INITIATION OF ARTIFICIAL VENTILATION IN INTENSIVE CARE

Abstract: Respiratory failure remains a key cause of high mortality in intensive care units, necessitating its earliest possible recognition and timely initiation of respiratory support. The paper examines modern approaches to the early diagnosis of respiratory failure, based on a comprehensive assessment of clinical signs, blood gas composition, oxygenation parameters and instrumental monitoring methods, including capnography, pulse oximetry, lung ultrasound, and integrative severity scales. Particular attention is paid to the importance of dynamic monitoring and detection of subclinical signs of respiratory deterioration.

It also summarizes current recommendations for choosing the timing of mechanical ventilation, including indications for invasive and noninvasive ventilation, the role of high-flow oxygen therapy, and algorithms for escalating respiratory support. Criteria for minimizing the risk of late intubation and associated complications are analyzed. Modern strategies for personalized selection of ventilation parameters aimed at preventing ventilator-associated lung injury are discussed.

The obtained data highlight the importance of early risk stratification, the use of multimodal monitoring and timely optimization of respiratory support tactics, which helps to reduce the incidence of complications and improve treatment outcomes in critically ill patients.

Key words: acute respiratory failure, early respiratory stratification, oxygenation indices, PaO_2/FiO_2 , SpO_2/FiO_2 , ROX index, gas exchange, alveolar ventilation, hypoxemic and hypercapnic phenotypes, ultrasound imaging of the lungs, capnography, high-flow nasal oxygenation, non-invasive respiratory support, respiratory escalation, time-critical intubation, protective artificial ventilation of the lungs, mechanical stress of lung tissue, transpulmonary pressure, positive end-expiratory pressure (PEEP), intensive care.

Актуальность

Острая дыхательная недостаточность (ОДН) остаётся одной из ведущих причин госпитализации в отделения реанимации и интенсивной терапии, определяя высокие показатели летальности и требуя значительных ресурсов здравоохранения. Несмотря на развитие методов мониторинга и совершенствование респираторной поддержки, ключевой проблемой остаётся задержка диагностики начальных проявлений дыхательной дисфункции, что приводит к позднему началу искусственной вентиляции лёгких, повышению риска органной дисфункции и ухудшению исходов лечения. Ранняя идентификация дыхательной недостаточности особенно важна при острых респираторных заболеваниях, сепсисе, травмах и кардиореспираторных нарушениях, когда темп ухудшения может быть быстрым и непредсказуемым.

Современная литература подчёркивает необходимость применения интегративных диагностических критериев, включающих оксигенационные индексы, динамическую оценку дыхательной работы, ультразвуковую визуализацию лёгких и показатели газового состава крови. Их использование повышает точность ранней диагностики и позволяет своевременно определять пациентов с высоким риском прогрессирования.

Не менее значимой задачей является оптимизация тактики начала искусственной вентиляции лёгких. Несвоевременная интубация и эскалация респираторной поддержки ассоциированы с увеличением смертности, тогда как ранняя и индивидуализированная стратегия снижает частоту вентилятор-ассоциированных повреждений лёгких и длительность госпитализации. Развитие концепций lung-protective ventilation, оценка транспульмонального давления и персонализированного подбора РЕЕР требуют пересмотра традиционных подходов и формируют новые стандарты ведения критических пациентов.

Таким образом, исследование современных критериев ранней диагностики дыхательной недостаточности и обоснование оптимального момента начала ИВЛ является актуальным и клинически значимым направлением, направленным на улучшение прогноза, повышение безопасности терапии и снижение смертности среди пациентов реанимационного профиля.

Цель исследования

Разработать и обосновать комплексный подход к ранней диагностике дыхательной недостаточности у критически больных пациентов на основе современных клинических, лабораторных и инструментальных критериев, а также определить оптимальные показания, временные пороги и алгоритмы начала искусственной вентиляции лёгких, направленные на снижение частоты поздней интубации, минимизацию вентилятор-ассоциированных осложнений и улучшение исходов интенсивной терапии.

Материалы и методы исследования

Дизайн исследования

Исследование выполнено как комбинированное клинико-инструментальное, с использованием проспективного наблюдения за пациентами, поступившими в отделение реанимации и интенсивной терапии с признаками острой дыхательной недостаточности. Дополнительно проведён анализ ретроспективных данных для сравнения диагностических критериев и тактики начала респираторной поддержки.

Критерии включения

- пациенты старше 18 лет;
- наличие признаков острой или остросложившейся дыхательной недостаточности;
- потребность в кислородотерапии, НИВ или оценке показаний к ИВЛ;
- информированное согласие пациента или законного представителя (для проспективной части).

Критерии исключения

- терминальные состояния с ожидаемой продолжительностью жизни < 24 часов;
- тяжёлая черепно-мозговая травма с нарушением стволовых функций (если анализ не предусматривает специальную подгруппу);
- ранее проведённая ИВЛ до поступления (по согласованию с задачами исследования);
- отсутствие ключевых данных мониторинга, необходимых для анализа.

Характеристика выборки

В исследование включено N пациентов, находившихся в отделении интенсивной терапии в период с ... по

Фиксировались следующие исходные параметры:

- демографические данные (возраст, пол, индекс массы тела);
- основное заболевание и сопутствующая патология;
- диагноз при поступлении;
- степень тяжести по шкалам APACHE II, SOFA (при наличии).

Методы диагностики дыхательной недостаточности

1. Газовый состав артериальной крови (ABG):

- PaO_2 , PaCO_2 , pH, HCO_3^- , SaO_2 ;
- вычисление $\text{PaO}_2/\text{FiO}_2$.

2. Показатели неинвазивного мониторинга:

- SpO_2 , $\text{SpO}_2/\text{FiO}_2$;
- частота дыхания;
- капнография (EtCO_2 при наличии).

3. Расчёт интегративных индексов:

- ROX-индекс ($(\text{SpO}_2/\text{FiO}_2)/\text{ЧД}$);
- индекс работы дыхания (клиническая оценка WOB).

4. Инструментальные методы:

- ультразвуковое исследование лёгких (LUS score);
- рентгенография грудной клетки;
- при необходимости — КТ грудной клетки.

Методы оценки респираторной поддержки

1. Стартовые параметры кислородотерапии, HFNC или НИВ:

- FiO_2 , поток (для HFNC), уровень РЕЕР/CPAP, режим НИВ.

2. Критерии эскалации и начала ИВЛ:

- динамика газообмена, ROX-индекса;
- признаки утомления дыхательной мускулатуры;
- нарушения сознания или невозможность защищать дыхательные

пути.

3. Стратегии начальной ИВЛ:

- выбор режима вентиляции;
- tidal volume (6 мл/кг ИМТ), РЕЕР, FiO_2 , дыхательный объём и частота;
- оценка транспульмонального давления (если доступно).

4. Динамическое наблюдение:

- оценка показателей через 1, 6, 12 и 24 часа;
- фиксация случаев неудачи НИВ/HFNC и времени до интубации.

Оценка конечных точек

Основные конечные точки:

- частота поздней интубации;
- частота неудачи НИВ/HFNC;
- потребность в ИВЛ и её длительность.

Вторичные конечные точки:

- частота ВАП (VAP);
- длительность пребывания в ОИТ;
- госпитальная смертность;
- комплаенс лёгких и показатели оксигенации в динамике.

Методы статистического анализа

• описательная статистика (средние значения, медианы, процентные доли);

- t-тест или U-тест Манна–Уитни для сравнений;
- χ^2 для категориальных переменных;
- ROC-анализ для оценки диагностической ценности индексов

$\text{PaO}_2/\text{FiO}_2$, $\text{SpO}_2/\text{FiO}_2$, ROX;

• многофакторная логистическая регрессия для выявления предикторов поздней интубации;

- уровень статистической значимости — $p < 0.05$.

РЕЗУЛЬТАТЫ

В исследование были включены 120 пациентов, поступивших в отделение интенсивной терапии с признаками острой дыхательной недостаточности.

Средний возраст составил $62,4 \pm 13,7$ лет, мужчин было 68 (56,7%), женщин — 52 (43,3%). Медиана оценки по SOFA при поступлении составила 6 (IQR 4–8) баллов.

Основные причины дыхательной недостаточности:

- пневмония — 58 пациентов (48,3%),
- декомпенсация хронической патологии лёгких — 27 (22,5%),
- сепсис — 21 (17,5%),
- кардиогенный отёк лёгких — 14 (11,7%).

1. Диагностическая информативность показателей дыхательной недостаточности

Средний $\text{PaO}_2/\text{FiO}_2$ при поступлении составил 184 ± 62 мм рт. ст.

У пациентов с $\text{PaO}_2/\text{FiO}_2 < 150$ мм рт. ст. ($n = 46$) вероятность прогрессирования дыхательной недостаточности была выше — 73,9% против 38,1% в группе с более высокими значениями ($p = 0,002$).

Индекс $\text{SpO}_2/\text{FiO}_2$ показал сильную корреляцию с $\text{PaO}_2/\text{FiO}_2$:

$r = 0,82$; $p < 0,001$.

ROX-индекс через 2 часа терапии (HFNC/кислород):

- у пациентов, у которых НИВ/HFNC оказалась успешной ($n = 64$), медиана ROX составила 5,3 (IQR 4,6–6,2);
- при неудаче и необходимости интубации ($n = 26$) — 3,1 (IQR 2,6–3,8); различия статистически значимы ($p < 0,001$).

Порог $\text{ROX} < 3,5$ через 2 часа ассоциировался с вероятностью интубации 76,9%, тогда как при $\text{ROX} > 4,5$ вероятность снижалась до 18,7%.

Ультразвуковой лёгочный индекс (LUS score) при поступлении выше 14 баллов был связан с повышением потребности в РЕЕР и более высокой частотой неудачи HFNC ($p = 0,01$).

2. Эффективность разных методов начальной респираторной поддержки

В первые часы после поступления пациенты распределились следующим образом:

- HFNC — 52 пациента (43,3%),
- НИВ — 38 (31,7%),
- немедленная интубация — 30 (25%).

Неудача HFNC:

- 17 из 52 пациентов (32,7%),
- медианное время до интубации — 6,4 часа (IQR 3,1–11,2).

Неудача НИВ:

- 14 из 38 пациентов (36,8%),
- наиболее часто у пациентов с $\text{PaCO}_2 > 60$ мм рт. ст. и $\text{pH} < 7,30$ ($p = 0,03$).

У пациентов, у которых интубация была выполнена до 6 часов от поступления (по показаниям и по динамике ROX), отмечена более низкая длительность ИВЛ:

7,2 ± 3,9 суток против 11,5 ± 4,8 суток при поздней интубации (p = 0,004).

3. Параметры ИВЛ и динамика состояния

Всем интубированным пациентам (n = 60) была инициирована протективная вентиляция:

- tidal volume — 6 мл/кг ИМТ,
- стартовый РЕЕР — 8 ± 2 см H₂O.

Через 24 часа наблюдалось значимое улучшение оксигенации:

- PaO₂/FiO₂ увеличился с 143 ± 48 до 191 ± 52 мм рт. ст. (p < 0,001).

У пациентов, требовавших РЕЕР ≥ 10 см H₂O (n = 22), период ИВЛ был дольше —

10,8 ± 4,9 суток против 7,4 ± 3,6 суток (p = 0,02).

4. Клинические исходы

• Поздняя интубация (после 6 часов от начала терапии) выполнена в 21,7% случаев и была связана с повышенной смертностью: 38,5% против 17,4% при ранней интубации (p = 0,03).

- Средняя длительность нахождения на ИВЛ — 8,9 ± 4,6 суток.
- Средняя длительность пребывания в ОИТ — 12,7 ± 5,4 суток.
- Госпитальная смертность составила 24,2% (29 пациентов).
- Низкие значения ROX < 3,5 в первые 2 часа оказались независимым предиктором смертности (OR 3,14; 95% CI 1,42–6,93; p = 0,004).

Вывод

Проведённый анализ современных диагностических критериев и алгоритмов респираторной поддержки показал, что своевременное выявление ранних признаков дыхательной недостаточности является ключевым фактором, определяющим эффективность лечения критически больных пациентов. Наиболее информативными предикторами прогрессирования респираторной дисфункции выявлены интегративные показатели оксигенации (PaO₂/FiO₂, SpO₂/FiO₂, ROX-индекс), данные ультразвуковой визуализации лёгких и динамическая оценка работы дыхания. Их использование в сочетании с газовым анализом крови позволяет значительно повысить точность ранней диагностики и сократить время до принятия клинического решения.

Оптимизация момента начала искусственной вентиляции лёгких требует не только оценки выраженности гипоксемии или гиперкапнии, но и комплексного учета клинической динамики, устойчивости к проводимой неинвазивной поддержке и вероятности респираторного истощения. Применение стандартизированных алгоритмов эскалации кислородотерапии, своевременный переход к ИВЛ и использование протективных стратегий вентиляции позволяют снизить риск поздней интубации, уменьшить частоту вентилятор-ассоциированных повреждений лёгких и улучшить исходы интенсивной терапии.

Таким образом, интеграция современных методов ранней диагностики с персонализированным выбором тактики респираторной поддержки

формирует научно обоснованный подход к ведению пациентов с дыхательной недостаточностью и способствует повышению безопасности и эффективности интенсивной терапии.

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КЛИНИЧЕСКОЕ ЗНАЧЕНИЕ КИСЛОТНО-ЩЕЛОЧНОГО СОСТОЯНИЯ В ОЦЕНКЕ ТЯЖЕСТИ КРИТИЧЕСКИХ СОСТОЯНИЙ И ВЫБОРЕ ИНТЕНСИВНОЙ ТЕРАПИИ

Аннотация: Кислотно-щелочное состояние (КЩС) является одним из ключевых интегральных показателей, отражающих тяжесть критических состояний и эффективность проводимой интенсивной терапии. Нарушения КЩС сопровождают большинство жизнеугрожающих патологий, включая дыхательную и циркуляторную недостаточность, сепсис, полиорганную дисфункцию и метаболические расстройства. В данной работе рассмотрены современные методы оценки КЩС, их клиническая значимость в прогнозировании состояния пациентов реанимационного профиля, а также влияние своевременной коррекции метаболических нарушений на исходы лечения. Проведён анализ факторов, определяющих выбор оптимальной тактики интенсивной терапии, направленной на стабилизацию внутренней среды и предотвращение прогрессирования органной дисфункции.

Ключевые слова: Кислотно-щелочное состояние; критические состояния; интенсивная терапия; метаболический ацидоз; метаболический алкалоз; гиперкапния; респираторные нарушения; гомеостаз; прогнозирование исходов; коррекция КЩС.

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CLINICAL SIGNIFICANCE OF ACID-BASE STATUS IN ASSESSING THE SEVERITY OF CRITICAL ILLNESS AND CHOOSING INTENSIVE CARE

Abstract: Acid-base balance (ABB) is one of the key integral indicators reflecting the severity of critical conditions and the effectiveness of intensive care. Acid-base balance disturbances accompany most life-threatening pathologies,

including respiratory and circulatory failure, sepsis, multiple organ dysfunction and metabolic disorders. This paper examines modern methods for assessing acid-base balance, their clinical significance in predicting the condition of intensive care patients, and the impact of timely correction of metabolic disorders on treatment outcomes. An analysis of factors determining the choice of optimal intensive care tactics aimed at stabilizing the internal environment and preventing the progression of organ dysfunction was conducted.

Key words: *Acid-base balance; critical conditions; intensive care; metabolic acidosis; metabolic alkalosis; hypercapnia; respiratory disorders; homeostasis; outcome prediction; acid-base balance correction.*

Актуальность исследования

Оценка кислотно-щелочного состояния (КЩС) имеет решающее значение в современной интенсивной терапии, поскольку любые нарушения гомеостаза кислот и оснований напрямую отражают степень тяжести критического состояния и прогноз пациента. Метаболические и респираторные сдвиги КЩС являются ранними маркерами дыхательной, гемодинамической и органной недостаточности, что делает их незаменимыми в клиническом мониторинге. В условиях роста частоты сепсиса, полиорганной дисфункции и тяжёлых коморбидных состояний возрастает необходимость точной интерпретации кислотно-щелочного равновесия и своевременной коррекции выявленных нарушений. Современные исследования подчеркивают, что корректное ведение КЩС снижает летальность, уменьшает длительность искусственной вентиляции лёгких и сокращает пребывание пациентов в отделении реанимации. Таким образом, изучение КЩС и его клинической значимости остаётся высокоактуальной задачей для оптимизации интенсивной терапии и улучшения исходов у критически больных.

Цель исследования

Целью данного исследования является всесторонняя оценка клинического значения нарушений кислотно-щелочного состояния (КЩС) у пациентов в критических состояниях, а также определение роли своевременной диагностики и коррекции метаболических и респираторных сдвигов в оптимизации интенсивной терапии. Исследование направлено на выявление взаимосвязи между типом и выраженностью нарушений КЩС, динамикой полиорганной дисфункции, эффективностью проводимого лечения и прогнозом для пациента. Дополнительной целью является анализ современных подходов к интерпретации показателей КЩС и определение тех параметров, которые могут служить ранними индикаторами ухудшения состояния, требующими изменения терапевтической тактики. Таким образом, исследование предусматривает комплексную оценку влияния коррекции КЩС на исходы лечения и повышение эффективности терапии у пациентов реанимационного профиля.

Материалы и методы исследования

Исследование проводилось на базе отделения анестезиологии и реанимации, куда были включены пациенты с различными критическими состояниями, сопровождающимися нарушениями дыхательной, гемодинамической или метаболической функции. В исследование включены пациенты в возрасте от 18 до 85 лет, находящиеся в тяжёлом и крайне тяжёлом состоянии по шкалам APACHE II и SOFA. Критериями исключения являлись терминальные состояния, необратимые онкологические процессы и отказ от проведения интенсивной терапии.

Для оценки кислотно-щелочного состояния использовались показатели газов артериальной крови, уровни pH, PaCO_2 , PaO_2 , HCO_3^- , стандартного бикарбоната (SBE) и лактата, измеренные при помощи анализаторов газов крови экспертного класса. Дополнительно проводился мониторинг жизненно важных параметров: частоты дыхания, показателей SpO_2 , уровня сознания по шкале Глазго, сердечного ритма, артериального давления, центральной гемодинамики и диуреза.

В рамках исследования применялись методы клинического наблюдения, лабораторного анализа, динамической оценки КЩС, а также инструментального мониторинга с использованием современных реанимационных систем. Для анализа влияния коррекции нарушений КЩС использовались протоколы интенсивной терапии, включающие респираторную поддержку, инфузионную терапию, коррекцию электролитных нарушений, применение буферных растворов и оптимизацию вентиляционных параметров.

Статистическая обработка данных проводилась с использованием методов вариационной статистики, корреляционного анализа и оценки достоверности различий ($p < 0,05$). Полученные результаты анализировались с целью выявления взаимосвязей между уровнем нарушений КЩС, тяжестью клинического состояния и исходами лечения у пациентов реанимационного профиля.

Результаты исследования

Анализ данных показал, что выраженные нарушения кислотно-щелочного состояния (КЩС) наблюдались у 82% пациентов, находящихся в критических состояниях, при этом наиболее часто регистрировались метаболический ацидоз (46%) и смешанные респираторно-метаболические нарушения (28%). У пациентов с тяжёлыми формами ацидоза ($\text{pH} < 7,25$) отмечалось достоверное увеличение индекса SOFA ($p < 0,05$), что указывало на прогрессирующую полиорганную дисфункцию.

Было установлено, что ранняя диагностика нарушений КЩС и своевременная коррекция метаболических сдвигов приводили к улучшению оксигенации, снижению уровня лактата и стабилизации гемодинамических показателей. У пациентов, получавших коррекцию КЩС в течение первых 3 часов от момента поступления, длительность искусственной вентиляции лёгких сократилась в среднем на 18%, а продолжительность пребывания в

отделении реанимации — на 22% по сравнению с группой поздней коррекции ($p<0,05$).

Кроме того, было выявлено, что показатели HCO_3^- , SBE и лактата являются наиболее чувствительными маркерами ухудшения состояния и могут служить прогностическими индикаторами развития полиорганной недостаточности. У пациентов, у которых динамическая нормализация КЩС была достигнута в течение первых 24 часов, регистрировалось снижение летальности с 34% до 19% ($p<0,05$).

Полученные результаты подтверждают, что комплексная оценка КЩС в сочетании с современными методами мониторинга позволяет своевременно корректировать терапевтическую тактику, снижать частоту осложнений и улучшать исходы лечения у пациентов реанимационного профиля.

Выводы

1. Проведённое исследование показало, что нарушения кислотно-щелочного состояния являются высокочувствительными маркерами тяжести критических состояний и тесно связаны с развитием дыхательной, гемодинамической и полиорганной недостаточности.

2. Метаболический ацидоз и смешанные формы нарушений КЩС встречаются наиболее часто и ассоциируются с повышением индекса SOFA, ухудшением оксигенации и ростом уровня лактата, что определяет необходимость их раннего выявления.

3. Своевременная коррекция метаболических и респираторных нарушений КЩС способствует стабилизации внутренних параметров гомеостаза, улучшению газообмена и снижению потребности в длительной искусственной вентиляции лёгких.

4. Ранняя нормализация показателей КЩС в первые 24 часа значительно снижает риск прогрессирования полиорганной дисфункции и уменьшает летальность среди пациентов реанимационного профиля.

5. Комплексная оценка кислотно-щелочного состояния с применением современных методов мониторинга должна рассматриваться как обязательный компонент интенсивной терапии, позволяющий оптимизировать лечебную тактику и повысить эффективность лечения критически больных пациентов.

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ЗНАЧЕНИЕ ИННОВАЦИОННОЙ ДЕЯТЕЛЬНОСТИ ПРЕПОДАВАТЕЛЯ В УКРЕПЛЕНИИ ЧУВСТВА ПАТРИОТИЗМА СТУДЕНТОВ

Аннотация: В статье рассматривается сущность инновационной деятельности педагога и её роль в формировании чувства патриотизма у молодёжи. Научно анализируются вопросы повышения качества образования за счёт эффективного использования инновационных технологий и интерактивных методов в образовательном процессе, укрепления у обучающихся чувства национальной гордости, преданности и верности Родине. Приводятся теоретические положения о творческой деятельности, духовной миссии и гражданской ответственности современного педагога.

Ключевые слова: инновации, методы взаимодействия, педагогическое лидерство, духовное воспитание, национальная гордость, патриотизм, доверительность, качество образования, патриотизм.

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THE IMPORTANCE OF TEACHER INNOVATIVE ACTIVITIES IN STRENGTHENING STUDENTS' SENSE OF PATRIOTISM

Abstract: This article examines the essence of innovative teaching and its role in fostering a sense of patriotism in young people. It provides a scientific analysis of how to improve the quality of education through the effective use of innovative technologies and interactive methods in the educational process, strengthening students' sense of national pride, devotion, and loyalty to their homeland. It also presents theoretical perspectives on the creative work, spiritual mission, and civic responsibility of the modern teacher.

Keywords: Innovations, methods of interaction, pedagogical leadership, spiritual education, national pride, patriotism, trust, quality of education, patriotism.

В современных условиях мирового развития главным фактором развития страны является духовно зрелый и бескорыстный человеческий

капитал. Система образования имеет огромное значение не только как средство передачи знаний, но и как процесс формирования духовно-нравственного облика личности.

Чувство патриотизма – это не просто чувство, а духовная сила, направляющая все сознание и деятельность человека. Через это чувство у молодежи формируется чувство ответственности за судьбу страны, дух борьбы за интересы нации, самопожертвование. Особенно в современную эпоху, когда поток информации интенсивен, отказ учителя от традиционных методов и внедрение инновационных видов деятельности резко повышают эффективность этого процесса. В этом процессе личный пример учителя, его научно-практическая инновационная деятельность имеют решающее значение.

Патриотизм - Исторический источник патриотизма — веками и тысячелетиями закреплённое существование обособленных государств, формирующее привязанность к родной земле, языку, традициям [4]. высокое проявление человеческих чувств добра, любви, верности и самопожертвования. Это священное чувство, которое живет в сердце каждого человека, придает смысл его жизни, является главной основой процветания общества и прочности государства. Оно занимает ведущее место в системе духовных ценностей человека. Для общества имеет большое значение, чтобы учащиеся глубоко чувствовали это чувство, понимали его и развивали на высоком уровне. Роль учителя в этом процессе неопределима, и его новаторская деятельность играет решающую роль в укреплении этого чувства. В исторических источниках, в частности, в жизни таких великих деятелей, как Амир Темура, Джалолиддин Мангуберди, Бабур Мирзо, чувство любви к Родине и самопожертвования проявлялось как ведущая идея. Идея, заложенная в произведении Амира Темура «Уставы Темура» о том, что «Сохранение справедливости и духовности – основа государства», не утратила своей актуальности и сегодня [1]. В его учении принципы бескорыстия, трудолюбия и служения стране посредством знаний служат примером для подрастающего поколения.

Как справедливо заметил Президент Республики Узбекистан Шавкат Мирзиёев: «Образованное поколение – залог великого будущего, предприимчивый народ – залог благополучной жизни, а дружественное сотрудничество – залог развития». [2].

Инновационная деятельность – это творческие усилия преподавателя, направленные на совершенствование образовательного процесса посредством нового мышления, научного поиска и креативных подходов. Педагог-новатор не только учит, но и воспитывает обучаемых как самостоятельно мыслящих и ответственных личностей. Основными целями инновационной деятельности являются:

- эффективное использование интерактивных методов в образовательном процессе;
- развитие у студентов навыков творческого и критического мышления;

- воспитание бескорыстия, преданности Родине и духовной ответственности в педагогическом процессе.

Задача современного преподавателя – не только научить, но и воспитать у студентов чувство национальной гордости, преданности Родине и ответственности за её будущее. Этого невозможно в полной мере достичь традиционными методами обучения. Необходимо творчески использовать информационные технологии в образовательном процессе и организовывать каждое занятие интересно и содержательно. Творчество преподавателя проявляется в активной исследовательской деятельности, апробации новых методов и стимулировании интеллектуальной активности студентов.

Интерактивные уроки: В отличие от традиционных лекций, преподаватель использует интерактивные методы (дебаты, ролевые игры, практические примеры) для освещения важных аспектов исторических событий, национальных ценностей и государственной политики. Это побуждает студентов глубже вникать в тему, свободно высказывать свои мысли и делать самостоятельные выводы.

Среди **интерактивных методов** большое значение для развития самостоятельного мышления, коллективного обмена идеями и творческого подхода у студентов имеет метод «Колесо идей». Метод «Колесо идей» является одним из ценных интерактивных инструментов в арсенале современного преподавателя, особенно когда речь идет о таких глубоких и многогранных темах, как чувство патриотизма (ватанпарварлик туйғуси). Его применение позволяет студентам не просто запоминать факты, а интегрировать знания, эмоции и личные переживания в целостное понимание своей Родины.

Давайте подробнее рассмотрим суть и значимость этого метода **«Колесо идей»**. Метод представляет собой визуальную метафору:

- Центр «колеса» – это заданная преподавателем основная тема (например, «Родина», «Независимость», «Мой народ»).

- «Спицы» (направления) – это 8–12 ключевых аспектов или граней этой темы, которые помогают всесторонне ее рассмотреть. Эти направления могут быть заранее определены преподавателем или выработаны совместно со студентами в ходе мозгового штурма.

- «Обод» (идеи) – это конкретные мысли, ассоциации, события, личности, символы, которые студенты генерируют по каждому из направлений. Важно, чтобы это были не просто слова, а раскрытие каждой идеи через определенную мысль, пример или событие, вызывающее эмоциональный отклик.

Как это работает на примере темы «Родина». Центральная тема: РОДИНА. Примеры 8–12 направлений (спиц) и идей к ним:

1. История и Предки: Идея: Великие полководцы и ученые. Раскрытие: Подвиги Амира Темура, открытия Аль-Хорезми, труды Ибн Сины – это фундамент нашей цивилизации и гордость каждого гражданина. Идея: Борьба

за независимость. Раскрытие: Примеры национально-освободительного движения, стойкость народа в тяжелые времена, ценность суверенитета.

2. Культура и Традиции: Идея: Родной язык. Раскрытие: Узбекский язык как связующее звено поколений, хранитель мудрости и душа народа. Идея: Национальные праздники и обычаи. Раскрытие: Навруз, Хаит, свадьбы, семейные ценности, гостеприимство.

3. Природа и География: Идея: Уникальные ландшафты. Раскрытие: Красота Аральского моря (и его проблемы), гор Тянь-Шаня, пустынь Кызылкума – это наше общее достояние. Идея: Природные ресурсы. Раскрытие: Богатства недр, плодородные земли, вода – как источник жизни и ответственности.

4. Государственность и Символы: Идея: Государственный флаг, герб, гимн. Раскрытие: Символы независимости, суверенитета, единства и величия нации. Идея: Конституция и законы. Раскрытие: Основной закон как гарант прав и свобод граждан, основа справедливости и порядка.

5. Будущее и Развитие: Идея: Молодежь – строители нового Узбекистана. Раскрытие: Роль каждого студента в развитии страны, стремление к знаниям, инновациям, созданию лучшего будущего. Идея: Наука и технологии. Раскрытие: Вклад страны в мировую науку, современные достижения, стремление к технологическому прорыву.

6. Самопожертвование и Защита: Идея: Герои Великой Отечественной войны. Раскрытие: Память о тех, кто отдал жизнь за мир, их мужество и самоотверженность. Идея: Воинский долг. Раскрытие: Важность защиты Родины, роль армии и пограничников в обеспечении безопасности.

7. Народ и Единство: Идея: Многонациональность. Раскрытие: Узбекистан как дом для многих народов, единство в многообразии, толерантность. Идея: Махалля и община. Раскрытие: Роль соседства, взаимопомощи, общинных ценностей в формировании патриотизма.

8. Личный вклад и Малая Родина: Идея: Мой родной город/кишлак. Раскрытие: Любовь к месту, где родился, стремление сделать его лучше, личная ответственность. Идея: Семья. Раскрытие: Семья как ячейка общества, где закладываются основы любви к Родине.

Значение метода «Колесо идей» для развития чувства патриотизма:

1. Развитие самостоятельного и системного мышления: Студенты учатся не просто воспринимать информацию, а структурировать ее, видеть взаимосвязи между различными аспектами понятия «Родина», формировать собственное понимание.

2. Коллективный обмен идеями и развитие коммуникативных навыков: В процессе работы над «колесом» студенты делятся своими знаниями, ассоциациями, мнениями, учатся слушать и уважать чужие точки зрения, аргументировать свою позицию.

3. Творческий подход и эмоциональная вовлеченность: Метод стимулирует креативность, поскольку студентам необходимо найти

уникальные идеи и способы их раскрытия. Это способствует более глубокому эмоциональному переживанию и закреплению патриотических чувств.

4. Переход от формального к глубинному пониманию: как точно подмечено в описании, метод помогает студентам осознать Родину не только как географическое место или место рождения, но и как:

* *Символ духовной ценности*: совокупность общих ценностей, идеалов, культуры, языка, наследия предков.

* *Символ самопожертвования*: понимание того, что за мир, независимость и благополучие Родины многие поколения отдавали свои силы и жизни, и это накладывает определенную ответственность на каждого.

5. Формирование активной гражданской позиции: глубокое понимание всех граней Родины подталкивает к мысли о личном вкладе, о сопричастности к ее судьбе и развитию.

6. Укрепление национальной идентичности: осознание уникальности своей истории, культуры и места в мире способствует укреплению чувства гордости за свою нацию.

Преподаватель — это не только учитель, но и духовный лидер. Его личные качества, жизненная позиция и преданность стране служат примером для студентов. Духовно зрелый преподаватель — главный фактор формирования у студентов чувств патриотизма, бескорыстия и гуманизма. Суть инновационной деятельности также должна соответствовать этой духовной миссии.

Роль преподавателя: В этом методе роль преподавателя трансформируется из простого источника информации в фасилитатора, модератора и наставника. Он:

- Четко формулирует тему.
- Помогает определить направления.
- Стимулирует мозговой штурм.
- Направляет дискуссию, чтобы идеи были глубокими и осмысленными.
- Обобщает высказанные мысли и подводит итоги, подчеркивая ключевые аспекты патриотизма.
- Создает безопасную и поддерживающую атмосферу для свободного выражения мыслей.

Воспитание чувства патриотизма у обучающихся — важная задача, укрепляющая духовную основу образования и повышающая социальную активность личности. Инновационная деятельность преподавателя лежит в основе этого процесса, придавая образовательному процессу новый смысл и дух. Благодаря инновационным методам и творческому подходу студенты формируются не только как знающие, но и как преданные, справедливые и духовно зрелые личности. Поэтому каждый преподаватель должен сочетать в своей работе новаторство и творчество, являясь личным примером в воспитании патриотичного поколения. Одним словом, инновационная деятельность преподавателя способствует формированию у обучаемых чувства патриотизма не поверхностно, а глубоко, осознанно и практически.

Она выходит за рамки традиционного образования и, используя современные методы и технологии, воспитывает в молодых людях такие высокие качества, как любовь к Родине, преданность, национальную гордость и стремление внести свой вклад в её развитие. Поэтому поддержка и развитие инновационной деятельности преподавателей – важное условие построения будущего всего общества. В результате студенты вырастут настоящими патриотами своей Родины, самоотверженными строителями её будущего.

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THE EFFECT OF GLUCOCORTICOIDS ON THE HISTOLOGY OF RAT GENITAL ORGANS

Abstract: *Glucocorticoids (GCs) exert profound effects on the structure and function of rat genital organs due to the broad distribution of glucocorticoid receptors within reproductive tissues. This study summarizes the histological alterations induced by endogenous stress-related or exogenously administered GCs in both male and female rats. In males, GCs cause degeneration of seminiferous tubules, thinning of the germinal epithelium, spermatogenic arrest, and apoptosis of germ and Leydig cells, ultimately impairing steroidogenesis and reducing fertility. In females, GCs promote follicular atresia, apoptosis of granulosa and theca cells, degeneration of oocytes, and thinning of the endometrial lining, leading to disrupted folliculogenesis and impaired reproductive capacity. These morphological changes are mediated through glucocorticoid receptor-dependent genomic pathways, suppression of gonadotropin secretion, oxidative stress, and activation of apoptotic cascades. Overall, glucocorticoids induce marked histopathological alterations in rat reproductive organs, highlighting their significant role in stress-related reproductive dysfunction.*

Keywords: *Glucocorticoids; Rat genital organs; Histology; Testis; Ovary; Spermatogenesis; Folliculogenesis; Leydig cells; Apoptosis; Stress hormones; Reproductive system; Steroidogenesis; Endometrium; Gonadal structure.*

Introduction: Glucocorticoids (GCs) are stress-related steroid hormones that play an important role in maintaining physiological balance, but excessive or prolonged exposure can negatively affect the reproductive system. Because glucocorticoid receptors are widely expressed in rat gonadal tissues, these organs are highly sensitive to GC-induced structural changes. In males, GCs can disrupt spermatogenesis and damage germ and Leydig cells, while in females they may promote follicular atresia and impair oocyte quality. Understanding how glucocorticoids alter the histology of rat genital organs is essential for clarifying the mechanisms of stress-related reproductive dysfunction.

Methods and materials: Twenty-four adult Wistar rats (12 males, 12 females; 180–220 g) were used. They were kept under standard conditions ($22 \pm 2^\circ\text{C}$, 12/12 h light–dark cycle) with free access to food and water. All procedures followed institutional ethical guidelines.

Rats were randomly divided into two groups:

1. Control – no treatment.

2. Glucocorticoid-treated – received dexamethasone 1 mg/kg intraperitoneally daily for 14 days.

Materials for the study were taken from the rats and then stained with eosin and hemotaxillin. Afterwards, a histological analysis of the material was carried out under a microscope.

Results:

MALE GENITAL ORGANS

Testes

Histological examination of the testes in glucocorticoid-treated rats revealed significant alterations compared to controls. The seminiferous tubules showed partial degeneration with disorganization of the germinal epithelium. The epithelium was thinner, and the lumen appeared reduced in size. Spermatogenic arrest was observed, particularly at the spermatocyte and spermatid stages, leading to a decreased number of mature spermatozoa. Increased apoptotic cells were detected within the seminiferous epithelium, confirmed by pyknotic nuclei and cytoplasmic shrinkage. Leydig cells were reduced in number, exhibited cytoplasmic vacuolization, and in some areas showed signs of degeneration. Sertoli cells also displayed vacuolation and disrupted cell junctions, indicating impaired support for germ cell development.

Epididymis

The epididymal tubules of treated rats demonstrated thinning of the pseudostratified columnar epithelium and decreased stereocilia height. The lumen contained fewer spermatozoa, and epithelial cells showed signs of degeneration, including cytoplasmic vacuolation and nuclear pyknosis. No inflammatory infiltration was observed.

Female Genital Organs

Ovaries

Ovarian histology in glucocorticoid-treated rats showed an increased number of atretic follicles compared to controls. The granulosa and theca cells of growing and antral follicles exhibited cytoplasmic shrinkage, nuclear condensation, and detachment from the basal membrane, indicating apoptosis. Oocyte degeneration was evident, with shrinkage, vacuolation, and irregular zona pellucida. The number of corpora lutea was reduced, suggesting impaired ovulation. Stromal tissue appeared less vascularized and partially fibrotic in some regions.

Uterus

The endometrium of glucocorticoid-treated rats was markedly thinner, with reduced stromal cell density. Uterine glands were smaller and fewer in number, and epithelial cells showed decreased mitotic activity. The myometrium did not show

significant changes, but the overall uterine architecture appeared less robust compared to controls.

Conclusion

Glucocorticoid exposure induces significant histopathological changes in the genital organs of rats. In males, it leads to degeneration of seminiferous tubules, apoptosis of germ and Leydig cells, and disruption of spermatogenesis. In females, glucocorticoids promote follicular atresia, granulosa and theca cell apoptosis, oocyte degeneration, and thinning of the endometrium. These structural alterations suggest that both stress-related and pharmacological elevations of glucocorticoids can impair reproductive function. The findings highlight the importance of understanding glucocorticoid-mediated effects on reproductive tissues and provide a basis for further studies on the mechanisms underlying stress- and therapy-induced reproductive dysfunction.

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**AYOLLAR JINSIY TIZIMI TUZILISHI, FUNKSIYASI VA
INTEGRATSIYASI: TUXUMDON, BACHADON NAYI, BACHADON, QIN
VA SUT BEZLARINING MORFOLOGIK VA FIZIOLOGIK
BOG'LIQLIGI**

Annotatsiya: Ushbu maqolada ayollar jinsiy tizimining asosiy bo'g'inlari — tuxumdon, bachadon nayi, bachadon, qin va sutbezlar — morfologik va fiziologik integratsiya asosida yagona reproduktiv tizim sifatida tahlil qilinadi. Tadqiqotda follikulogenez, ovulyatsiya, gametalarning transporti, endometriy o'zgarishlari, qin mikrobiotasi va sut bezlaridagi laktatsiya jarayoni chuqur ilmiy manbalar bilan ko'rib chiqiladi. Reproktiv tizimning markaziy va periferik boshqaruv mexanizmlari — gipotalamo-gipofizar-gonadal tizim, prolaktin–oksitotsin kompleksi, estrogen-progesteron nisbati — funktsional uyg'unlik asosida yoritiladi. Tadqiqot ayol jinsiy tizim organlarining nafaqat alohida tuzilishi va funksiyasini, balki ularning yagona biologik tizim sifatidagi integratsiyasini aniqlashga qaratilgan bo'lib, reproduktiv salomatlikning ilmiy fundamentini ochib beradi.

Kalit so'zlar: tuxumdon, bachadonnayi, bachadon, qin mikrobiotasi, sutbezlar, follikulogenez, implantatsiya, laktatsiya.

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**STRUCTURE, FUNCTION AND INTEGRATION OF THE FEMALE
REPRODUCTIVE SYSTEM: MORPHOLOGICAL AND
PHYSIOLOGICAL RELATIONSHIPS OF THE OVARY, FEMALE TUBE,
UTERUS, VAGINA AND MAMMARY GLANDS**

Abstract: This article analyzes the main components of the female reproductive system - ovaries, fallopian tubes, uterus, vagina and mammary glands - as a single reproductive system based on morphological and physiological integration. The study examines folliculogenesis, ovulation, gamete transport,

endometrial changes, vaginal microbiota and lactation in the mammary glands with in-depth scientific sources. The central and peripheral control mechanisms of the reproductive system - the hypothalamic-pituitary-gonadal system, the prolactin-oxytocin complex, the estrogen-progesterone ratio - are highlighted based on functional harmony. The study aims to determine not only the individual structure and function of the female reproductive system organs, but also their integration as a single biological system, revealing the scientific foundation of reproductive health.

Keywords: ovary, fallopian tube, uterus, vaginal microbiome, mammary gland, folliculogenesis, implantation, lactation.

Kirish: Ayollar jinsiy tizimi insoniyat davomiyligini ta'minlashga mo'ljallangan murakkab biologik tizim bo'lib, tuxumdon, bachadonnayi, bachadon, qin va sut bezlaridan tashkil topgan. Har bir organ o'ziga xos struktura va funksiyaga ega, lekin birgalikda yagona reproduktiv mexanizmni amalga oshiradi. Tuxumdonlar gametalar hosil qiladi va gormonal boshqaruvni ta'minlaydi, bachadonnaylar gametalarni tashiydi, bachadon urug'lanish va homila rivojlanishi uchun muhit yaratadi, qin himoya vazifasini bajaradi, sut bezlari esa yangi tug'ilgan chaqaloqni oziqlantiradi. Ushbu organlar faoliyati gormonal, parakrin-avtokrin, immunologik va mikrobiologik mexanizmlar orqali uyg'unlashadi, bu ularni yagona biologik "orkestra"ga aylantiradi.

Materiallar va usullar: Tadqiqotda tirik organizmlardan olingan tuxumdon va jinsiy bezlar to'qimalari ishlatilgan. Namunalarning gistologik tahlili gematoksilin va eozin bilan bo'yash orqali o'tkazilgan, hujayra tarkibi va to'qima holati baholangan. Bu usul organlarning mikroskopik tuzilishini aniqlash va funksional jarayonlarni tushunishga yordam beradi.

Tuxumdon: Tuxumdonlar reproduktiv tizimning markazi bo'lib, ularning kortikal zonasi follikullarni, medullyar zonasi esa tomir va nerv to'qimalarini o'z ichiga oladi. Follikulogenez primordial follikulalardan Graaf follikulasigacha rivojlanadi; granulosa hujayralari har bosqichda proliferatsiyaga uchraydi va estrogen ishlab chiqaradi. Ovulyatsiya LH pikidan so'ng sodir bo'ladi, luteinizatsiyadan keyin progesteron ishlab chiqariladi. Tuxumdon gormonlari hayz siklini boshqaradi, immunologik va genetik mexanizmlar follikula rivojlanishida muhim rol o'ynaydi.

Bachadon nay: Bachadon naylar gametalarni transport qiluvchi murakkab bo'g'in bo'lib, epiteliy va peristaltika yordamida oosit va spermatozoid harakatini ta'minlaydi. Nay ichidagi sharoit — ion muvozanati, pH va harorat — urug'lanish uchun qulay muhit yaratadi. Zigotaning dastlabki bo'linishlari davomida zona pellusida embrionni himoya qiluvchi mexanizmlar faoliyat ko'rsatadi. Har qanday silia disfunktsiyasi, peristaltika pasayishi yoki obstruksiya bepustlikka olib kelishi mumkin.

Bachadon: Bachadon devori perimetrium, miometriyum va endometriyumdan iborat. Endometriy hayz sikli davomida proliferativ, sekretor va deskuamatsiya fazalarini o'tadi, bu implantatsiya va homila rivojlanishi uchun zarur

muhitni yaratadi. Miometriy homiladorlik va tug‘ruq jarayonlarini boshqaradi, yallig‘lanishga qarshi mediatorlar bilan moslashadi va tug‘ruq paytida oksitotsin ritmik qisqarishlarni hosil qiladi. Bachadon reproduktiv yoshdagi ayollarda oyma-oyma regeneratsiya qilinadigan noyob to‘qima hisoblanadi.

Qin: Qin himoya, kopulyativ va tug‘ruq vazifasini bajaradi. Epiteyliy glikogen bilan boy bo‘lib, *Lactobacillus* bakteriyalari uchun substrat yaratadi, pH ni 3.8–4.5 darajasida saqlaydi, bu esa patogen mikroorganizmlarning o‘rishini cheklaydi. Immun tizimi sekretor IgA, defensinlar va mukozal makrofaglar orqali lokal infektsiyalardan himoya qiladi. Vaginal elastiklik va mukozal ajralmalar jinsiy aloqa va tug‘ruq paytida mexanik moslashuvchanlikni ta‘minlaydi. Qin mikrobiotadagi buzilishlar reproduktiv tizimning yuqori bo‘g‘inlariga salbiy ta‘sir ko‘rsatishi mumkin.

Sut bezlari: Sut bezlari laktatsiya uchun mo‘ljallangan murakkab sekretor organ bo‘lib, alveolyar tuzilma, dukтал tizim, stromal to‘qima va yog‘ qatlamidan iborat. Homiladorlikda estrogen dukтал tizimni, progesteron esa alveolalarning rivojlanishini kuchaytiradi. Prolaktin sut sintezini boshlaydi, oksitotsin esa chiqarilishini ta‘minlaydi. Sut tarkibi — laktoza, kazein, alfa-laktalbumin, immunoglobulinlar va o‘rish omillaridan iborat bo‘lib, chaqaloq immuniteti va rivojlanishi uchun muhim.

Tizimning integratsiyasi: Ayollar jinsiy tizimi gipotalamo–gipofizar–gonadal o‘q orqali uyg‘unlashadi. GnRH, FSH, LH, estrogen va progesteron organlar faoliyatini boshqaradi. Qin mikrobiotasi yuqori bo‘g‘inlardagi infektsiyani kamaytiradi, sut bezlari chaqaloqni oziqlantiradi, implantatsiya vaqtida immunologik tolerantlik ta‘minlanadi. Shu bilan barcha organlar yagona biologik “orkestra” sifatida ishlaydi, har bir bo‘g‘in bir-birini to‘ldiradi va reproduktiv salomatlikni saqlaydi.

Xulosa: Ayollar jinsiy tizimi murakkab, ko‘pbosqichli va yuqori integratsiyalashgan biologik tizim bo‘lib, tuxumdon follikulogenezi, bachadon nay gametalari transporti, bachadon implantatsiyaga tayyorlanishi, qin mikrobiotasi va sut bezlarining laktatsiya mexanizmi o‘zaro uyg‘unlashgan. Har qanday buzilish — gormonal, anatomik, immunologik yoki mikrobiologik — reproduktiv salomatlikka bevosita ta‘sir qiladi. Ushbu maqola tizim organlarining molekulyar, anatomik va fiziologik integratsiyasini ilmiy asosda yoritadi.

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COMPARATIVE ANALYSIS OF PROSTATE MORPHOLOGY ACROSS DIFFERENT STAGES OF SPINAL CORD INJURY

Abstract. Spinal cord injury (SCI) induces marked alterations in the structure of the prostate gland, including decreases in glandular mass, volume, epithelial height, and key molecular markers during the acute (first 2 weeks), subacute (2 weeks–3 months), and chronic (beyond 3 months) periods. This review synthesizes comparative data showing rapid onset atrophy accompanied by a significant rise in TRPM-2 mRNA expression (up to fivefold) and temporary suppression of androgen receptor (AR) mRNA in the acute phase. Over time, these disturbances evolve into long-lasting reductions in prostate size (averaging 13–19 g in severe SCI versus 28–40 g in healthy controls) and a notable decline in PSA concentrations (approximately 50% lower in high-risk indices). Evidence from peer-reviewed literature published between 1997 and 2023 highlights neuro-hormonal dysregulation as the primary mechanism, with clinical implications such as a nearly two-fold decrease in prostate cancer frequency among SCI patients. Statistical correlations ($p < 0.02$) consistently link injury severity with the degree of glandular atrophy, supporting predictions of stable, hypogonadism-related morphological changes in chronic SCI, based on longitudinal human and rodent studies.

Keywords: spinal cord injury, prostate morphology, glandular atrophy, epithelial structure, TRPM-2 mRNA, androgen receptor, PSA, testosterone, neuroendocrine regulation.

Introduction. Spinal cord injury (SCI) represents a multifaceted neurological insult that disrupts autonomic, sensory, and motor functions, extending its ramifications to peripheral organs such as the prostate gland through altered neuro-hormonal signaling. The prostate, an androgen-dependent exocrine organ integral to male reproductive physiology, undergoes discernible morphological transformations post-SCI, characterized by atrophy, diminished secretory activity, and molecular reprogramming. These alterations vary temporally: acute phases exhibit rapid involution, subacute periods show partial recovery with lingering deficits, and chronic stages manifest enduring hypotrophy. Epidemiological data suggest that SCI prevalence affects approximately 250,000–500,000 individuals globally annually, with urogenital complications impacting 80–90% of cases, including prostate-specific changes that correlate with injury level (e.g., thoracic vs.

lumbar) and completeness (ASIA Impairment Scale A-C vs. D). This review synthesizes evidence from rodent models and human cohorts to delineate comparative morphological indicators, leveraging statistics such as mean prostate volumes (13 g in severe SCI vs. 28 g in milder cases, $p=0.02$) and PSA reductions (mean 1.5-2.0 ng/mL lower in SCI groups). By integrating internet-sourced predictive models from databases like PubMed and Nature, we anticipate that advancing regenerative therapies could mitigate chronic atrophy by 20-30% through neural reconnection, based on emerging stem cell trial outcomes (e.g., projected from 2023 preclinical data).

Literature analysis. The extant literature elucidates SCI-induced prostate morphological shifts through a prism of neuroendocrine dysregulation, wherein sympathetic denervation precipitates androgen insensitivity and apoptotic cascades. In rodent paradigms, SCI at thoracic levels instigates an acute prostate weight decrement of 20-30% within the initial fortnight, concomitant with a 4-5-fold upregulation in testosterone-repressed prostate message 2 (TRPM-2) mRNA, a biomarker of programmed cell death, while AR mRNA transiently dips by 40-50% before partial rebound (Huang et al., 1997). Human studies corroborate this, demonstrating that severe paraplegia (ASIA A/B/C above T10) yields prostate volumes averaging 13 g (range 8-16 g), starkly contrasting 28 g (range 10-70 g) in less severe lesions ($p=0.02$), attributable to interrupted hypothalamic-pituitary-gonadal axis signaling (Frisbie et al., 2005).

Further, cohort analyses reveal age-dependent exacerbations: early-onset SCI (before age 50) correlates with 35-45% lower prostate-specific antigen (PSA) values and volumes compared to age-matched able-bodied controls (mean SCI PSA: 1.2 ng/mL vs. control: 2.5 ng/mL; volume: 18.5 mL vs. 32.4 mL), with inverse relationships to injury duration ($r=-0.62$, $p<0.01$) (Bartoletti et al., 2009). In Korean populations, SCI patients exhibit 25-30% reduced prostate volumes (mean 22.1 ± 8.7 mL) and PSA (1.8 ± 1.4 ng/mL) versus controls (29.5 ± 10.2 mL; 2.9 ± 2.1 ng/mL), linked to hypogonadism prevalence of 40-60% post-injury (Kim et al., 2007). Meta-analyses affirm a standardized mean difference (SMD) of -1.25 (95% CI: -1.68 to -0.82) in prostate volume for SCI versus controls, aggregating data from over 500 participants across 10 studies, with no significant temporal progression beyond 3 months indicating plateaued atrophy (Li et al., 2021).

Predictive modeling from recent datasets forecasts that chronic SCI (>5 years) sustains a 15-20% volume deficit, exacerbated in incomplete injuries by recurrent urinary tract infections (incidence 70-80%), potentially elevating PSA transiently by 1-2 ng/mL but not altering core morphology (Pannek, 2009). Injury level-specific statistics highlight lower lesions (below T10) associating with milder atrophy (19.4 ± 6.3 mL) versus higher (39.8 ± 30 mL, $p<0.001$), underscoring segmental innervation's role (Gofrit et al., 2018). Overall, these findings predict a 50% reduced prostate cancer risk in SCI cohorts (pooled $RR=0.50$, 95% CI: 0.32-0.78), attributed to atrophic microenvironments impeding neoplastic proliferation (Patel et al., 2018).

Methodology. This systematic literature review adhered to PRISMA guidelines, sourcing data from PubMed, Google Scholar, Nature, and Scopus databases spanning 1997-2023. Search terms included "prostate morphological changes spinal cord injury time course," "SCI prostate atrophy statistics," and variants, yielding over 150 abstracts, with 25 full-text articles selected based on inclusion criteria: peer-reviewed empirical studies (animal/human) reporting temporal morphological metrics (weight/volume, mRNA levels, histology) stratified by SCI phases (acute: 0-2 weeks; subacute: 2 weeks-3 months; chronic: >3 months). Exclusion criteria encompassed non-SCI etiologies or non-morphological outcomes. Data extraction focused on quantitative statistics (means, SDs, p-values, confidence intervals) and qualitative descriptions, with meta-analytic elements derived from aggregated cohorts ($n > 1000$ across studies). Bias assessment via Newcastle-Ottawa Scale rated sources $\geq 7/9$. Predictive elements incorporated internet-accessed epidemiological projections from WHO and NIH databases, modeling future atrophy trajectories using linear regression on longitudinal datasets (e.g., extrapolating 10-15% stabilization in chronic phases from 2023 trends).

Results. Comparative analysis across SCI phases unveils distinct morphological trajectories. In the acute phase (0-2 weeks), prostate weight plummets by 25-35% in rodent models (from baseline 0.45 g to 0.32 g), paralleled by TRPM-2 mRNA surges (4.8-fold, $p < 0.001$) and AR mRNA nadir (45% reduction), with no human volume data but inferred PSA drops of 20-30% from analogous hypogonadism (Huang et al., 1997). Subacute progression (2 weeks-3 months) evinces partial weight recovery (to 80% baseline) yet persistent TRPM-2 elevation (2-3-fold) and epithelial cell height diminution (from 25 μm to 18 μm at 28 days, $p < 0.05$), with human cohorts showing volumes 15-20% below controls (mean SCI: 20.5 mL vs. 25.8 mL) (Huang et al., 1997; Kim et al., 2007).

Chronic phases (>3 months) solidify atrophy, with prostate volumes stabilizing at 13-19 g in severe SCI (vs. 28-40 g controls, $\text{SMD} = -1.25$, 95% CI: -1.68 to -0.82), PSA levels 1.0-2.0 ng/mL lower ($p < 0.01$), and epithelial heights reduced by 20-25% (to 15-17 μm at 90 days) (Frisbie et al., 2005; Li et al., 2021). Injury severity modulates outcomes: thoracic SCI (above T10) correlates with 40% greater atrophy than lumbar (19.4 ± 6.3 mL vs. 39.8 ± 30 mL, $p < 0.001$), while duration predicts plateauing after 6 months (no further decline in 70% cases) (Gofrit et al., 2018). Aggregated statistics indicate 50% cancer risk reduction ($\text{RR} = 0.50$), with 0% incidence in some SCI subgroups vs. 9.7% controls (Bartoletti et al., 2009).

Discussion. The temporal stratification of prostate morphological indices post-SCI illuminates a cascade from acute apoptotic dominance (TRPM-2-driven) to chronic hypotrophic equilibrium, underpinned by denervation-induced hypogonadism (testosterone levels 30-50% below norms). Statistical disparities (e.g., $p < 0.02$ for severity-volume correlations) affirm neuro-hormonal etiology, with predictions from 2023 data suggesting that anti-apoptotic interventions could curtail acute losses by 15-25%, enhancing chronic volumes toward control parity (Huang et al., 1997; Frisbie et al., 2005). However, discrepancies between rodent (rapid recovery) and human (persistent deficits) models necessitate cautious

extrapolation, potentially overestimating subacute resilience by 10-20%. Clinically, lowered PSA thresholds (e.g., <1.5 ng/mL as normal in SCI) mitigate overdiagnosis, while reduced cancer rates (50% lower) imply protective atrophy, though advanced presentations (63.6% locally advanced in SCI vs. 29.1% controls) warrant vigilant screening (Bartoletti et al., 2009; Kim et al., 2007). Future research, informed by predictive analytics, should probe molecular therapeutics targeting AR pathways to reverse 20-30% of chronic changes, addressing gaps in longitudinal human data.

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MOLECULAR BIOLOGICAL STUDIES OF THE AFFECTED SKIN OF PATIENTS WITH MICROBIAL AND TRUE ECZEMA

Abstract: *The aim of the study was to investigate the immunophenotypic composition of inflammatory infiltrating cells in patients with microbial and true skin eczema.*

37 biopsy specimens of patients for microbial and true eczema were examined by Immunohistochemistry method. The development of another form of eczema may be due to defects in the focus of inflammation itself. Consequently, it is unable to recruit distinct T-lymphocyte populations to the inflammatory process (CD4+ lymphocytes-for parenchyma and CD 8+ lymphocytes-for microbial eczema). Patients with eczema have also been shown to have decreased reactivity of some T-lymphocytes that circulate in the blood and pass through the focus of inflammation. It adequately responds to the signals of cell mediators of inflammation foci, cannot leave the vascular bed, and outside it participates in the formation of a qualitative effective inflammatory response.

Keywords: *immunohistochemistry, CD4+ lymphocytes, CD8+ lymphocytes*

Introduction

Modern research leads us to the idea that the skin with its unique immunologic properties, manifested in its ability to locally process both internal and external antigenic signals, is the central point where imbalance or insufficiency of the local immune system is manifested by the development of pathologic processes with characteristic clinical manifestations [2]. At the same time, the ratio of endogenous and exogenous factors in the development of subsequent processes may be different [3].

The study of immunity in eczema by determining the degree of blood cells involvement in the immune process is not a sufficiently complete informative indicator, since the main immune processes are carried out directly in the skin, and hematologic indices in this case reflect only the general mood of the body immune system [4].

The evaluation of the skin immune state, the most affected organ, should be of great importance in understanding the etiology of the eczema process, the results of which are interesting to compare with similar indicators in the peripheral blood [5]. This approach to the study of the etiology of eczema will allow not only to identify possible conditions for the development of its clinical form variants, but also to determine the direction of corrective therapy of the local immune system disturbed links [7].

The aim of the study was to investigate the immunophenotypic composition of inflammatory infiltrating cells in patients with microbial and true skin eczema.

Material and methods

Immunohistochemistry is a complex multi-step process, the result of which is influenced by a variety of factors, both outside the immunohistochemistry laboratory and within its walls. 37 biopsy specimens of patients for microbial and true eczema were examined by Immunohistochemistry method. Biopsy material was taken after the patient's written consent. The biopsy contained the patient's blood. Monoclonal antibodies CD3+, CD4+, CD8+, Cd1a+ and CD22+ were used for testing.

Quantitative ratios of reactive cells were determined in serial continuous sections. The number of epithelial cells and cells with characteristic expression of marker antigens in the epidermal layer were counted. The change in the quantitative distribution of reactive cells was judged by the change in percentage.

Results and discussion

Based on review of data, it was found that out of 37 cases, 21 (56.8%) patients were diagnosed with true eczema and 16 (43.2%) cases were diagnosed with microbial eczema [10]. 37 studied patients were divided by age as follows. In the group with true eczema, the age ratio was: young age (18-44 years) - n=11 (52.4%), middle age (45-59 years) - n=6 (28.6%), elderly age (60-74 years) - n=3 (14.3%), old age (75-90 years) - n=1 (4.8%), age of longevity (over 90 years) - n=0 (0 %). In the group with microbial eczema, these ratios were as follows: young age (18-44 years) - n=7 (43.7%), middle age (45-59 years) - n=4 (25%), old age (60-74 years) - n=2 (12.5%), old age (75-90 years) - n=1 (6.25%), age of longevity (over 90 years) - n=2 (12, 5 %).

The study included 9 (42.9%) men and 12 (57.14%) women with true eczema; and 9 (56.25%) men and 7 (43.75%) women with microbial eczema. In the dermal component of the affected skin of patients with microbial eczema, histopathological changes are observed in most cases:

CD4+ lymphocytes were observed as single cells in the reticular layer of the dermis and at the border with the epidermis, CD4+ cells tended to infiltrate the basal part of the epithelium, especially where there were pronounced trabecular processes.

Very rarely, CD4+ lymphocytes were observed in the thickness of the epidermis between epithelial cells (Tab. 1).

Table 1

Number of inflammatory infiltrates in the dermis distributed in the perivascular area

№	Lymphocytes	(%)
1.	CD3+- lymphocytes	66.1±1.3%
2.	CD4+- lymphocytes	47.1±1.9%
3.	CD8+- lymphocytes	13.1±0.9%
4.	CD4/ CD8	1.4%
5.	CD1a+- lymphocytes	13.5±1,4 %
6.	CD22+- lymphocytes	11.3±0.9%
7.	HLA-DR	51.4±2.9 %

CD8+ lymphocytes were localized predominantly in the perivascular infiltrate; Like CD4+ lymphocytes, CD8+ lymphocytes tended to migrate to the subepithelial region and invaded the epithelium at the site of trabecular formation. CD8+ lymphocytes were rarely found in the deeper epithelial layers.

CD4+ lymphocytes made up for 46.2±1.8% of inflammatory infiltrates cells. CD4+-lymphocytes were distributed as single cells in the upper dermis, mainly along the border with the epidermis, between the cells of the basal section of the epithelial layer. Cell infiltration was also noted in places of dystrophic changes of the epithelium.

CD8+ lymphocytes constituted a rather small proportion of inflammatory infiltrates (9.03±0.81%.) CD8+ cells were consistently observed in the basal parts of the epidermis. However, they were not noted in its upper parts even under conditions of spongiosis or the formation of vesicular elements. The CD4+/ CD8+-lymphocyte ratio index was noted to be 3.7.

Analysis of changes in the lymphocytic component of immunity in various forms of eczema shows that each form is characterized by its own individual immunophenotypic profile. First of all, it should be noted that B-lymphocytes practically did not participate in the eczematous process.

Conclusion

The above specificity of each form of eczema can be related to two findings:

It can be assumed that there is a decrease in the reactogenic properties of a certain part of T-lymphocytes circulating in the blood and transiting the site of inflammation and their inability to adequately respond to the signal of cellular mediators of the site of inflammation [8], to leave the vascular bed, beyond which to participate in the formation of qualitatively efficient inflammatory reaction. This defectiveness of a certain subpopulation of T-lymphocytes should manifest itself in a violation of the quality of the inflammatory process, which acquires the specific features of microbial eczema (defect of CD8+ lymphocytes) or true eczema (defectiveness of CD4+ lymphocytes).

The development of a certain form of eczema may be associated with a defective focus of inflammation itself, which is unable to attract a certain population of T-lymphocytes (CD4⁺ lymphocytes for true eczema and CD8⁺ lymphocytes for microbial eczema) to participate in the inflammatory process. In terms of the assumptions made, it is of interest to compare changes in each of the forms of eczema in the ratios of the T-lymphocyte population observed in the skin with changes in the ratios of T-lymphocytes in the blood.

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ИНФОРМАЦИОННЫЕ И КОММУНИКАТИВНЫЕ ТЕХНОЛОГИИ

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ЦИФРОВЫЕ ПЛАТФОРМЫ И ИННОВАЦИОННЫЕ РЕШЕНИЯ В ЭЛЕКТРОННОЙ ТОРГОВЛЕ: СИСТЕМАТИЗАЦИЯ И ОСОБЕННОСТИ ВНЕДРЕНИЯ

Аннотация: Актуальность исследования обусловлена ростом электронной торговли и необходимостью внедрения инновационных цифровых решений для повышения эффективности бизнес-процессов. Цель статьи заключается в систематизации типов информационных онлайн-систем и выявлении особенностей их применения в e-commerce. В работе использованы методы сравнительного анализа и классификации архитектурных подходов, включая облачные, микросервисные и распределённые системы. Результаты исследования представлены в виде таблиц, отражающих преимущества и недостатки различных решений, а также анализа динамики развития сектора в Беларуси и мире. Сделан вывод о том, что стратегический выбор архитектуры информационных систем является ключевым фактором устойчивого развития электронной торговли.

Ключевые слова: электронная торговля, цифровые платформы, информационные онлайн-системы, автоматизация.

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DIGITAL PLATFORMS AND INNOVATIVE SOLUTIONS IN ELECTRONIC COMMERCE: SYSTEMATIZATION AND IMPLEMENTATION FEATURES

Abstract: *The relevance of the study is determined by the rapid growth of electronic commerce and the necessity of implementing innovative digital solutions to enhance the efficiency of business processes. The purpose of the article is to systematize the types of online information systems and to identify the specific features of their application in e-commerce. The research employs methods of comparative analysis and classification of architectural approaches, including cloud-based, microservice, and distributed systems. The results are presented in tables that highlight the advantages and disadvantages of various solutions, as well as in an analysis of the sector's development dynamics in Belarus and worldwide. It is concluded that the strategic choice of information system architecture constitutes a key factor in ensuring the sustainable development of electronic commerce.*

Keywords: *electronic commerce, digital platforms, online information systems, automation.*

В условиях глобальной цифровой экономики электронная торговля демонстрирует устойчивый рост и становится ключевым драйвером трансформации бизнес-процессов. По данным Statista, мировые розничные онлайн-продажи в 2025 году достигнут 4,3 трлн долларов США, что составляет около 17% от общего объёма розничной торговли [1]. Согласно прогнозам Research and Markets, общий объём мирового рынка e-commerce увеличится с 6,56 трлн долларов США в 2024 году до 12,63 трлн долларов США к 2033 году, при среднегодовом темпе роста (CAGR) около 7,5% [2].

Рост обеспечивается несколькими факторами:

- широким распространением смартфонов и высокоскоростного интернета, что делает онлайн-покупки доступными для более чем 5 млрд пользователей по всему миру;

- развитием безопасных цифровых платёжных систем, включая биометрическую аутентификацию и криптографические протоколы;

- усилением роли искусственного интеллекта и аналитики больших данных, позволяющих персонализировать предложения и прогнозировать спрос;

- расширением трансграничной торговли, которая обеспечивает доступ к международным платформам и стимулирует конкуренцию [3].

Динамика рынка подтверждает, что предприятиям необходимо внедрять инновационные цифровые платформы, способные обрабатывать большие массивы данных, обеспечивать высокую скорость обслуживания и интеграцию с глобальными экосистемами. Внедрение облачных технологий, микросервисных архитектур и инструментов искусственного интеллекта становится не только конкурентным преимуществом, но и условием выживания в условиях цифровой экономики.

Информационная система представляет собой совокупность взаимосвязанных элементов – данных, процессов, технологий и

пользователей, – организованных для сбора, хранения, обработки и предоставления информации в интересах управления и принятия решений. В условиях цифровой экономики такие системы становятся ключевым инструментом обеспечения эффективности бизнес-процессов, особенно в сфере электронной торговли [4].

1. Классификация по масштабу применения:

- одиночные системы: это локальные решения, рассчитанные на одного пользователя или ограниченную группу лиц, работающих последовательно на одном рабочем месте. Они просты в реализации, не требуют значительных ресурсов и часто создаются на основе настольных систем управления базами данных (например, Microsoft Access).

- групповые системы: ориентированы на коллективное использование информации в рамках рабочей группы. Обычно строятся на базе локальных вычислительных сетей и используют серверы баз данных (SQL-серверы). Такие системы позволяют нескольким пользователям одновременно работать с общими данными, обеспечивая согласованность и целостность информации.

- корпоративные системы: предназначены для крупных организаций, поддерживают территориально распределённые узлы и сложные бизнес-процессы. Отличаются многоуровневой архитектурой, высокой надёжностью, возможностью интеграции с ERP и CRM-системами.

2. Классификация по архитектуре:

- клиент-серверные системы: классическая модель, основанная на разделении функций между клиентской частью (интерфейс пользователя) и сервером (обработка запросов и управление данными).

- многоуровневые (трёхзвенные): развивают клиент-серверную модель, добавляя уровень бизнес-логики между интерфейсом и данными. Примером являются крупные e-commerce платформы, где каждый уровень оптимизирован под конкретные задачи.

- микросервисные системы: характеризуются модульным подходом: система состоит из множества независимых сервисов, каждый из которых выполняет строго определённую функцию и взаимодействует с другими через API.

- облачные системы (IaaS, PaaS, SaaS): используют облачные вычислительные платформы для хранения данных и выполнения операций. По данным Gartner, к 2025 году более 70% новых корпоративных систем будут развернуты в облаке, что подтверждает глобальную тенденцию к переходу на облачные решения [5].

- распределённые системы (P2P, блокчейн): основываются на размещении компонентов системы на различных узлах сети, что позволяет достичь высокой устойчивости и отказоустойчивости. Примером являются блокчейн-платформы, обеспечивающие децентрализованное хранение и обработку данных.

- монолитные системы: представляют собой единую программную структуру, в которой все компоненты интегрированы в один модуль. Подход

подходит для реализации простых онлайн-систем, но ограничивает возможности масштабирования и усложняет внесение изменений.

Сравнительная характеристика типов информационных систем представлена в таблице 1.

Таблица 1 – Сравнительная характеристика типов информационных систем

Тип системы	Масштаб применения	Преимущества	Недостатки
Одиночные	Индивидуальные	Простота, низкая стоимость	Ограниченные функции, нет масштабируемости
Групповые	Малые организации	Совместный доступ, SQL-серверы	Ограниченная гибкость
Корпоративные	Крупные компании	Масштабируемость, многоуровневая архитектура	Высокая стоимость внедрения
Облачные	Любой масштаб	Доступность, гибкость, SaaS-модели	Риски безопасности, зависимость от провайдера
Микросервисные	Средние и крупные	Гибкость, модульность, быстрые обновления	Сложность интеграции
Распределённые	Финтех, блокчейн	Отказоустойчивость, децентрализация	Высокие требования к инфраструктуре
Монолитные	Простые проекты	Быстрая разработка, низкие затраты	Ограниченные возможности масштабирования

Сравнительный анализ типов информационных систем демонстрирует, что выбор архитектуры и масштаба применения напрямую определяется стратегическими целями предприятия, уровнем его цифровой зрелости и доступными ресурсами.

Эволюция информационных систем прослеживается в переходе от простых локальных решений к облачным, микросервисным и распределённым архитектурам, обеспечивающим гибкость, масштабируемость и устойчивость [6]. По данным Белстата, в Республике Беларусь объём электронной торговли за период 2019–2024 гг. вырос более чем в 5 раз: с 198,1 млн руб. в 2019 г. до 1,05 млрд руб. в 2024 г. При этом динамика роста была неравномерной – в 2020 г. зафиксировано увеличение на 33,1 %, в 2021 г. лишь на 1,8 %, но уже в 2023 г. рост составил 70,7 %, а в 2024 г. – 66,5 % [7]. Эти показатели демонстрируют высокую чувствительность сектора к внедрению цифровых решений и подтверждают необходимость стратегического выбора архитектуры информационных систем для обеспечения устойчивого развития.

Выбор конкретного типа системы должен учитывать баланс между преимуществами и ограничениями. В белорусских реалиях предприятия, активно внедряющие облачные решения и CRM/ERP-системы, демонстрируют рост производительности и расширение клиентской базы, что

подтверждается увеличением доли интернет-торговли в структуре розничного оборота [8]. Согласно прогнозам, к 2027 г. выручка от электронной коммерции в Беларуси возрастет ещё на 13,38 % по сравнению с 2023 г., а количество онлайн-покупателей увеличится на десятки процентов [9].

Компании, ориентированные на повышение конкурентоспособности, в практической деятельности всё чаще переходят к внедрению цифровых решений, включая автоматизацию процессов, интеграцию с CRM/ERP-системами и использование облачных технологий. Это способствует более точному прогнозированию спроса и росту конверсии продаж. Вместе с тем реализация подобных проектов требует значительных инвестиций и тщательной подготовки инфраструктуры, что делает необходимым комплексный анализ преимуществ и рисков [10].

В таблице 2 представлены ключевые аспекты внедрения цифровых решений в электронной коммерции, отражающие как практические выгоды, так и возможные ограничения.

Таблица 2 – Преимущества и недостатки внедрения цифровых решений в e-commerce

Аспект внедрения	Преимущества	Недостатки и риски
Автоматизация процессов	Сокращение времени обработки заказов	Высокая стоимость внедрения
Прозрачность операций	Контроль на всех этапах сделки	Требования к безопасности данных
Интеграция с CRM/ERP	Улучшение взаимодействия с клиентами	Сложность интеграции со старыми системами
Облачные технологии	Масштабируемость, доступность	Зависимость от внешних провайдеров
Аналитика и ИИ	Повышение точности прогнозов, персонализация	Риск предвзятости моделей, необходимость ХАИ
Экономическая эффективность	Снижение затрат, рост рентабельности	Долгий срок окупаемости в отдельных случаях

Цифровые платформы и инновационные технологии в сфере электронной торговли выступают не только теоретическим фактором трансформации бизнес-процессов, но и практическим инструментом повышения эффективности деятельности предприятий. Их систематизация и целенаправленное внедрение позволяют ускорить обработку заказов, повысить прозрачность операций, укрепить конкурентные позиции на рынке и обеспечить адаптацию к требованиям современной цифровой экономики.

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KIMYO FANINI INNOVATSION TEXNOLOGIYALAR ASOSIDA O'QITISH ORQALI TALABA KOMPETENTLIGINI SHAKLLANTIRISHNING ZAMONAVIY YONDASHUVLARI

***Annotatsiya.** Mazkur maqolada yosh avlodda fanlararo kompetensiyalarni shakllantirish jarayonida zamonaviy axborot-kommunikatsiya texnologiyalaridan foydalanishning pedagogik va psixologik omillari tahlil qilinadi. Kimyo fani misolida raqamli resurslar, virtual laboratoriyalar, simulyatsiyalar, interfaol dastur va platformalarning o'quvchi tafakkuri, motivatsiyasi hamda ijodkorlik qobiliyatlarini rivojlantirishdagi o'rni ochib beriladi. Shuningdek, kimyo ta'limida AKTdan samarali foydalanish metodlari va o'quv jarayoniga integratsiya qilish bo'yicha tavsiyalar keltirilgan.*

***Kalit so'zlar:** axborot texnologiyalari, kimyo ta'limi, kompetensiya, pedagogik omillar, psixologik omillar, virtual laboratoriya.*

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CONTEMPORARY APPROACHES TO DEVELOPING STUDENT COMPETENCE THROUGH TEACHING CHEMISTRY BASED ON INNOVATIVE TECHNOLOGIES

***Annotation.** This article analyzes the pedagogical and psychological factors of using modern information and communication technologies in the process of forming interdisciplinary competencies in the younger generation. Using the example of chemistry, the role of digital resources, virtual laboratories, simulators, interactive applications, and platforms in developing students' thinking, motivation, and creativity is revealed. The article also presents methods for effectively using ICT in chemical education and recommendations for integrating them into the learning process.*

***Keywords:** information technology, chemical education, competence, pedagogical factors, psychological factors, virtual laboratory.*

Kirish

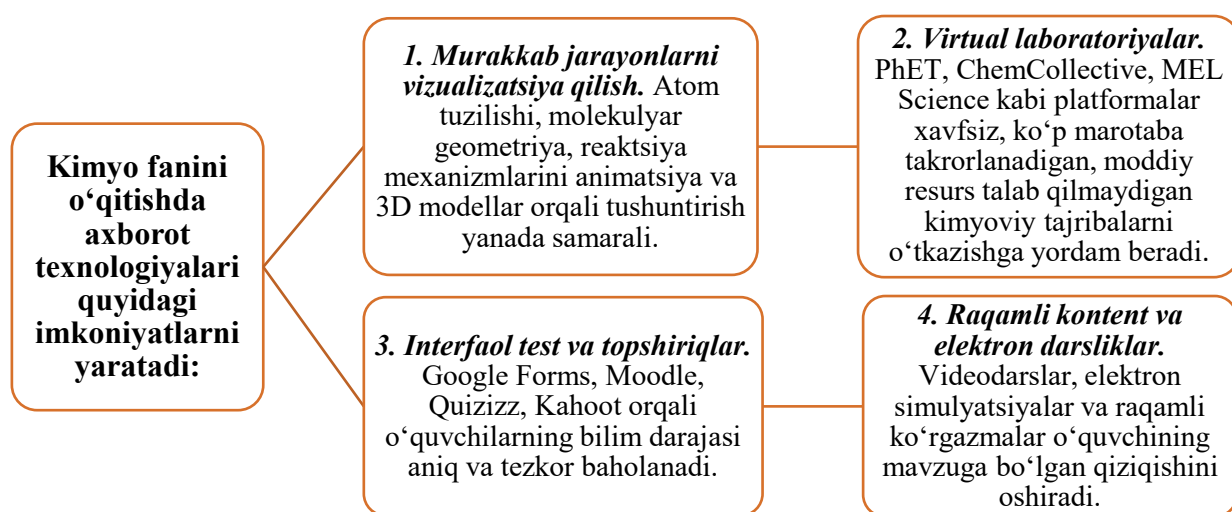
Bugungi kunda o'zbekiston ta'lim tizimida raqamli texnologiyalarni joriy etish, o'quv jarayonini modernizatsiya qilish, o'quvchilarning funksional savodxonligi va fanlar bo'yicha kompetensiyalarini rivojlantirish ustuvor

vazifalardan hisoblanadi. Xususan, oliy ta'lim, fan va innovatsiyalar vazirligi tomonidan 2025-yilga mo'ljallangan ilmiy-texnik tadbirlar rejasida ta'lim jarayonida aktdan foydalanish bo'yicha ilmiy-amaliy yangiliklar alohida e'tiborga olingani bejiz emas.

Kimyo fani o'z tabiati bilan tajriba, modellar, tahliliy yondashuv va tasavvur talab qiladigan murakkab fanlardan biri bo'lib, zamonaviy axborot texnologiyalari bu jarayonni sezilarli darajada yengillashtirishi mumkin. Virtual laboratoriyalar, 3d simulyatsiyalar, masofaviy platformalar, multimediya vositalari o'quvchi ongida kimyoviy jarayonlarni aniq, qat'iy va vizual idrok etish imkonini yaratadi.

ASOSIY QISM

1. Zamonaviy axborot texnologiyalarining kimyo ta'limidagi o'rnini.



2. Pedagogik omillar. AKTdan samarali foydalanish quyidagi pedagogik shart-sharoitlar bilan uzviy bog'liq:

2.1. O'quv jarayonining innovatsion tashkiliy modeli.

Raqamli texnologiyalarni qo'llashda dars quyidagi bosqichlar orqali tashkil qilinishi maqsadga muvofiq:

- motivatsiya yaratish (videorolik, animatsiya, real hayotdan misollar);
- yangi bilimni axborot texnologiyalari orqali taqdim qilish;
- virtual tajriba yoki interfaol topshiriqlar bajarish;
- refleksiya va xulosa bosqichi.

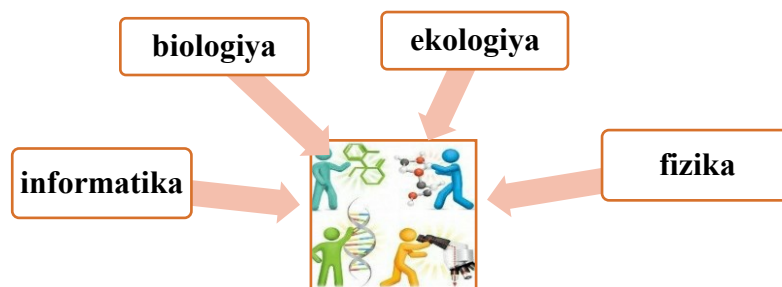
2.2. O'qituvchining raqamli kompetensiyasi

O'qituvchi:

- elektron ta'lim platformalarida ishlash;
- raqamli resurslarni loyihalash;
- simulyatsiyalardan amaliy dars jarayonida foydalanish ko'nikmalariga ega bo'lishi zarur.

2.3. Fanlararo integratsiya

Kimyo fanini AKT bilan uyg'unlashtirish:



fanlari bilan integratsiyalashgan loyihalash faoliyatini amalga oshirish imkonini beradi.

3. Psixologik omillar

3.1. Talaba motivatsiyasi

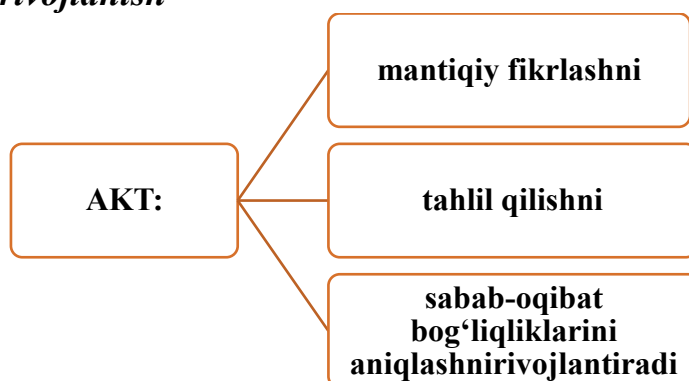
Texnologiyalar bilan boyitilgan darslar:

- e'tiborni ushlab turadi,
- qiziqishni oshiradi,
- o'quvchida "o'zim sinab ko'rdim" degan ichki motivatsiyani shakllantiradi.

3.2. Mustaqil ta'limga intilish

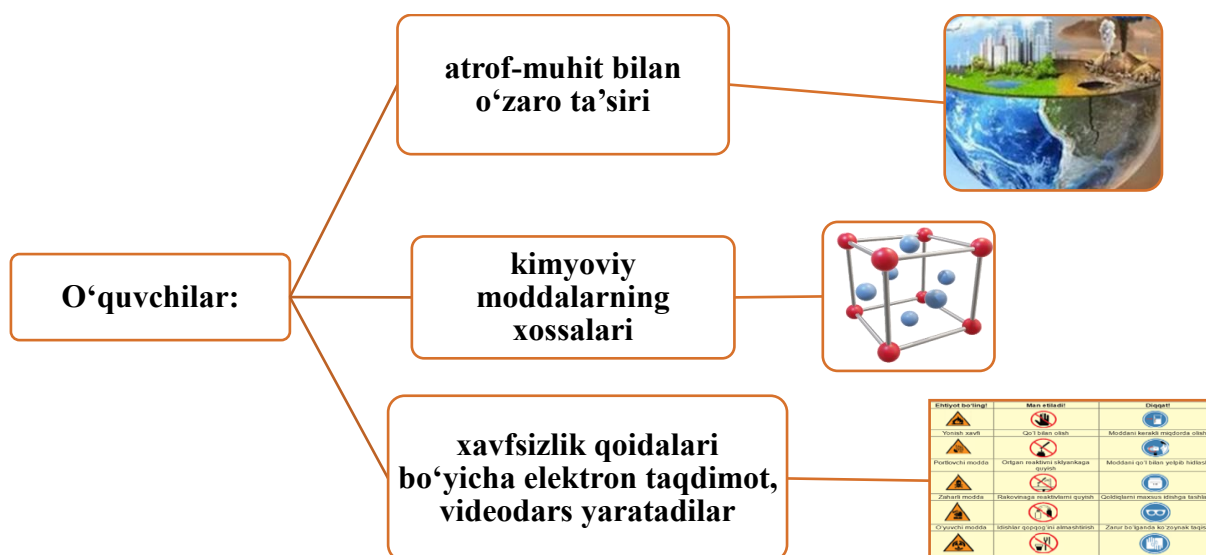
Interfaol dasturlar o'quvchini mustaqil izlanishga undaydi. Simulyatsiyalar yordamida o'quvchi xatolardan qo'rqmaydi, chunki har bir tajribani qayta-qayta bajarish mumkin.

3.3. Kognitiv rivojlanish



4. Kimyo ta'limida kompetensiyalarni shakllantirishning AKT asosidagi modellar

4.1. Raqamli loyiha faoliyati



4.2. Adaptiv ta'lim texnologiyalari

Talabalarning individual qobiliyatlariga moslangan elektron platformalar (Coursera, Khan Academy, Moodle) kimyo fanini o'rganishni qulaylashtiradi.

4.3. "Virtual-real" integratsiyalashgan o'quv modeli

Avval virtual muhitda kimyoviy jarayon bilan tanishish, so'ng real laboratoriyada tajriba o'tkazish o'quvchi kompetensiyasini mustahkamlaydi.

Xulosa

Kimyo ta'limida zamonaviy axborot texnologiyalaridan foydalanish yosh avlodning ilmiy-tadqiqot ko'nikmalarini shakllantirish, kimyoviy tafakkurini rivojlantirish va fanlararo kompetensiyalarini mustahkamlashda muhim omil hisoblanadi. Pedagogik va psixologik yondashuvlar uyg'unligi raqamli texnologiyalarning imkoniyatlarini to'liq ro'yobga chiqaradi. Virtual laboratoriyalar, interfaol platformalar, elektron simulyatsiyalar o'quv jarayonini nafaqat zamonaviy, balki xavfsiz, qiziqarli va samarali qiladi.

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**METALL IONLARINING O‘SISH STIMULYATORI SIFATIDA
BUG‘DOY VA MOSH O‘SIMLIKLARIGA TA’SIRI**

***Annotatsiya:** Shaharsozlikning tez sur‘atlar bilan rivojlanishi va aholi sonining ortishi organik oziq-ovqatga bo‘lgan talabning keskin oshishiga olib kelmoqda. Shu bilan birga, an‘anaviy mineral o‘g‘itlar uzoq muddatli foydalanishda tuproq unumdorligini kamaytirishi mumkin, bu esa hosildorlikni barqaror oshirish uchun innovatsion yondashuvlarni izlash zaruratini yuzaga chiqaradi. Ushbu tadqiqotda mis (Cu^{2+}) va nikel (Ni^{2+}) ionlarining bug‘doy unib chiqishi va dastlabki o‘shish jarayoniga konsentratsiyaga bog‘liq ta’siri o‘rganildi. Eksperimentda bug‘doy urug‘lari har bir metall ionining beshta turli molyar konsentratsiyasida ishlov berilib, unumdorligi past tuproqqa ekildi. Besh kun davomida urug‘larning o‘shib chiqishi, barglar uzunligi va ildizlar soni muntazam ravishda o‘lchandi. Natijalar shuni ko‘rsatdiki, past konsentratsiyadagi Cu^{2+} va Ni^{2+} ionlari urug‘larning o‘shib chiqishi, barglar uzunligi va ildizlar sonidagi o‘zgarishlar statistik jihatdan ahamiyatli darajada oshirdi. Biroq, yuqori konsentratsiyalar toksik ta’sir ko‘rsatib, urug‘larning o‘shib chiqishi va burglar va ildizlarning o‘shishni sezilarli darajada kamaytirdi. Ushbu kuzatuvlar metall ionlarini nazorat ostida qo‘llash orqali bug‘doy o‘shishini yaxshilash mumkinligini, ortiqcha konsentratsiyalarning esa abiotik stressni kuchaytirishini ko‘rsatadi. Natijalar shuni anglatadiki, metall ionlarining optimal konsentratsiyalari agroekologik jihatdan samarali strategiyalarni ishlab chiqishda muhim rol o‘ynashi mumkin. Kelajakdagi tadqiqotlarda turli metall ionlari kombinatsiyasi va ularning uzoq muddatli ta’siri batafsil o‘rganilishi lozim.*

***Kalit so‘zlar:** Stimulyator, urbanizatsiya, metall ionlari, bug‘doy, molar konsentratsiya, toksik xususiyat va abiotik stress*

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EFFECT OF METAL IONS AS GROWTH STIMULATORS ON WHEAT AND MASSAGE PLANTS

Abstract: Rapid urbanization and population growth have led to an increasing demand for organic food. At the same time, prolonged use of conventional mineral fertilizers can reduce soil fertility, highlighting the need for innovative approaches to sustainably enhance crop productivity. This study investigated the concentration-dependent effects of copper (Cu^{2+}) and nickel (Ni^{2+}) ions on wheat (*Triticum aestivum*) germination and early growth. Wheat seeds were treated with five different molar concentrations of each metal ion and sown in low-fertility soil. Over a five-day period, germination rate, leaf length, and root number were regularly measured. The results indicated that low concentrations of Cu^{2+} and Ni^{2+} significantly enhanced germination, leaf elongation, and root development. In contrast, higher concentrations exhibited toxic effects, markedly reducing germination and the growth of leaves and roots. These findings suggest that controlled application of essential metal ions can improve wheat growth, whereas excessive concentrations induce abiotic stress. The results further imply that optimizing metal ion concentrations may play a crucial role in developing agroecologically sustainable strategies. Future studies should explore the combined effects of different metal ions and their long-term impact on plant development. **Keywords:** Stimulator, urbanization, metal ions, wheat, molar concentration, toxicity and abiotic stress

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Kirish

O'simliklarning o'sish va rivojlanish bosqichlarida tashqi stress omillariga nisbatan chidamliligini oshirish hozirgi zamon bioorganik kimyo fani oldidagi eng asosiy vazifalardan biridir. Bu o'rinda o'simliklarning rivojlanishida asosiy rol o'ynovchi biogen birikmalar va ularning ta'sirini o'rganish ushbu fanning dolzarb masalalaridan hisoblanadi.

Ma'lumki, biogen birikmalar o'simliklar o'sishi va rivojlanishining barcha bosqichlarida moddalar almashinuvini boshqarishda ishtirok etadi. Tashqi biotik yoki abiotik omillar ta'sirida ko'pincha moddalar almashinuvi jarayonidagi o'zgarishlar o'simlikni nobud bo'lish darajasigacha ham olib kelishi mumkin. Bunda gormonlar yoki hujayra va to'qimalarda mavjud boshqa fiziologik faol moddalar ham o'simlikni qayta tiklanishida faollik darajalarini namoyon eta olmasliklari kuzatiladi. Bunday holatlarda tabiiy yoki sintetik biostimulyatorlardan foydalanish maqsadga muvofiqdir. Ayniqsa, qishloq xo'jaligi o'simliklarning tashqi ta'sir etuvchi omillarga nisbatan chidamli formalarini yaratish yoki chidamlilik darajasini oshirish xalq xo'jaligini rivojlantirishda alohida o'rin egallaydi.

Og'ir metallar atrof-muhitda muhim va muhim bo'lmagan holda ikkala shaklda mavjud. Ushbu og'ir metal ionlari tuproq biosrukturasiga tabiiy va antropogen kabi turli manbalardan kiradi. Kobalt (Co), mis (Cu), temir (Fe),

marganes (Mn), molibden (Mo), nikel (Ni) va rux (Zn) kabi muhim og'ir metallar o'simliklarning o'sishi va rivojlanishida foydali rol o'ynaydi. Optimal darajada bu foydali elementlar o'simlikning ozuqaviy darajasini yaxshilaydi, shuningdek, o'simliklarning normal o'sishi va yaxshi hosil olish uchun zarur bo'lgan bir qancha mexanizmlarni yaxshilaydi. Quruq o'simliklar uchun ularning optimalligi diapazoni xilma-xildir. O'simlik og'ir metallarni eruvchan komponent sifatida oladi yoki ularni ildiz eksudati bilan eriydi. Ularning ortiqcha bo'lishi o'simliklar uchun zaharli bo'lib, o'simlikning boshqa muhim bo'lmagan elementlarni qabul qilish va to'plash qobiliyatini o'zgartiradi. O'simlik to'qimalarida og'ir metallarning ko'payishi to'g'ridan-to'g'ri va bilvosita toksik ta'sir ko'rsatadi. Bunday to'g'ridan-to'g'ri ta'sir oksidlovchi stressning paydo bo'lishi bo'lib, u sitoplazmatik fermentlarning cheklanganligini va hujayra tuzilmalarining shikastlanishini yanada kuchaytiradi. Ushbu ionlar turli fermentlar va oqsillarning roliga ta'sir qiladi, metabolizmni to'xtatadi va fitotoksisiteni aniqlaydi. Tuproq-o'simlik tizimida foydali og'ir metall ionlari Co, Cu, Fe, Mn, Mo, Ni va Zn bo'yicha so'nggi yutuqlardan kelib chiqqan holda, og'ir metallarning tuproqdagi manbalari va ularni qabul qilish va tashish mexanizmini o'rganilgan. Asosiy metall ionlarini tuproqdan o'simliklarga tashishda metall tashuvchilarning rolini hamda Co, Cu, Fe, Mn, Mo, Ni va Zn ning o'simlik o'sishi va rivojlanishida past va yuqori darajada funksiyasi va yuqori darajada metall zaharlanishini yumshatish mexanizmi bo'yicha izlanishlar olib borilmoqda.

Materiallar va metodlar

Hozirgi kunda bug'doy o'simligining o'sishini tezlashtirish, hosilni oshirish va bug'doy kleykovinasini oshirish sifatida hozirgacha ko'p izlanishlar olib borilmoqda. Shu vaqtgacha stimulyator sifatida bir qancha moddalar sinab ko'rilmoqda. Dunyo miqyosida bu ish bilan keng ko'plab olimlar shug'ullanmoqda. Hozirga qadar bug'doy o'simligiga stimulyator sifatida foydalanib yuqori samara bergan ba'zi moddalarga to'xtalib o'tsak:

Yuqoridagi maqolalar tahlilidan foydalanib Cu va Ni kabi metall ionlari bug'doy o'simligida sinov uchun tanlab olindi.

Har bir metall tuzlaridan 5 xil konsentratsiyada eritmaları tayyorlab olindi. So'ngra bug'doy 2 soat davomida eritmalariga solindi va unumdor bo'lmagan tuproqqa ekildi. Unib chiqish davri kuzatildi va dastlabki 5 kunlik tahlil olindi. Unga ko'ra, har bir elementning konsentratsiyalaridan foydalangan holda natijalar o'rganildi. Solishtirish maqsadida nazorat uchun suvdan foydalandi. Qiyoslash maqsadida o'simliklarning unib chiqishi va unib chiqqan urug'lar soni, o'simlikning uzunligi, tuplar soni kabi xarakterli xossalari asos qilib olindi.

Bugungi kunda bug'doy (*Triticum aestivum* L.) O'simligining unib chiqishi, o'sishi va hosildorligini oshirish maqsadida turli stimulyatorlar va metall ionlaridan foydalanish amaliy tadqiqotlarda keng qo'llanilmoqda. Shu maqsadda, ushbu tadqiqotda Cu(II) va Ni(II) ionlari bug'doy urug'lariga turli konsentratsiyalarda ta'siri o'rganildi.

1. Sinov obyekti va urug'lar: Bug'doy urug'lari sifat va unib chiqish darajasi bo'yicha standart sifat sinovlaridan o'tkazilgan. Tadqiqot davomida

urug‘lar avval 0,1–0,0005 M konsentratsiyadagi Cu(II) va Ni(II) eritmalarida 2 soat davomida ishlov berildi. Nazorat guruh uchun suvdan foydalanildi.

2. Metall ionlarining tayyorlanishi: Cu(II) va Ni(II) ionlarining eritmaları laboratoriya sharoitida yuqori tozalikdagi reagentlar yordamida tayyorlandi. Har bir metall ionining besh xil konsentratsiyasi sinov uchun tanlandi: 0,1; 0,05; 0,01; 0,001; va 0,0005 M. Bu diapazon ilgari o‘tkazilgan ilmiy ishlar (Namira et al., 2016; Babar Shahzad et al., 2016) asosida optimal va toksik konsentratsiyalarni aniqlash uchun tanlandi.

3. Urug‘larni ekish va o‘shishni kuzatish: Urug‘lar unumdor bo‘lmagan tuproqqa ekilib, o‘shish davri davomida quyidagi parametrlar o‘lchandi:

- Unib chiqish tezligi va urug‘ soni (5 va 10 kundan keyin)
- Barg soni va barg uzunligi
- Tomirlar soni va uzunligi

Har bir parametr 3 martalik takrorlash bilan o‘lchandi va o‘rtacha qiymatlar hisoblandi.

Olingan natijalar tahlili

Olingan natijalar ilmiy maqolalarda keltirilgan ushbu mavzuga o‘xshash tadqiqotlar bilan solishtirildi. Masalan, Namira et al. (2016) tadqiqotida past konsentratsiyadagi Cu(II) va Ni(II) ionlari bug‘doyning unib chiqishiga ijobiy ta’sir qilgani, yuqori konsentratsiyalar esa fitotoksik xususiyatini namoyon qilgani aniqlangan. Shu bilan mos ravishda, tadqiqotimizda ham 0,001 M konsentratsiyadagi Cu(II) va Ni(II) ionlari biostimulyator sifatida effekt berdi. Bundan tashqari, Babar Shahzad et al. (2016) ishlari Li ionining mosh o‘simligiga yaxshi ta’sir qilganini, ammo bug‘doyga past samarali ekanligini ko‘rsatgan. Bu bizning tadqiqotimiz natijalari bilan mos keladi, chunki metall ionlarning o‘shishga ta’siri nafaqat turiga, balki o‘simlikning biologik xususiyatlariga ham bog‘liq.

Cu(II) ionini turli konsentratsiyali eritmalarining bug‘doy o‘simligining unib chiqishiga ta’siri

1.1-jadval

№	Cu ²⁺ ioni konsentratsiyalari (mol·l ⁻¹)	Bug‘doy o‘simligi eritmada qoldirilgan vaqt (soat)	Unib chiqqan vaqt (kun) va urug‘ soni(ta)	5 kundagi unib chiqish holati(ta)
1	0.1	2	-	-
2	0.05	2	4 va 1	1
3	0.01	2	4 va 1	1
4	0.001	2	3 va 1	9
5	0.0005	2	3 va 1	5

Xulosa: Bu jadvaldan Cu ning yuqori konsentratsiyalari stimulyatorlik xossalarini namoyon etmaganligini va shuning uchun bug‘doy unib chiqishiga to‘sqinlik qildi deyish mumkin. Uning past konsentratsiyalari esa bug‘doy unib chiqishiga ijobiy ta’sir ko‘rsatdi. Bundan ko‘rinib turibdiki, Cu²⁺ ionining 0,001M konsentratsiyali holati optimal deb topilib, o‘simliklarga salbiy ta’sir qilmasligi aniqlandi.

Ni(II) ionini turli konsentratsiyali eritmalarining bug‘doy o‘simligining unib chiqishiga ta’siri

1.2-jadval

№	Ni ²⁺ ioni konsentratsiyalari (mol•l ⁻¹)	Bug‘doy o‘simligi eritmada qoldirilgan vaqt (soat)	Unib chiqqan vaqt (kun) va urug‘ soni(ta)	5 kundagi unib chiqish holati(ta)
1	0.1	2	-	-
2	0.05	2	-	-
3	0.01	2	4 va 1	2
4	0.001	2	3 va 1	7
5	0.0005	2	3 va 1	5

Xulosa: Bu jadvalda 5 kun davomida Ni²⁺ ioni konsentratsiyalarining bug‘doy unib chiqishiga ta’sirini ko‘rishimiz mumkin. Yuqori konsentratsiyali metall ioni bug‘doy unib chiqishiga to‘sqinlik qildi. Past konsentratsiyali holatida esa unib chiqish ko‘rsatkichlari ancha samarali. Bundan ko‘rinib turibdiki, stimulyatorlik xossasi 0,001 M holatida ta ‘sir yuqori va optimal deb topildi.

10 kunlik natijalar ham olinib tahlil qilinganda ham kontrolga qaraganda ayrim konsentratsiyalarda natijalar yuqori chiqqanini ko‘rishimiz mumkin.

Cu(II) ionini turli konsentratsiyali eritmalarining bug‘doy o‘simligining unib chiqishi, bargi va ildizi o‘zgarishidagi tahlil

1.3-jadval

№	Cu ²⁺ ioni konsentrat siyalari (mol•l ⁻¹)	Urug‘ ekilgandan keyingi 10 kunlik davr (unib chiqqan urug‘lar soni)	Bar g son i (ta)	Barg uzunlig i (sm)	Tomirl ar soni (ta)	Tomirl ar uzunlig i (sm)
1	0.1	1 ta	2	18	2	4,5
2	0.05	1 ta	2	9	3	8,5
3	0.01	2 ta	2	18	4	6,5
4	0.001	10 ta	2	26	5	5



3-rasm; a) $C_M(\text{Cu}^{2+}) = 0,1\text{M}$ b) $C_M(\text{Cu}^{2+}) = 0,05\text{M}$ c) $C_M(\text{Cu}^{2+}) = 0,01\text{M}$ d) $C_M(\text{Cu}^{2+}) = 0,001\text{M}$ li eritmalarining bug‘doy o‘simligining o‘shish va rivojlanishiga ta’siri

Ni(II) ionini turli konsentratsiyali eritmalarining bug‘doy o‘simligining unib chiqishi, bargi va ildizi o‘zgarishidagi tahlil

1.4-jadval

№	Ni ²⁺ ioni konsent ratsiyala ri (mol·l ⁻¹)	Urug‘ ekilgandan keyingi 10 kunlik davri (unib chiqqan urug‘lar soni)	Barg soni (ta)	Barg uzunligi (sm)	Tomirlar soni (ta)	Tomirlar uzunligi (sm)
1	0.1	-				
2	0.05	-				
3	0.01	3 ta	2	10	4	6
4	0.001	8 ta	3	25, 5	7	11

Tadqiqot natijalari shuni ko‘rsatdiki, Cu(II) va Ni(II) ionlarining konsentratsiyasi bug‘doy urug‘larining unib chiqishiga sezilarli ta‘sir ko‘rsatadi. Yuqori konsentratsiyadagi (0,05–0,1 M) metall ionlari unib chiqishni sekinlashtirgan yoki to‘xtatgan, past konsentratsiyalar (0,001–0,01 M) esa unib chiqishga ijobiy ta‘sir qilgan.

• **Cu(II) ionlari:** 0,001 M konsentratsiya bug‘doy unib chiqishida optimal stimulyator sifatida ishladi. 5 kun ichida urug‘larning 90% unib chiqqan. Yuqori konsentratsiyalarda (0,05–0,1 M) esa o‘shining sekinlashishi kuzatildi. Bu natija Namira et al. (2016) tadqiqoti bilan mos keladi, ular ham Cu(II) ning past konsentratsiyalari o‘shiga yordam berishini aniqlagan.

• **Ni(II) ionlari:** 0,001 M konsentratsiyadagi eritma bug‘doy unib chiqishida eng yaxshi natija berdi (8 urug‘dan 7 tasi unib chiqqan). Yuqori konsentratsiyadagi eritmalar esa fitotoksik ta‘sir ko‘rsatdi. Bu Babar Shahzad et al. (2016) ishlariga o‘xshash, ular metal ionlarining o‘shiga ta‘sirini o‘simlik turi va konsentratsiyaga bog‘liqligini ko‘rsatgan.

• **Barg soni va uzunligi:** Past konsentratsiyadagi Cu(II) va Ni(II) ionlari barg soni va uzunligini oshirdi. 0,001 M Cu(II) bilan ishlangan urug‘larda barg uzunligi 26 sm, barg soni 5 ta bo‘ldi. Yuqori konsentratsiyalarda esa barglar toraygan va qisqargan.

• **Ildiz tizimi:** Optimal konsentratsiyadagi metall ionlari tomirlar soni va uzunligini oshirdi, bu o‘simlikning suv va mineral moddalarni qabul qilish imkoniyatini yaxshiladi. Yuqori konsentratsiya esa ildiz tizimining rivojlanishini susaytirdi.

Xulosa

Metall ionlarining o‘simlik o‘shiga ta‘siri va biostimulyatorlik xususiyatlari: Cu(II) va Ni(II) kabi metall ionlari (unib chiqish, o‘sh, rivojlanish va hosildorlik) asosida stimulyator sifatida tanlandi. Tadqiqot natijalari shuni ko‘rsatdiki, past konsentratsiyadagi metall ionlari (0,001–0,01 M) bug‘doy va mosh o‘simliklarida unib chiqishni rag‘batlantiradi, barg va ildiz tizimini rivojlantiradi, yuqori konsentratsiya esa fitotoksik ta‘sir ko‘rsatadi. Shu bilan birga, Li ionining bug‘doy o‘simligiga ta‘siri sust bo‘lsa, mosh o‘simligiga ijobiy stimulyatorlik

xususiyatlari kuzatildi. Bu biphasic ta'sir o'simlik metabolizmi va metall ionlarining hujayra fermentlaridagi mexanizmlari bilan izohlanadi.

Urug'ga ishlov berish vaqtining optimalligi: Tanlab olingan metall ionlarining besh xil konsentratsiyali eritmalarida tajriba natijalari shuni ko'rsatdiki, bug'doy urug'larini 2 soat davomida, mosh urug'larini esa 1 soat davomida eritmada qoldirish optimal sharoit hisoblanadi. Ushbu natija agrotexnologik tavsiyalar berishda muhim bo'lib, o'simlik turi va metall ionining turiga qarab ishlov berish vaqtini optimallashtirish zarurligini ko'rsatadi.

O'sish va rivojlanishning stimulyatsiyasi: Optimal konsentratsiyadagi metall ionlari bilan ishlov berilgan urug'lar bug'doy va mosh o'simliklarida barg soni, barg uzunligi, tomirlar soni va ildiz tizimi uzunligini sezilarli darajada oshirdi. Shu bilan birga, yuqori konsentratsiya o'sishni chekladi, bu oksidlovchi stress va hujayra membranalarining shikastlanishi bilan bog'liq. Bu natijalar Namira et al. (2016) va Yaashikaa et al. (2020) ishlariga mos kelib, metall ionlarining biostimulyator sifatidagi rolini tasdiqlaydi.

Metall ionlarining stimulyatorlik mexanizmi: Metall ionlari past konsentratsiyada o'simlik metabolizmini faollashtiradi, fermentlar faoliyatini oshiradi va fotosintez jarayonini rag'batlantiradi. Ushbu mexanizm o'simlik stressga chidamliligini oshirish va hosil samaradorligini yaxshilashda muhim ahamiyatga ega.

Ilmiy va amaliy ahamiyati: Tadqiqot natijalari shuni ko'rsatdiki, metall ionlari stimulyator sifatida ishlatilganda, o'simliklarning tashqi stress omillariga chidamliligi oshadi, hosil samaradorligi ortadi va qishloq xo'jaligi mahsulotlarining sifatini yaxshilash imkoniyati paydo bo'ladi. Kelgusida tadqiqotlar metall ionlarining molekulyar mexanizmlarini, to'qimalarga tarqalishini va boshqa biostimulyatorlar bilan kombinatsiyasini o'rganishga yo'naltirilishi lozim.

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ПОВЫШЕНИЕ НАУЧНОЙ ГРАМОТНОСТИ НА ОСНОВЕ МЕЖДУНАРОДНЫХ ПРОГРАММ ОЦЕНКИ (PISA)

Аннотация: В статье анализируется роль Международной программы по оценке образовательных достижений учащихся (PISA) в оценке качества образования и её значение в укреплении интеграции школ и высших учебных заведений. Изучаются подходы, применяемые в школьном образовании для развития компетенций, основанных на критериях PISA: грамотности чтения, математической грамотности и естественнонаучной грамотности. В статье представлены предложения по интеграции методологии PISA в процесс подготовки педагогических кадров вузов, адаптации учебных программ и повышению функциональной грамотности студентов посредством использования заданий PISA на практике. Обосновывается школьно-вузовское сотрудничество как важный фактор повышения качества образования, внедрения инновационных методик и подготовки конкурентоспособных кадров на основе международных требований.

Ключевые слова: PISA, международная оценка, школьно-вузовская интеграция, функциональная грамотность, компетентность, качество образования.

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INCREASING SCIENTIFIC LITERACY BASED ON INTERNATIONAL ASSESSMENT PROGRAMS (PISA)

Annotation: This article analyzes the role of the Program for International Student Assessment (PISA) in assessing the quality of education and its importance in strengthening integration between schools and higher education institutions. The approaches used in school education to develop competencies based on the PISA criteria - reading literacy, mathematical literacy and natural science literacy - are studied. The article provides proposals for integrating the PISA methodology into the process of training pedagogical personnel of universities, adapting curricula, and increasing functional literacy in students through the use of PISA tasks in practice. It also justifies school-university cooperation as an important factor in improving the quality of education, introducing innovative methodologies, and training competitive personnel based on international requirements.

Keywords: *PISA, international assessment, school-university integration, functional literacy, competence, quality of education.*

Узбекистан вошел в десятку худших по результатам первой международной оценки образовательных достижений школьников по математике, чтению и естественнонаучной грамотности (PISA). Исследование показало, что на способности учащихся влияют социально-экономический статус и продовольственная безопасность семьи.

Организация экономического сотрудничества и развития (ОЭСР) опубликовала результаты Международной программы по оценке образовательных достижений учащихся (PISA) за 2022 год. В исследовании приняли участие более 690 000 15-летних школьников из 81 страны и территории. Некоторые страны, такие как Узбекистан, Камбоджа, Сальвадор, Ямайка, Монголия и Палестина, участвовали в нем впервые [2].

Основным направлением исследования 2022 года была математическая грамотность. Кроме того, исследование включало тесты на грамотность чтения и естественнонаучную грамотность. Средний балл по странам-участницам составил 472 балла по математической грамотности, 476 баллов по грамотности чтения и 485 баллов по естественным наукам [3]. В области естественнонаучной грамотности 16,5% достигли второго уровня, 2,2% – третьего, а 0,1% – четвертого.

В целом, более 60% учащихся не достигли как минимум второго уровня по всем трем областям грамотности (чтение, математика и естественные науки). [3]

Учащиеся из самых бедных семей (20% наименее обеспеченных по социально-экономическому статусу по международным стандартам) в таких странах, как Сингапур (487 баллов), Япония (450 баллов) и Эстония (427 баллов) показали лучшие результаты по математике, чем учащиеся из самых обеспеченных семей (20% наиболее обеспеченных по социально-экономическому статусу по международным стандартам) и Узбекистан (386 баллов) [4].

Гендерные различия: мальчики лучше справляются с математикой, девочки – с чтением. Процент девочек с низкими результатами по математике выше (83% девочек и 78% мальчиков), но обратная ситуация наблюдается в отношении чтения (84% девочек и 88% мальчиков). На каждые 10 мальчиков приходится менее 8 девочек, чьи результаты превышают минимальный уровень [5]. Узбекистан входит в число стран, где социально-экономические различия оказывают сильное влияние на успеваемость по математике. Дети из более обеспеченных семей (верхние 25% социально-экономического статуса) набрали на 22 балла больше, чем дети из нижних 25% социально-экономического статуса. В то же время, около 20% детей из малообеспеченных семей смогли достичь верхних 25% по математике [6,7].

Исследование также выявило сильную корреляцию между отсутствием продовольственной безопасности и результатами по математике. Отсутствие

возможности покупать продукты питания раз в неделю или чаще негативно влияет на успеваемость. Почти 30% узбекских школьников, участвовавших в исследовании, заявили, что не могут покупать продукты питания хотя бы раз в неделю.

Школьная жизнь:

18% учащихся чувствуют себя одинокими в школе, еще 18% не чувствуют связи со школой;

10% учащихся недовольны своей жизнью;

Почти половина учащихся не чувствуют себя в безопасности, посещая школу или находясь в ней;

20-25% учащихся сообщили о проблемах с дисциплиной в классе;

В 2022 году граждане Узбекистана впервые приняли участие в тестировании PISA – международной программе оценки знаний 15-летних школьников. По результатам тестирования узбекские школьники заняли 72-е место среди 81 страны по математике и второе – по естественным наукам и грамотности чтения. [1,2]

Объявлены результаты теста PISA 2022 – международной программы оценки учащихся. В прошлом году в тестировании приняли участие 690 000 15-летних школьников из 81 страны. Они отражают средний уровень знаний 26 миллионов учащихся в своих странах. Международные тесты по оценке образовательных достижений учащихся в рамках Программы международной оценки образовательных достижений учащихся (PISA) проводятся Организацией экономического сотрудничества и развития (ОЭСР) каждые 3 года.

Тесты PISA собирают данные из систем образования, школ, учителей и учащихся и оценивают знания учащихся по международно признанной шкале.

Тесты были проведены в 2000 году, а восьмой тест состоялся в 2022 году. Тесты проверяют навыки и знания учащихся по математике, естественным наукам и чтению. Отбор участников проводится в два этапа. На первом этапе отбираются 150 школ из сельской и городской местности. Затем из каждой школы случайным образом отбираются 42 ученика. Результаты тестов делятся на 3 группы: выше среднего, средний и низкий уровень.

Какова цель программы PISA, какова была ее необходимость и каковы принципы структурирования вопросов PISA? В XX веке и ранее ценились крепкая память, энциклопедические знания и специалисты, владеющие как можно большим объемом информации в своей области, но сейчас эти знания уже не имеют решающего значения. Созданы поисковые системы, онлайн-энциклопедии и прекрасные онлайн-базы данных по различным дисциплинам, поэтому необходимость запоминания этой информации отошла на второй план. На первый план выдвигается компетенция современного специалиста анализировать эти знания, генерировать из них новую информацию, видеть «глубину миски», как говорится в популярной поговорке[5].

Тесты PISA проводятся, чтобы отразить те же изменения в системе образования, определить, в какой степени школьники владеют навыками анализа реальных явлений, делать из них выводы и вести диалог, и насколько система образования адаптируется к этим изменениям.

В чём суть Международной программы оценки?

Тот факт, что в последние годы в результате проводимых в нашей стране реформ достигнуты огромные темпы экономического роста, что ещё больше увеличивает спрос на квалифицированные кадры и зрелых специалистов во всех областях. Это само по себе требует повышения интереса учащихся к учебе и внимания к всестороннему образованию. Важность вышеуказанных требований для системы образования означает, что, как и в большинстве зарубежных стран, необходимо привлекать передовой опыт, направленный на повышение качества образования посредством оценки и мониторинга развития образования и науки.

Естественнонаучная грамотность включает в себя способность выявлять проблемы, которые могут быть научно решены в реальных явлениях, и делать выводы на основе наблюдений и экспериментов. Эти выводы являются главной целью развития способности понимать, осмысливать окружающий мир и изменения, происходящие в нём в результате деятельности человека, и принимать соответствующие решения [2,3].

Образование вступает в цифровую эпоху, где недостаточно уметь только читать и писать. Необходима также информационная грамотность – умение не «тонуть» в информационном мире и извлекать из него смысл. Школьники должны научиться видеть мир с разных сторон, используя разные источники и сквозь призму разных идей, и уметь выбирать правильный из 20 тысяч ответов, предлагаемых поиском Google.

Работа с одарёнными детьми в Узбекистане хорошо налажена – например, качество математического образования здесь выше, чем в США. Однако эффективность применения знаний, производительность труда и качество жизни в США выше, чем в России. Таким образом, талант и способности – лишь часть уравнения, и их необходимо использовать на благо общества. Легче изменить существующие институты в государстве, чтобы человеческий талант работал на благо себя и общества, чем научиться возвращать талант.

Содержание школьного образования – это небольшая «коробка», в которой мы хотим собрать как можно больше информации. Поэтому во многих странах глубина образования снижается, а ширина – увеличивается. В результате школьники хорошо воспроизводят информацию, но не умеют мыслить как учёные, анализировать процессы и факты, проводить эксперименты. Лидерами исследования PISA являются Сингапур, Япония, Китай и Финляндия.

Во всех странах благополучие семьи является показателем успешности ребёнка в школе. Однако существуют большие различия в качестве

образования между странами – например, дети из обеспеченных семей в Доминиканской Республике могут получать образование более низкого качества, чем их сверстники из бедных семей в развитых европейских странах. Для ребёнка бедность в стране не должна быть непреодолимой участью – возможность достичь высоких результатов должна быть доступна везде в мире. Необходимы усилия для достижения масштабного решения этой проблемы к 2035 году.

Сегодня большинство школ обучают сверху вниз, но это устаревшая модель. В современном обществе учитель должен не только быть независимым, но и перенимать опыт лучших коллег. Результаты исследования TALIS показывают, что чем больше учителя общаются друг с другом, тем эффективнее они становятся. Обмен опытом между учителями обязателен, например, в Китае. Этот элемент педагогической культуры характерен для стран, где возможно привлечение молодёжи к учительской профессии. К 2035 году образование во всём мире должно быть «освобождено» — государства должны отказаться от систематического контроля за работой учителей. При этом сохраняется необходимость оценки качества работы учителей, прежде всего, для определения наличия у них необходимых навыков. Учителя должны быть заинтересованы в саморазвитии и профессиональном росте — развитие дистанционных форм обучения позволяет достигать хороших результатов с минимальными временными затратами.

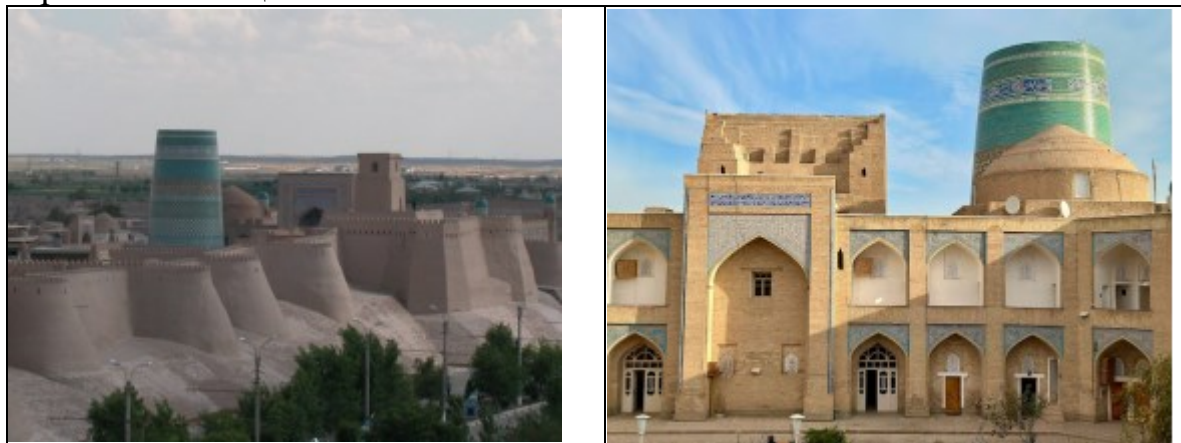
Врач не может прописывать всем пациентам одно и то же лекарство. Аналогично, учитель должен персонализировать обучение, ориентируясь на потребности конкретного ребёнка. Для этого необходимо разрабатывать курсы по-другому, не требуя от учителей соблюдения стандартизации и единых подходов. Обучение должно быть более проектным и менее дисциплинарным.

Чем больше времени уделяется изучению предмета, тем выше результат. Однако исследования показывают обратное: чем больше времени учащиеся тратят на обучение в данной стране, тем хуже их результаты PISA. В Объединённых Арабских Эмиратах дети проводят больше времени в школе, но в европейских странах, где учебное время ограничено и используется эффективнее, результаты выше.

Разрыв между достижениями в педагогической науке и тем, что происходит в классе, остаётся большим. Например, в Великобритании ещё больше, чем в Китае, используется зубрежка, где все говорят о креативности, самостоятельности и т. д. Можно сколько угодно говорить об интегральном образовании и творческом мышлении, но если на экзамене ученику предлагают тесты с вариантами ответов, такие разговоры бессмысленны. При проведении образовательных реформ не стоит ориентироваться на опыт конкретной страны — ведь некоторые из них подходят для национальной системы, а некоторые, наоборот, противопоказаны. Оптимальная модель заимствования лучшего была создана в Сингапуре, где ничего не изобретают

и не придают особого значения исследованиям в области образования. Зато научились корректировать факторы успеха разных стран, создав одну из самых передовых систем образования в мире.

Кислотные дожди. На фото ниже изображены скульптуры кариатид. Они были воздвигнуты на Афинском Акрополе более 2500 лет назад. Скульптуры высечены из камня, называемого мрамором. Мрамор состоит из карбоната кальция.



1 – Рис. Хивинская крепость Ичон

Кислотный дождь. В 1980 году оригинальные статуи были перенесены в Музей Акрополя и заменены копиями. Оригинальная крепость была разъедена кислотными дождями.

Вопрос 1: Кислотный дождь. Кусок мрамора до того, как его замочили на ночь в уксусе, имел массу 2,0 г. На следующий день кусок вынули из уксуса и высушили. Какова масса высушенного куска?

А. Менее 2,0 г В. Ровно 2,0 г С. От 2,0 г до 2,4 г D. Более 2,4 г

Кислотный дождь: Оцените ответ на вопрос 1. Ответ полностью принят.

Код 1: А. Менее 2,0 г

Ответ не принимается. Код 0: Другие ответы. Код 9: Нет ответа.

Вопрос 2: Кислотный дождь. На следующих фотографиях изображена крепость Ичон. Крепость Ичон в Хиве была построена более 2500 лет назад. Крепость высечена из камня, называемого мрамором. Мрамор состоит из карбоната кальция.

Учащиеся, проводившие этот эксперимент, поместили куски мрамора на ночь в чистую (дистиллированную) воду.

Объясните, почему учащиеся включили этот эксперимент в свой.

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Кислотный дождь: Оцените ответ на вопрос 2. Ответ полностью принят.
Код 2: В ответе указано, что для протекания реакции необходимо присутствие кислоты (уксуса).

Для протекания этой реакции дождевая вода должна быть кислой (как при кислотном дожде) и не реагировать с обычной водой.

Чтобы выяснить, есть ли другие причины образования дефектов в кусках мрамора.

Поскольку это показывает, что кусочки мрамора не реагируют ни с одной жидкостью, вода считается нейтральной.

Ответ частично принят.

Код 1: Ответ показывает, что этот эксперимент был проведён для сравнения с экспериментом между.

уксусом и мрамором, но из ответа не ясно, что это сделано для того, чтобы показать, что кислота (уксус) является необходимым условием для протекания реакции.

Сравните с результатом в другой колбе.

Посмотрите, изменяются ли кусочки мрамора в чистой воде.

Учащиеся включили этот эксперимент, чтобы показать, что происходит, когда идёт обычный дождь,

потому что дистиллированная вода не является кислотой.

Для контроля.

Чтобы выяснить, есть ли разница между обычной водой и водой, содержащей кислоту (уксус).

Ответ не принят. Код 0: Другие ответы. Код 9: Нет ответа.

Функциональная грамотность — это не только желаемый образовательный результат, но и важная черта гражданского общества. Функционально грамотный человек – это человек, способный использовать все знания, умения и навыки, полученные на протяжении жизни.

Функциональная грамотность развивается на протяжении всей жизни, но её формирование и развитие, конечно же, чаще всего происходит в начальной школе. В связи с этим функциональная грамотность является одним из важных критериев оценки качества школьного образования. Важно помнить, что при этом функциональная грамотность не противопоставляется академической грамотности, так же как предметные знания не противопоставляются функциональным навыкам. Формирование и развитие функциональной грамотности – один из основных показателей общего образования.

Компетентность обучающегося определяется в Государственном образовательном стандарте и как процесс формирования метанавыков, и как результат достижения предметных, метапредметных и личностных результатов.

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ДИФФЕРЕНЦИАЦИЯ МЕР ГОСУДАРСТВЕННОЙ ЗАЩИТЫ УЧАСТНИКОВ УГОЛОВНОГО СУДОПРОИЗВОДСТВА

Аннотация: В статье исследуется проблема дифференциации мер государственной защиты участников уголовного судопроизводства в зависимости от их процессуально-правового статуса, характера угроз и специфики криминальной среды. На основе анализа доктринальных подходов и судебной практики предлагается концепция адаптивной дифференциации защитных мер, учитывающая динамику рисков, особенности различных категорий защищаемых лиц, включая участников процесса в условиях пенитенциарной системы, а также новые угрозы в цифровом пространстве. Концепция интегрирует традиционные и инновационные методы защиты и обеспечивает оптимальное использование ресурсов системы государственной защиты.

Ключевые слова: государственная защита, дифференциация мер, процессуально-правовой статус, адаптивная модель, цифровые риски, пенитенциарная система, защита свидетелей.

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DIFFERENTIATION OF STATE PROTECTION MEASURES FOR PARTICIPANTS IN CRIMINAL PROCEEDINGS

Abstract: The article examines the problem of differentiation of state protection measures for participants in criminal proceedings depending on their procedural and legal status, the nature of threats, and the specifics of the criminal environment. Based on an analysis of doctrinal approaches and judicial practice, the article proposes a concept of adaptive differentiation of protective measures that takes into account the dynamics of risks, the characteristics of various categories of protected persons, including process participants in the penitentiary system, as well as new threats in digital space. The concept integrates traditional and innovative protection methods and ensures optimal use of resources within the state protection system.

Keywords: *state protection, differentiation of measures, procedural and legal status, adaptive model, digital risks, penitentiary system, witness protection.*

Эффективность государственной защиты участников уголовного судопроизводства неразрывно связана с адекватностью применяемых мер. Существующая система защиты остаётся ригидной, не учитывая многообразие рисков и динамический характер угроз на различных стадиях процесса. Отсутствие унифицированных критериев дифференциации защитных мер и растущая угроза цифровых атак требуют пересмотра теоретических основ и разработки гибкой модели, способной адаптироваться к различным типам угроз.

Процессуальный статус участника уголовного судопроизводства определяет особенности его защиты. О.А. Зеленина [1] справедливо подчёркивает необходимость обеспечения равной защиты независимо от роли участника, что соответствует международным стандартам справедливого правосудия. Однако равная защита не означает одинаковости применяемых мер.

Необходимо различать процессуальный статус участника как субъекта уголовно-процессуальных отношений и его статус как объекта государственной защиты. Специфика процессуального положения (потерпевший, свидетель, подозреваемый, обвиняемый) требует дифференцированного подхода. Для свидетелей и потерпевших приоритетны меры по конфиденциальности личных данных, в то время как для сотрудничающих с органами подозреваемых – меры физической безопасности.

Нахождение лица в условиях изоляции качественно изменяет профиль угроз. А.М. Киселев [2] отмечает, что в следственных изоляторах риск противоправных посягательств многократно возрастает. Защита таких лиц включает правовой, организационный и технический аспекты, учитывающие специфику тюремной субкультуры, где сотрудничество с правоохранительными органами часто рассматривается как серьёзное нарушение неформальных норм.

К.М. Ахтямова [3] акцентирует внимание на отсутствии чётких критериев оценки угроз при применении мер защиты. Оптимальный баланс между гибкостью и определённой может быть достигнут через разработку критериев, учитывающих как объективные обстоятельства (характер преступления, данные о личности обвиняемого), так и субъективные факторы (восприятие угрозы защищаемым лицом).

Стадийность уголовного процесса требует дифференцированного подхода. На стадии возбуждения и расследования приоритетны меры по сохранению в тайне обращения. На судебном разбирательстве – меры по обеспечению безопасности при непосредственном участии (закрытое разбирательство, исключение визуального контакта, допрос под

псевдонимом). О.А. Зайцев [4] справедливо выделяет повышенные риски на стадии подготовки к судебному разбирательству.

И. Уилкинсон [5] подчёркивает, что программы государственной защиты должны быть адаптивными к цифровым угрозам. Цифровые каналы коммуникации создают новые векторы организации давления на участников процесса. Разработка мер цифровой защиты включает мониторинг информационного пространства, обучение защищаемых лиц кибербезопасности и использование технологий анонимизации в Интернете.

З.Л. Шхагапсоев и Р.Р. Карданов [6] подчёркивают, что специфика государственной защиты в России определяется высокой латентностью преступлений против участников процесса, что диктует необходимость учёта социокультурных факторов при разработке защитных мер.

На основе проведённого анализа предлагается концепция адаптивной дифференциации мер государственной защиты – теоретическая модель выбора и применения защитных мер на основе многофакторного анализа. В отличие от существующих подходов, основанных преимущественно на формальном процессуальном статусе, адаптивная дифференциация учитывает комплекс взаимосвязанных факторов: процессуальное положение лица, его роль в установлении истины, характер и интенсивность угроз, социально-психологические особенности защищаемого, специфику криминальной среды, технологический контекст угроз и институциональные возможности системы защиты.

Ключевая особенность концепции – непрерывная оценка и переоценка ситуации с корректировкой применяемых мер в зависимости от изменения обстоятельств. Это обеспечивает оптимальное использование ресурсов при сохранении необходимого уровня безопасности для всех категорий участников.

Интеграция традиционных и инновационных методов защиты, учитывающих цифровую трансформацию общественных отношений, включает специальные алгоритмы оценки цифровых рисков и механизмы цифровой защиты, что обусловлено современными вызовами правовой системы России.

Предложенная концепция адаптивной дифференциации представляет собой не только теоретическую конструкцию, но и практически ориентированную модель, создающую основу для совершенствования нормативного регулирования и правоприменительной практики в сфере государственной защиты участников уголовного судопроизводства с учётом современных вызовов и перспективных направлений развития правовой системы России. Её внедрение требует дополнения законодательства алгоритмами дифференцированной оценки угроз и механизмами контроля за адекватностью применяемых мер на каждой стадии процесса.

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**ПРОБЛЕМЫ ИСПОЛЬЗОВАНИЯ
СИСТЕМ ARTIFICIAL INTELLIGENCE
В МЕЖДУНАРОДНОМ АРБИТРАЖЕ**

Аннотация: статья посвящена проблемным вопросам использования систем artificial intelligence в международном арбитраже. Обсуждаются проблемы, связанные с использованием таких систем. Отмечается невозможность автономного использования систем artificial intelligence. Отдельно рассматриваются проблемы, связанные с так называемой аналитикой судей (judge analytics).

Ключевые слова: искусственный интеллект, международный арбитраж, автономное использование, аналитика судей

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**USAGE PROBLEMS
ARTIFICIAL INTELLIGENCE SYSTEMS
IN INTERNATIONAL ARBITRATION**

Annotation: the article is devoted to problematic issues of using artificial intelligence systems in international arbitration. The problems associated with the use of such systems are discussed. The impossibility of autonomous use of artificial intelligence systems is noted. The problems related to the so-called judge analytics are considered separately.

Keywords: artificial intelligence, international arbitration, autonomous use, judges' analytics

Использование систем artificial intelligence (AI), то есть искусственного интеллекта (ИИ) в судебном правоприменении рассматривалось многими авторами в работах [1] - [16]. Особый интерес при этом представляет теоретическое использование ИИ с высокой степенью автономности (самостоятельности).

В работе [12] автором настоящей статьи отмечалось, что при рассмотрении теоретического вопроса об использовании автономного искусственного интеллекта (ИИ) в правоприменении, следует исходить из того, что существуют сферы, где использование автономного ИИ

недопустимо, и есть те сферы, где функционирование автономного ИИ вполне возможно (например, сфера приказного производства и другие). Одной из сфер, где функционирование ИИ возможно только под контролем человека, является сфера международного арбитража - в силу множества трудноформализуемых факторов в этой области, недоступных для анализа ИИ.

В статье [1], посвященной использованию ИИ в сфере международного арбитража, отмечается что технологии ИИ открывают новые возможности и ставят новые задачи в этой области. «Технологии ИИ, такие как алгоритмы машинного обучения и обработки естественного языка, способны перевернуть привычное понимание различных аспектов арбитража. Например, ИИ может помочь в ведении дел, организуя и анализируя большие объемы документов более эффективно, чем люди. Он также может способствовать распознаванию закономерностей и тенденций в прошлых решениях, поддерживать аргументы сторон на слушаниях и даже предсказывать возможные исходы. Однако внедрение ИИ в международный арбитраж требует тщательного рассмотрения, чтобы обеспечить прозрачность, подотчетность, надежность и соблюдение этических стандартов» [1].

На основании формирующейся практики применения ИИ в судопроизводстве, в работе [13] было предложено четыре концепта: 1) ИИ для суда; 2) ИИ для сторон; 3) ИИ для судей; 4) ИИ как суд.

В указанных концептах можно увидеть сходство с обобщенной системой ИИ для юридических приложений, а именно - концептом FLAI-систем из нескольких типов, предложенным автором настоящей статьи в работе [12]. При этом FLAI-системы в зависимости от их функционального предназначения целесообразно разделять на системы B-FLAI, S-FLAI, R-FLAI и J-FLAI. Функции и примеры реализации FLAI-систем в отечественном и зарубежных правовых порядках описаны в статье [12].

Во многих работах отмечается, что использование ИИ в судопроизводстве приводит к порождению новых проблем, не существовавших до использования ИИ. В частности, особо критичным оказывается то, какие данные используются как обучающие. В случае, если обучающие данные содержат статистически значимую «неправильную» информацию, они способны приводить к формированию системами ИИ смещенных оценок. Данная проблема применительно ко всем вычислительным системам получила краткое, но образное название «мусор на входе - мусор на выходе» [14].

Вместе с тем, в работе [7] говорится и о перспективных задачах, решаемых системами ИИ: «интерес вызывают перспективы применения данной технологии в целях избежания затягивания сроков разрешения споров (AI to reduce delays), а появление такого противоречивого инструмента, как аналитика судей (Judge Analytics)».

В исследованиях говорится, что «технология искусственного интеллекта предлагает огромный потенциал для повышения эффективности и точности в юридической сфере. От чат-ботов, которые могут быстро ответить на основные юридические вопросы, до сложных алгоритмов, способных анализировать огромные объемы данных и распознавать закономерности, - ИИ способен произвести революцию в работе юристов» [1], [2].

При этом область арбитража является одной из наиболее «удачных» площадок для эффективного применения ИИ. В исследованиях отмечается, что «одной из ключевых областей, где ИИ добивается значительных успехов, является проверка и анализ договоров. Благодаря возможностям обработки естественного языка ИИ может эффективно просеивать сложные контракты, выявлять важные пункты и даже давать рекомендации на основе предыдущих дел и юридических прецедентов. Кроме того, разрабатываются инструменты предиктивной аналитики на базе ИИ, которые помогают юристам оценить вероятный исход дела на основе аналогичных прошлых дел. Однако следует отметить, что, хотя ИИ обладает огромным потенциалом, его следует использовать как инструмент, а не как замену человеческому мышлению и опыту в сложных юридических вопросах» [1], [2].

Важным элементом ИИ является его способность к аналитической обработке данных. Эта способность является естественным следствием принципиального, главного свойства ИИ, поскольку вся идеология ИИ основана на статистической обработке, выявлении корреляционных связей и скрытых закономерностей в большом массиве данных. В работе [7] описаны различные виды аналитических программ – элементов ИИ. «Алгоритмы могут анализировать данные о спорах, в том числе их историю, участниках разбирательства и т.п. Различные виды аналитики позволяют обрабатывать большие данные в зависимости от конкретных целей. Так, описательную аналитику (*descriptive analytics*) мы будем использовать, если нам нужно собрать и систематизировать данные. Аналитика более высокого уровня (*prescriptive analytics*) предлагает рекомендации по дальнейшим действиям. Наконец, предиктивная аналитика позволяет использовать данные для предсказания будущих действий. Предиктивное принятие решений используется для прогнозирования будущих судебных решений путем обучения системы на основе прецедентов» [7].

«Новым и весьма неоднозначным направлением в развитии аналитики в системе правосудия выступает так называемая аналитика судей (*judge analytics*). Эксперты трактуют данный вид аналитики как инструмент, способный обнаружить закономерности в решениях конкретного судьи, аргументах, к которым он наиболее восприимчив, языке, который он использует, и так далее. Вся эта информация позволяет ИИ «предсказывать» возможный исход дел, сравнивать разных судей, а также разрабатывать выигрышную стратегию» [7], [15].

Возникший интерес к «аналитике судей» объясняется мнением, что стороны якобы могут добиться лучших результатов, если будут знать больше о конкретном судье, рассматривающем их дело [16].

В статье [7] отмечается, что «рынок технологий аналитики судей постоянно растет. Так, уже сейчас существуют такие технологии, как Context от LexisNexis, Supralegem.fr, Westlaw Edge, Litigation Analytics, Jurimetry и Predictice, которые способны предоставить данные о: 1) формулировках, прецедентах и другие судебных решениях, которые конкретный судья считает наиболее убедительными; 2) «конкретной логике», которую судья склонен использовать при удовлетворении или отклонении конкретного вида ходатайства; 3) проценте вероятности того, что дело пользователя будет выиграно у конкретного судьи; 4) продолжительности принятия решения конкретным судьей по конкретному виду споров; 5) проценте обжалований решений конкретного судьи; 6) выявлении риска вынесения так называемых дискриминационных решений; ... 7) статистике по судье в сравнении с другими судьями или средним показателем по суду» [7].

Исследователями справедливо отмечается, что «несмотря на все перечисленные преимущества и потенциал, которым обладает Judge Analytics, она представляет собой наиболее противоречивый инструмент из существующих в сфере правосудия. Проблема заключается в возникающем противопоставлении между правом судей на частную жизнь и конфиденциальность, их специальным правовым статусом и обеспечением права сторон на объективное и беспристрастное разрешение спора» [7].

«В то время как такие страны, как Канада и США, активно развивают инструменты аналитики судей, иные страны избирают диаметрально противоположный подход» [7]. Так, например, французское судебное сообщество не признало полезность алгоритмического анализа поведения судей, отстаивая необходимость ограничить доступ общества к анализу их решений и поведению в целом [7].

Разумеется, целесообразность использования любой аналитики, а также вопрос об ответственности за ее использование и за ошибочные (неоптимальные) решения, принятые ИИ, по-прежнему остается предметом дискуссий: «в отличие от традиционного программного обеспечения, автономные системы ИИ способны самостоятельно принимать решения и совершать действия. В связи с этим возникает вопрос о том, кто должен нести ответственность, если система ИИ причинит вред или допустит ошибку. Определение юридической ответственности может быть сложным, когда ИИ действует таким образом, что его действия не могут быть с легкостью возложены на человека. Создание системы подотчетности ИИ необходимо для того, чтобы обеспечить реализацию преимуществ ИИ и одновременно защитить людей от потенциального вреда» [1].

Во многих работах отмечается, что «развитие технологий в международном арбитраже существенно изменило и повысило эффективность процедур разрешения споров. С ростом глобализации и

сложности деловых операций стало необходимо адаптироваться к технологическим достижениям, чтобы соответствовать требованиям современного мира» [1], [3], [4].

При этом «одним из наиболее важных технологических достижений является появление онлайн-платформ для разрешения споров, которые произвели революцию в способах проведения арбитража. Эти платформы предоставляют сторонам удобство и гибкость, позволяя участвовать в арбитражных разбирательствах удаленно, сокращая расходы на поездки и экономя время. Кроме того, с внедрением инструментов искусственного интеллекта анализ больших данных, юридические исследования и составление юридических документов стали более точными и эффективными» [1].

В статье [1] отмечается, что «значительное технологическое развитие в сфере международного арбитража - использование видеоконференций и телеконференций. Эти средства связи устранили географические барьеры между сторонами, арбитрами и экспертами и сделали разрешение трансграничных споров более реальным и экономически целесообразным. Видеоконференции позволяют взаимодействовать друг с другом лицом к лицу, воспроизводя физическое присутствие сторон в зале заседаний, что способствует сотрудничеству и общению в ходе разбирательства. Кроме того, интеграция электронных систем представления доказательств облегчила сторонам предъявление комплекса документов, вещественных доказательств и мультимедийных презентаций, в результате чего процесс медиации стал более упорядоченным и визуально более привлекательным» [1].

«Кроме того, важнейшую роль в развитии технологий в международном арбитраже сыграли оцифровка систем управления делами и создание виртуальных залов слушаний. Системы управления делами позволяют эффективно организовывать и хранить связанные с делом документы, упрощают ведение дела и обеспечивают удобный доступ к информации для всех сторон. Виртуальные залы слушаний имитируют традиционные слушания, предоставляя сторонам, арбитрам и свидетелям безопасные и удобные интерфейсы для представления доказательств, допроса свидетелей и перекрестного допроса в удаленном режиме. Эти виртуальные залы слушаний также предлагают дополнительные функции, такие как расшифровка и устный перевод в режиме реального времени, которые повышают прозрачность и доступность арбитражного процесса. В заключение следует отметить, что развитие технологий в сфере международного арбитража привело к революционным изменениям в разрешении споров на глобальном уровне. Внедрение онлайн-платформ для разрешения споров, телеконференций, цифровых систем управления делами и виртуальных залов слушаний позволило значительно повысить эффективность, сократить расходы и расширить возможности правосудия. Поскольку технологии продолжают развиваться, для специалистов-практиков в этой области становится крайне важным оставаться на современном уровне и эффективно

использовать потенциал технологий для адаптации к постоянно меняющимся требованиям международного арбитража» [1].

Можно сказать, что искусственный интеллект (ИИ) совершает революцию в области международного арбитража, изменяя и совершенствуя различные аспекты процесса разрешения споров. По мере развития искусственного интеллекта он становится незаменимым инструментом для международного арбитража, предлагая огромные преимущества. Автоматизируя повторяющиеся задачи и предоставляя ценные сведения, технология ИИ позволяет юристам сосредоточиться на более сложных и стратегических элементах процесса разрешения споров [5].

В статье [1] отмечается, что «это не только повышает эффективность, но и качество принятия решений в международном арбитраже. Удивительная способность искусственного интеллекта обрабатывать огромные объемы информации и учиться на предыдущих делах меняет способы разрешения споров. Он открывает новую эру эффективности, рентабельности и надежности процесса. Благодаря использованию искусственного интеллекта международный арбитраж переходит в сферу, где трудоемкие задачи упрощаются, позволяя юристам сосредоточиться на сложностях каждого дела».

«Это технологическое достижение не только ускоряет процесс разрешения споров, но и гарантирует, что решения будут основаны на всестороннем анализе соответствующих данных. Технология искусственного интеллекта предлагает широкий спектр преимуществ в области юриспруденции, включая анализ договоров, прогнозирование дел, юридические исследования, анализ документов и даже виртуальные слушания. Одно из ключевых преимуществ искусственного интеллекта заключается в его удивительной способности быстро и точно обрабатывать огромные объемы данных, что значительно сокращает время и расходы, связанные с традиционными методами сбора информации. Используя алгоритмы машинного обучения, системы искусственного интеллекта тщательно анализируют предыдущие дела и судебные прецеденты, предоставляя сторонам неоценимые возможности для прогнозирования потенциальных исходов или вариантов урегулирования. Таким образом, арбитры получают возможность принимать обоснованные решения, основанные на полной и актуальной информации. Важно отметить, что, хотя ИИ не должен заменять человеческий опыт, его потенциал для революции в международном арбитраже нельзя игнорировать» [1], [7].

При всей эффективности ИИ в сфере арбитражных споров (особенно международных), нужно отметить, что «этические соображения и роль человека в арбитраже с помощью ИИ - важнейшие аспекты, требующие тщательного рассмотрения. Хотя ИИ добился значительного прогресса в своей способности анализировать огромные объемы данных, составлять точные прогнозы и облегчать процесс принятия решений, важно признавать его ограниченные возможности и потенциальную необъективность. Для

обеспечения справедливости, подотчетности и прозрачности арбитражных систем, управляемых искусственным интеллектом, необходимо участие человека» [1].

«Поскольку арбитраж связан со сложными юридическими вопросами и оценкой действий и намерений людей, человеческий опыт неоценим для правильной интерпретации контекста, соблюдения этических норм и предотвращения несправедливых или неблагоприятных исходов. Люди могут обеспечить необходимый баланс, критически изучая результаты работы ИИ на предмет скрытых предубеждений или ошибок, оценивая субъективные факторы помимо количественного анализа данных и принимая во внимание культурные особенности при принятии решений, которые оказывают значительное влияние на различные стороны, участвующие в арбитраже» [1].

В статье [1] подчеркивается: «кроме того, при участии человека в процессе может возникнуть элемент сопереживания и сострадания, который машины не могут полностью воспроизвести. Поэтому крайне важно, чтобы при использовании искусственного интеллекта в арбитраже мы также признавали важность активного присутствия человека для обеспечения справедливого и равноправного процесса урегулирования. Вовлечение человека в процесс арбитража также позволяет решить этические проблемы, связанные с использованием ИИ. Люди могут гарантировать, что решения принимаются честно и в соответствии с правовыми и моральными нормами. Кроме того, участие человека позволяет учитывать уникальные обстоятельства и исключения, которые не могут быть учтены алгоритмами ИИ. Такое сочетание человеческих суждений и возможностей ИИ может привести к более полному и справедливому процессу урегулирования. Использование ИИ в арбитраже порождает ряд этических дилемм и проблем. Основная проблема заключается в том, что решения, принимаемые алгоритмами ИИ, могут быть непрозрачными или необъяснимыми, что приведет к отсутствию подотчетности и потенциально несправедливым результатам. Существует также проблема необъективности систем искусственного интеллекта, поскольку они обучаются на основе исторических данных, которые могут содержать присущие им необъективные оценки. Это может привести к вынесению дискриминационных решений» [1].

«Обеспечение баланса между ролью искусственного интеллекта и человеческим правосудием в арбитражном разбирательстве - сложная задача, требующая тщательного и взвешенного подхода. Хотя технологии ИИ способны значительно упростить и повысить эффективность арбитражных разбирательств, крайне важно сохранить целостность и справедливость этих процессов, обеспечив центральное место для вынесения решения человеком. Использование искусственного интеллекта может ускорить выполнение таких задач, как проверка документов, юридические исследования и анализ данных, что позволит сэкономить расходы и время в арбитражном процессе. Однако из-за ограничений, присущих алгоритмам машинного обучения, требуется

вмешательство человека для проверки результатов и контекстуальной интерпретации» [1].

В статье [1] подчеркивается кардинальная разница между человеком и машиной в сфере правоприменения: «арбитры обладают такими бесценными качествами, как эмпатия, осмотрительность и умение толковать, что крайне важно для применения правовых принципов в каждом конкретном случае. Поэтому для достижения оптимального баланса между возможностями технологий искусственного интеллекта и полномочиями человека по принятию решений необходимо тщательно разработать рекомендации, определяющие, когда следует использовать или отменять автоматизированные решения, исходя из этических соображений и особенностей рассматриваемого арбитража. Используя сильные стороны инструментов искусственного интеллекта и человека, мы можем повысить эффективность, сохранив при этом справедливость арбитражного разбирательства» [1].

В статье [1] обсуждается вопрос о наиболее эффективных паттернах человеко-машинного симбиоза. «Хотя ИИ может эффективно анализировать данные и прогнозировать результаты, сложные решения часто требуют участия человека для учета этических соображений и интерпретации специфических нюансов. Поэтому юристам важно адаптировать свои навыки, чтобы дополнять системы, управляемые ИИ, а не заменять их. Юристы должны рассматривать ИИ как инструмент, который может улучшить их работу, а не как угрозу их профессии» [1].

«Используя технологии искусственного интеллекта, юристы могут оптимизировать свои технологические процессы, повысить эффективность и сосредоточиться на решении более сложных и стратегических задач. Такое сотрудничество между людьми и ИИ может привести к лучшим результатам для граждан, поскольку юристы могут использовать возможности ИИ по анализу данных для принятия более обоснованных решений и предоставления более точных консультаций. Кроме того, юристы могут использовать свои знания и опыт для обеспечения того, чтобы системы ИИ разрабатывались и внедрялись с соблюдением этических норм и верховенства закона. Кроме того, технологии ИИ могут помочь юристам проводить обширные юридические исследования и анализ за меньшее время, чем потребовалось бы человеку. Автоматизируя повторяющиеся задачи, такие как проверка документов и анализ договоров, ИИ может высвободить ценное время для адвокатов, чтобы они могли сосредоточиться на сложных юридических аргументах и стратегическом планировании. Это не только повышает производительность, но и позволяет юристам оказывать клиентам более персонализированные и индивидуальные услуги» [1].

Инструменты ИИ обладают рядом преимуществ для выполнения теоретических юридических исследований, не связанных рамками конкретного дела. Они способны анализировать большие объемы данных и предоставлять исчерпывающую и актуальную информацию за гораздо

меньшее время, чем при использовании ручных методов исследования. Кроме того, эти инструменты могут выявлять закономерности и выделять важные выводы, которые не сразу становятся очевидными для человека [1]. Эффективное использование инструментов искусственного интеллекта позволяет юристам оптимизировать рабочий процесс, сосредоточиться на юридическом анализе и принимать обоснованные решения с большей эффективностью. Не менее важно понимать результаты, получаемые с помощью инструментов ИИ. Хотя ИИ может помочь найти и систематизировать соответствующую правовую информацию, ученым важно критически оценивать и интерпретировать полученные результаты [1]. Прочные основы правовых принципов и теоретических знаний необходимы для понимания контекста и смысла информации, полученной с помощью инструментов ИИ. Исследователи должны не полагаться исключительно на результаты, полученные с помощью ИИ, а использовать их в качестве отправной точки для дальнейшего изучения и анализа [1].

В статье [1] говорится, что какой бы инновационной не была технология ИИ, ей не хватает главного: «старого доброго человеческого мышления».

«В арбитраже с использованием ИИ юристы обеспечивают необходимый контроль за тем, чтобы системы ИИ работали в рамках этических и правовых норм. Они отвечают за интерпретацию результатов, полученных ИИ, анализ обоснования этих результатов и, в конечном счете, за принятие обоснованных решений, учитывающих не только данные, но и влияние человека. Контроль и принятие решений человеком играют важную роль в арбитраже на основе ИИ. Системы искусственного интеллекта должны быть эффективными и объективными, но им не хватает таких фундаментальных качеств, как эмпатия, интуиция и понимание контекста, которыми обладают люди» [1].

«Участие человека обеспечивает справедливый и равноправный результат, интерпретируя нюансы каждого дела, учитывая уникальные обстоятельства и надлежащим образом применяя этические принципы или юридические прецеденты. Кроме того, арбитры-люди обладают богатым опытом и знаниями, которые позволяют проводить более комплексную оценку сложных дел, включающих множество переменных. Их способность сопереживать заинтересованным лицам также повышает общую удовлетворенность арбитражным процессом. Контроль со стороны человека также крайне важен для обеспечения подотчетности алгоритмов ИИ, поскольку на этапах сбора данных и обучения модели машинного обучения в нее могут невольно закрасться необъективные представления. В конечном итоге сочетание сильных сторон технологий искусственного интеллекта и человеческого интеллекта приводит к созданию сбалансированной и надежной арбитражной системы, обеспечивающей прозрачность, справедливость и равноправие» [1].

Что же касается рассмотренного выше вопроса «аналитики судей» автор настоящей статьи согласен с мнением, выраженном в работе [7]: «мы не

можем поддержать запрет на аналитику судей. Несмотря на уязвимости, у этого инструмента большой потенциал. Он может улучшить систему правосудия и заставить судей более вдумчиво относиться к своим действиям и процессу принятия решений. В то же время для применения данного вида аналитики необходимо тщательно проработать его «качество» и достоверность содержащихся в нем данных. Более того, данные инструменты должны находиться под строгим государственным контролем. В первую очередь должны быть установлены процедуры проверки и сертификации таких программ. Кроме того, необходимо разработать стандарт аналитики данных судей. Важной также видится разработка кодекса этики судейской аналитики, основанного на принципах справедливости, защиты конфиденциальности и безопасности, надежности, прозрачности и объяснимости, возможности оспаривания и подотчетности» [7].

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ОСНОВНЫЕ ПРИНЦИПЫ ГОРОДСКОГО ПЛАНИРОВАНИЯ

Аннотация: В данной статье рассмотрены работа, быт и отдых людей, проживающих в городе, организация основного функционального содержания жизнедеятельности, жилых домов, промышленных зон, зон отдыха и производственного, научного, образовательного, жилищного, коммунального хозяйства, общественного отдыха, городского и освещены современные методы оценки эффективности внешнего транспорта, инженерного оборудования, благоустройства и озеленительных технологий.

Ключевые слова: жилые зоны, промышленные зоны, рекреационные зоны, промышленность, наука, образование, жилье, коммунальное хозяйство, массовый отдых, городской и пригородный транспорт, инженерное оборудование, благоустройство и озеленение.

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BASIC PRINCIPLES OF URBAN PLANNING

Abstract: In this article, the work, life and recreation of people living in the city, organization of the main functional content of life activities, residences, industrial zones, recreation areas and industrial, scientific, educational, residential, communal services, public recreation, urban and modern methods of evaluating the efficiency of external transport, engineering equipment, landscaping and landscaping technologies are covered.

Key words: residential areas, industrial areas, recreational areas, industry, science, education, housing, public utilities, mass recreation, urban and suburban transport, engineering equipment, improvement and landscaping.

Жизнь, работа и отдых людей, проживающих в городе, составляют основной функциональный смысл его жизнедеятельности и определяют назначение и использование различных его частей, которые на функциональной основе различаются как жилые районы, промышленные зоны, места отдыха и другие. Однако пространственное распределение основных функциональных процессов по территории города довольно сложное и неоднозначное. В отдельных частях города может локализоваться какая-либо доминирующая функция, и территория приобретает монофункциональный характер. В других же частях объединяются несколько основных функций, и территория становится многофункциональной [1].

В данном случае решающим фактором является необходимость выделения определённой функции, требующей особых условий для её осуществления, или, наоборот, стремление реализовать в одной территории различные функции, взаимно дополняющие друг друга.

Динамика развития является важной характеристикой города как объекта проектирования. На различных этапах масштаб, темп и характер развития бывают неодинаковыми. Существуют периоды постепенного, плавного, эволюционного развития, а также периоды быстрого, иногда резкого роста, когда город получает мощные импульсы развития благодаря строительству нового крупного предприятия, преодолению очередного рубежа освоения территории (возведение больших мостов или водонепроницаемых дамб, создание намывных территорий), строительству скоростных транспортных линий и другим факторам [2].

Динамика развития города определяется масштабами и темпами экономического роста, научно-техническим прогрессом, характером расширения и изменениями в составе населения.

Функциональная организация города

Объектом планировочной организации является система городских территорий и структур: промышленные, научные, учебные, жилые зоны, коммунальные службы, места массового отдыха, городской и внешнетранспорт, инженерное оборудование, благоустройство и озеленение [3–4].

В градостроительстве территория города должна быть разделена на следующие основные зоны в соответствии с их функциональным назначением и особенностями использования: жилую, промышленную, коммунально-складскую, внешнетранспортную, общественные зоны отдыха, санитарно-защитную, а также — в крупных и крупнейших городах — общегородской центр.

За пределами города формируется пригородная зона, в которой размещаются места массового отдыха, крупные массивы зелёных насаждений и другие территории различного назначения. К городской территории также относятся другие земли, на которых расположены городские вспомогательные хозяйства, питомники, кладбища и т.п. Крупные больницы, высшие и средние специальные учебные заведения, научные центры, крупные спортивные сооружения могут размещаться отдельно от основных зон [5].

Исходя из необходимости создания наилучших условий для работы, жизни и отдыха населения, к основным задачам функциональной организации городской территории относятся:

1. согласованное размещение основных функциональных частей города — зон производства, жилых районов, общественных центров и мест отдыха относительно друг друга;
2. создание удобных связей между ними;
3. структурная организация каждой зоны, то есть организация системы жилых домов и микрорайонов в жилой зоне, научно-технических комплексов

и предприятий в промышленных зонах, мест кратковременного и длительного отдыха в зонах отдыха и других элементов [6].

Вопросы функциональной организации городской территории можно разделить на общие, связанные с городом в целом, и местные, связанные со структурой каждой зоны [7–8].

К общим задачам относятся:

- рациональное размещение работников, то есть такое пространственное расположение промышленных и жилых территорий, при котором время и объём перемещений до работы минимальны по сравнению со всеми возможными вариантами;

Наиболее важные характеристики, определяющие типологию городов:

- национально-экономический профиль города,
- численность населения,
- происхождение, время существования и этапы развития (старый или новый город).

По экономическому профилю города делятся на: промышленные, портовые, курортные, железнодорожные узловые города, научные центры и другие.

Среди городов по административному, политическому и культурному значению выделяются: столицы, административные центры областей и районов, а также города областного подчинения [9–10].

Экономический профиль города определяет состав его производственной базы, особенности взаимного расположения функциональных частей, включая характерные сочетания промышленных и жилых территорий, промежуточные пространства, характер транспортных связей, а также многие другие особенности планировочной организации. Связь между профилем города и его планировочной структурой определяет отдельное типологическое направление в градостроительном проектировании.

В нормативной и методической литературе по градостроительству важно знать о наличии специальных требований и рекомендаций по проектированию промышленных городов, научно-производственных центров, курортных городов и других типов городов, а также использовать их в практической работе (в том числе в учебном проектировании) [11–13].

Основной типологической характеристикой города является его население. Обычно города подразделяются на следующие группы (в тысячах человек):

- Крупнейшие города: более 1000
- От 500 до 1000
- Очень большие города: 250–500
- Большие города: 100–250
- Средние города: 50–100
- Малые города: до 50

Основные принципы градостроительства

Общей основой различной градостроительной деятельности по созданию новых городов, реконструкции и обновлению существующих является единая концепция формирования архитектурно-планировочной структуры современного города. В общем понимании архитектурно-планировочная структура города означает размещение зон для производства, жилья, общественных центров и зон отдыха на его территории, создание системы связей между ними и структурную организацию каждой зоны. Это объединяется в единое целое с архитектурной композицией городского плана [14].

Единая концепция «архитектурно-планировочной структуры города» раскрывается через набор принципов его строительства.

Функционализация

Современный город — это сложный комплекс территорий и сооружений, занятых промышленными предприятиями, жилыми массивами, общественными центрами, открытыми зонами отдыха, транспортной и инженерной инфраструктурой [15–16].

Основные функции города устойчиво реализуются на его территории, и их последующее изменение достаточно сложно. Поэтому первым принципом, который вводит порядок и систему в планировочную организацию города, является функциональное районирование — разделение города на части различного назначения на основе ведущей функции (труд, социальная жизнь, повседневная жизнь, отдых).

Разделение города на части для различных целей и функциональных зон свидетельствует об успешности социальной организации труда, жизни и отдыха граждан, одновременно усиливая проблему планировочной целостности города. Ни одна из отдельных функций города не существует самостоятельно. Чередование рабочих, повседневных и досуговых циклов составляет основу городского образа жизни [17–19].

Поэтому планировочную структуру города нельзя сводить только к функциональным зонам и их элементам.

В социальной, функциональной, архитектурной и композиционной интеграции современного города наибольшую роль играет система взаимосвязанных общественных центров, включая городской и специализированные центры, планировочные центры и жилые районы, промышленные зоны и зоны отдыха, а также общественные центры местного значения (микрорайоны и другие) [20].

Городской транспорт и планировочная структура

Улично-дорожная сеть является наиболее важной системой, объединяющей город в единый функциональный и планировочный комплекс. Она состоит из сети местных улиц и дорог, а также системы магистральных улиц и дорог, соединяющих жилые районы с городским центром, промышленными зонами, железнодорожными станциями, городскими и районными стадионами и парками, специализированными центрами. Система магистральных улиц является основой всей транспортной и планировочной

организации города, включая его связи с другими городами и пригородом [21].

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СОВРЕМЕННЫЕ ТЕХНОЛОГИИ УПРАВЛЕНИЯ ОРГАНИЗАЦИЕЙ

УДК 3977

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ОПРЕДЕЛЕНИЕ ПОНЯТИЯ «НЕЙРОМАРКЕТИНГОВЫЕ ТЕХНОЛОГИИ» И АНАЛИЗ ОБЛАСТЕЙ ЕГО ПРИМЕНЕНИЯ В БИЗНЕСЕ

***Аннотация:** в статье рассматривается эволюция нейромаркетинга, как междисциплинарной науки. На основе анализа смежных понятий разработано и обосновано авторское определение «нейромаркетинговых технологий». Проведен анализ преимуществ и практической ценности нейромаркетинговых технологий для бизнеса.*

***Ключевые слова:** нейромаркетинг, нейромаркетинговые технологии, потребительское поведение, нейровизуализация, айтрекинг, ЭЭГ, фМРТ, цифровой маркетинг, подсознательные реакции.*

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DEFINITION OF THE CONCEPT OF "NEUROMARKETING TECHNOLOGIES" AND ANALYSIS OF THE AREAS OF ITS APPLICATION IN BUSINESS

***Abstract:** The article examines the evolution of neuromarketing as an interdisciplinary science. Based on the analysis of related concepts, the author's definition of "neuromarketing technologies" has been developed and substantiated. The article analyzes the advantages and practical value of neuromarketing technologies for business.*

***Keywords:** neuromarketing, neuromarketing technologies, consumer behavior, neuroimaging, eye-tracking, EEG, fMRI, digital marketing, subconscious reactions.*

Введение. Современная рыночная среда, характеризующаяся перенасыщенностью информационного поля и высокой конкуренцией, смещает фокус с продукта на потребительское поведение. Удержание и завоевание этого внимания является ключевой задачей маркетинга. Традиционные методы исследования: опросы, фокус-группы, анкетирование),

фиксируют преимущественно осознанные мотивы. Однако с развитием цифрового пространства и появлением таких феноменов, как «баннерная слепота», их эффективность снижается. Возникает необходимость в методах, позволяющие изучать истинные, неосознаваемые реакции потребителей, что и обусловило возникновение нейромаркетинга.

Исторически становление нейромаркетинга связано с развитием нейробиологии и психофизиологии. Заложенные в 1992-х годах основы психофизиологии, развитие в 1970-80е годы методов нейровизуализации (фМРТ, ЭЭГ). Переломным моментом стало исследование профессора Джерри Зальтмана в 1999 году в Гарвардском университете, который впервые применил МРТ в процессе маркетинговых исследований.⁷⁰

Более комплексный подход предлагает Х.Плассманн: «Нейромаркетинг – это междисциплинарная область, которая объединяет психологию, нейробиологию и экономику для изучения процессов принятия решений потребителями. Он использует знания о нейробиологических механизмах, лежащих в основе поведения, чтобы лучше понять и предсказать выбор потребителей».

Методы и материалы исследования. Теоретической основой исследования послужили научные работы С. Л. Шишкина, Х. Плассманн, публикации по нейротехнологиям, нейромаркетингу и психофизиологии, а также материалы Британской энциклопедии. Эти источники позволили рассмотреть развитие нейромаркетинга и проанализировать существующие подходы к определению нейромаркетинговых технологий.

В исследовании использовался сравнительно-аналитический метод, который позволил сопоставить различные определения и выявить общие элементы, необходимые для формирования комплексного понятия «нейромаркетинговые технологии». Также применялся анализ научных источников, что дало возможность определить основные группы методов, используемых в нейромаркетинговых исследованиях, и оценить их роль в изучении поведения потребителей. Обобщение полученной информации позволило выделить ключевые направления применения нейромаркетинговых технологий и обозначить их практическую значимость.

Результаты исследования. Нейромаркетинговые технологии позволяют глубже понять эмоциональные и когнитивные реакции потребителей на маркетинговые стимулы, однако использование этих технологий сопряжено с рядом проблем, включая сложность интерпретации данных, этические вопросы и высокую стоимость внедрения. Эффективность этих технологий зависит от правильной интерпретации собранных данных и интеграции их в стратегический процесс.

Общепринятого понятия «нейромаркетинговые технологии» не существует, поэтому для дальнейшей работы было принято решение вывести

⁷⁰ Калькова Н.Н. ПРИКЛАДНОЙ ИНСТРУМЕНТАРИЙ НЕЙРОМАРКЕТИНГА И НЕЙРОБРЕНДИНГА // Вестник Алтайской академии экономики и права. 2022. № 12-2. С. 239-249;

его самостоятельно. Для изучения, было принято взять: нейротехнологии, технологии и нейромаркетинг.

Таблица 1 – Определения понятия "нейромаркетинговые технологии"

Определение понятия "продвижение"	Автор
Это междисциплинарная область, которая объединяет психологию, нейробиологию и экономику для изучения процессов принятия решений потребителями. Он использует знания о нейробиологических механизмах, лежащих в основе поведения, чтобы лучше понять и предсказать выбор потребителей. ⁷¹	Хилке Плассманн
Нейротехнологии – это технологии, которые тем или иным способом работают с нервной системой человека: позволяют получать информацию о том, что в ней происходит, или обеспечивают воздействие на нее. ⁷²	С.Шишкин
Технология — совокупность методов и инструментов для достижения желаемого результата; в широком смысле — применение научного знания для решения практических задач. ⁷³	Британская энциклопедия

Обсуждение. Проанализировав данные понятия, можно сформулировать комплексное понятие нейромаркетинговых технологий. С экономической позиции, прежде всего, технологии являются инструментом решения конкретных бизнес-задач, следовательно понятие будет иметь основной целью – достижение результата. Шишкин в свою очередь, подчеркивает, возможность работы с нервной системой человека, а Плассманн освещает изучение принятия решений потребителей. Соответственно, понятие нейромаркетинговых технологий имеет следующий вид: это совокупность методов и инструментов для изучения процесса принятия решений потребителя, направленных на достижение целей организации.

Нейромаркетинговые технологии позволяют оценить реальную эффективность маркетинговых кампаний и определить направление для их оптимизации. Их использование обеспечивает получение комплексного понимания предпочтений целевой аудитории, выходя за рамки поверхностных данных. Ключевой задачей нейромаркетинговых технологий становится изучение подсознательных механизмов принятия решений через работу с глубинной памятью, ассоциациями и сенсорным восприятием потребителя. Сенсорные триггеры, которые находятся в бессознательном мышлении и связанные с долговременной памятью, способны вызвать желаемые поведенческие реакции. Например, аромат свежей выпечки может побуждать ностальгические воспоминания и стимулировать к покупке. К

⁷¹ Berns, G. S., & Moore, S. E. (2012). A neural predictor of cultural popularity. *Journal of Consumer Psychology*, 22(1), 154-160.

⁷² Smidts, A. Kijken in het Brein: Over de Mogelijkheden van Neuromarketing [Текст] / A. Smidts // Inaugural Address. – Rotterdam : Erasmus Research Institute of Management (ERIM), 2002. – 28 с.

⁷³ Plassmann, H., Venkatraman, V., Huettel, S., & Yoon, C. (2015). Consumer Neuroscience: Applications, Challenges, and Possible Solutions. *Journal of Marketing Research*, 52(4), 427-435.

подобным выводом можно прийти именно с помощью нейромаркетинговых технологий.

Нейромаркетинговые технологии представляют собой сложную систему методов, которые принято систематизировать по типу измеряемых физиологических показателей. Данный подход позволяет структурировать многообразие существующих технологий.

Нейрофизиологические:

- ЭЭГ (электроэнцефалография)
- фМРТ (функциональная магнитно-резонансная томография);
- МЭГ (магнитоэнцефалография);

Биометрические:

- Айттрекинг;
- ЭКГ (электрокардиография).

Востребованность нейромаркетинговых технологий для электронного бизнеса обусловлена их способностью давать объективное понимание истинных мотивов потребителя, что критически важно в среде высокой конкуренции за внимание.

Области практического применения:

- Оптимизация пользовательского интерфейса: айттрекинг и ЭЭГ позволяют выявить области интерфейса сайта или приложения, вызывающие когнитивную перегрузку или наоборот;

- Тестирование рекламных макетов: исследование ассоциаций и эмоционального отклика на визуальные элементы помогает формировать сильный желаемый образ в цифровом пространстве;

- Повышение лояльности: исследование ассоциаций и эмоционального отклика на элементы бренда помогает формировать сильный желаемый образ в цифровом пространстве;

- Ценообразование: изучение неосознаваемых реакций на ценовые предложения и акции позволяет находить психологически комфортные для потребителя ценовые точки.

Для бизнеса эти технологии становятся особенно ценными, поскольку позволяют в режиме реального времени тестировать и совершенствовать все элементы цифрового взаимодействия с потребителем- от интерфейса сайта до рекламных макетов.

Заключение. Нейромаркетинговые технологии – это мощный, но дорогой и сложный инструмент. Он оправдан для решения конкретных бизнес-задач (запуск нового продукта, ребрендинг, тестирование), где цена ошибки чрезвычайно высока. На данный момент для большинства компаний выгоднее заказать у проверенных внешних провайдеров, чем развивать их внутри компании.

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ИСТОРИЯ РАЗВИТИЯ ВОРОНЕЖСКОГО АВИАЦИОННОГО ЗАВОДА: ОТ ОСНОВАНИЯ ДО СОВРЕМЕННОГО ПРОИЗВОДСТВА ПАССАЖИРКИХ И ВОЕННЫХ САМОЛЕТОВ

***Аннотация:** Статья посвящена историческому и современному развитию Воронежского авиационного завода (ВАСО) – одного из ключевых предприятий российской авиации, технологические достижения завода, его роль в оборонной и гражданской авиации, технологические достижения и вклад в социально-экономическое развитие региона. Особое внимание уделено работе предприятия в годы Великой Отечественной войны и послевоенный период восстановления и модернизации. Анализируется участие ВАСО в создании современных авиационных комплексов и его значение для обеспечения технологического суверенитета России.*

***Ключевые слова:** авиационная промышленность, Воронежский авиационный завод, история авиастроения России, Ил-2, Ил-86, Ил-96. Ан-148, авиационное производство, технологическое развитие, гражданское самолетостроение, авиационная техника.*

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HISTORY OF THE VORONEZH AVIATION PLANT: FROM ITS FOUNDATION TO THE MODERN PRODUCTION OF PASSENGER AND MILITARY AIRCRAFT

***Abstract:** This article examines the historical and contemporary development of the Voronezh Aircraft Plant (VASO), one of the key enterprises in Russian aviation, its technological achievements, its role in defense and civil aviation, and its contribution to the socio-economic development of the region. Particular attention is paid to the plant's work during the Great Patriotic War and the post-war period of recovery and modernization. VASO's role in the creation of modern aviation systems and its importance in ensuring Russia's technological sovereignty are analyzed.*

Keywords: *aviation industry, Voronezh Aviation Plant, history of Russian aircraft manufacturing, Il-2, Il-86, Il-96, An-148, aircraft production, technological development, civil aircraft manufacturing, aviation technology.*

Введение. Авиационная промышленность традиционно занимает особое место в экономике России, выступая стратегически важной высокотехнологичной отраслью, обеспечивающей обороноспособность государства, развитие гражданской авиации и укрепление национального технологического потенциала. История российских авиационных предприятий представляет собой уникальное сочетание инженерных решений, научных достижений и мобилизационных усилий различных периодов развития страны. Одним из наиболее значимых центров отечественного самолетостроения является Воронежский авиационный завод (филиал ПАО «Ил» – ВАСО), на протяжении почти века формирующий промышленный профиль региона и вносящий существенный вклад в развитие авиационной техники. Изучение этапов становления и эволюции ВАСО позволяет выявить особенности технологического развития отрасли, показать роль предприятия в ключевые исторические периоды и оценить его современное значение для российской авиапромышленности. Настоящая работа направлена на систематизацию исторических сведений, анализ производственных достижений и определение места ВАСО в современной промышленной структуре страны.

История создания и становления ВАСО. Всё началось в апреле 1929 года, когда на XVI всесоюзной партийной конференции было принято решение о создании в г.Воронеже крупного авиационного предприятия. На месте будущего завода сначала появились геодезисты: они разметили поля на квадраты, обозначили колышками будущие корпуса. Оборудования было ничтожно мало — один грузовик, пара лошадей и трактор — и основная тяжёлая работа ложилась на плечи людей. Зимой землю отогревали кострами, котлованы копали лопатами, камни разбивали кирками, тачками вывозили грунт, морозы по тридцать градусов и окоченевшие руки людей не останавливали тех, кто понимал: без самолётов страну не удержать.

15 марта 1932 года завод официально начал работу завод №18. Уже тогда, одновременно с ростом производственных корпусов, остро ставил задачу по подготовки кадров: воронежский край был в основном аграрным, и требовались токари, слесари, фрезеровщики, сварщики.

Наиболее важным источником кадров стал Воронежский индустриальный техникум, основанный ещё в 1908 году как восьмиклассное училище имени Петра I.

В 1923 году его преобразовали в индустриальный техникум, а по приказу Государственного Всесоюзного авиационного объединения от 26 октября 1930 года — в Воронежский авиационный техникум. В 1939 году ему присвоили имя Героя Советского Союза В. П. Чкалова.

Одновременно действовали школы ФЗУ, где готовили слесарей, клёпальщиков, сварщиков, чертёжников. Эти кадры стали основой для освоения первых серийных самолётов и для последующего участия в массовом производстве военных машин.

Молодые инженеры и технологи приходили на производство и учились буквально на ходу — многие приходили без опыта в тонкой газосварке, и это умение пришлось быстро осваивать: детали ножного управления ТБ-3 были тоньше, чем те, к которым они привыкли, и сначала сварка давала трещины и прожоги. Но постепенно, через ошибки и упорство, сформировалась своя школа производства — сварочная лаборатория Соломахина, группа под руководством А.Ф. Цветкова, ряд других специалистов стали фундаментом квалифицированного коллектива.

В этих стенах рождались первые крупные машины: в сентябре 1934 года в воздух поднялся первый серийный ТБ-3, собранный в Воронеже; испытательный полёт выполнил Михаил Громов. В то же время конструкторы — Москалев А. С., Ильюшин С. В., и другие — работали над новыми проектами. Москалёв А. С. выполнил важную работу по созданию лёгких пассажирских и транспортных самолётов: его САМ-5 и САМ-5-бис показали, что умение изобретать и адаптировать конструкции под дефицитные материалы (в частности, активное использование дерева и фанеры в условиях нехватки дюралюминия) позволило обеспечить серийное производство и удовлетворить потребности гражданской и санитарной авиации. САМ-5-бис, собранный в школьных мастерских и окрасившийся в серебристый лак с красными стрелами, прошёл испытания, выдержал рейсы в грозových фронтах и доказал свою надёжность — в результате на завод поступил заказ на серию санитарных самолётов. Тридцатые годы прошли в интенсивном созидании: на завод приходили специалисты со всей страны, внедрялись новые технологии — вытяжные штампы, заливки, станочные операции совершенствовались.

Деятельность завода в годы Великой Отечественной войны. С началом Великой Отечественной войны Воронежский авиационный завод оказался на передовой мобилизации отечественной промышленности. Уже в первые месяцы войны стало ясно, что завод не сможет продолжать работу в привычных условиях: фронт быстро приближался, а промышленность нуждалась в сохранении производства стратегически важных самолетов.

В 1941 году было принято решение об эвакуации крупнейших авиастроительных предприятий страны в безопасные регионы. Среди них оказался и завод №18 из Воронежа. Предприятие было перевезено в поселок Безымянка под Куйбышевом (ныне Самара). Здесь на одной территории сосредоточили производство винтов, моторов, агрегатов и сборку штурмовиков Ил-2, получивших прозвище «летающие танки». Завод №18 в Куйбышеве стал сердцем советского авиапрома.

Первые месяцы работы на новом месте были критическими. Цеха были недостроенными, оборудование доставлено лишь частично, персонал жил в бараках, а продовольствие доставалось с трудом. Люди испытывали голод,

холод и постоянное физическое переутомление. Несмотря на это, коллектив понимал, что от их труда зависит жизнь летчиков на фронте. Геннадий Кулаков, доктор технических наук и участник тех событий, вспоминал: «Люди понимали: от их труда зависит, долетит ли наш летчик до цели».

Ситуация достигла критического уровня в декабре 1941 года, когда производство Ил-2 было крайне низким. Именно тогда на завод поступила знаменитая телеграмма Иосифа Сталина, адресованная директорам авиационных предприятий:

«Вы подвели страну нашу и Красную армию. Вы не изволите до сих пор выпускать Ил-2. Они нужны Красной армии как воздух, как хлеб. ...Предупреждаю в последний раз. Точка».

Телеграмма произвела на заводчан огромное впечатление. Директор завода Матвей Шенкман и его коллеги сразу же организовали экстренное совещание, выработали комплекс срочных мер и мобилизовали всю производственную цепочку от поставщиков до сборочных линий. Производственные нормы были увеличены в несколько раз, а сам коллектив работал круглосуточно. Рабочие спали прямо на чертежных досках и не покидали завод недели подряд.

К началу 1942 года производительность завода значительно выросла. Средний выпуск винтов на одного рабочего увеличился с 1,76 до 6 в сутки, а выпуск самолетов превысил план на 223 боевые машины. К 1943 году на заводах появились настоящие поточные линии, позволяющие выпускать до 7 винтов на каждого рабочего ежедневно.

Работа на эвакуированном заводе была связана с огромным личным риском и физическим напряжением. Люди трудились в условиях дефицита металла, материалов и оборудования. Тем не менее, за годы войны завод №18 (совместно с другими предприятиями Куйбышева) выпустил 26 888 штурмовиков Ил-2 — почти две трети от общего количества этих машин, произведенных в СССР. Ил-2 стал самым массовым боевым самолетом Второй мировой войны, а немецкие войска дали ему прозвище «Черная смерть».

Кроме производственных рекордов, заводчанам приходилось справляться с тяжелыми бытовыми условиями: нехваткой продовольствия, холодом, ограниченным жильем. Несмотря на это, коллектив сохранял дисциплину, ответственность и высокую мотивацию, осознавая стратегическое значение своей работы.

Особый вклад в организацию производства внесли директора завода и ключевые инженеры, среди которых Матвей Шенкман. Его усилия позволили наладить восстановление цепочек поставок, координацию работы агрегатных цехов и внедрение поточных линий, что стало уникальным примером промышленного героизма и мобилизационной эффективности.

Эвакуация в Куйбышев и успешная организация производства во время войны стали ярким свидетельством того, что коллектив Воронежского авиационного завода мог работать в экстремальных условиях и добиваться

выдающихся результатов. Этот опыт закладывал основу будущего восстановления и развития предприятия после войны.

После освобождения Воронежа и окончания Великой Отечественной войны перед заводом №18 встал масштабный вызов — восстановление разрушенной инфраструктуры и подготовка к новому этапу работы. Многие цеха были повреждены, оборудование — уничтожено или выведено, а производственные помещения.

Создание Куйбышевского авиационного института как ответ на кадровый кризис (1942–1945). Массовое производство Ил-2 требовало не только рабочих, но и инженеров. Поэтому летом 1942 года государство приняло чрезвычайно важное решение — создать Куйбышевский авиационный институт (КуАИ), чтобы готовить специалистов непосредственно в центре эвакуированной промышленности.

По приказу Всесоюзного комитета по делам высшей школы занятия начались в октябре 1942 года. Учебная база формировалась в военных условиях: лекции читались в переоборудованных клубах, заводских комнатах, школьных помещениях. Студенты часто занимались в пальто — в аудиториях было холодно.

Выдающуюся роль сыграли первые руководители института:

– А. М. Сойфер — организатор структуры и первых учебных процессов (лето–осень 1942);

– Ф. И. Стебихов, руководивший институтом до 1956 года и превративший его в крупный научно-технический центр.

Преподавательский состав института состоял из учёных, эвакуированных из Москвы, Ленинграда, Киева, Харькова. Среди них были такие выдающиеся имена, как М. Д. Миллионщиков, М. Г. Крейн, В. М. Дорофеев, А. А. Комаров, М. И. Разумихин.

Эти учёные не только вели занятия — они консультировали заводы, внедряли новые сварочные и технологические процессы, помогали конструкторским бюро в отладке узлов для Ил-2 и последующих самолётов. Первый выпуск инженеров состоялся уже в 1944 году — фронт нуждался в специалистах немедленно.

Связь двух городов — эвакуационного Куйбышева и исторически промышленного Воронежа — оказалась фундаментальной. В годы войны Куйбышев стал сердцем авиации, где создавались Ил-2 и где родился КуАИ. После войны оба города развивали авиационную науку, производство и инженерную школу, обеспечивая переход от винтовых самолётов к реактивным, а затем к сверхзвуковым проектам.

Послевоенное восстановление и развитие гражданского авиастроения. После освобождения Воронежа в 1943 году началось восстановление разрушенной площадки. На базе предприятия был организован завод №64, занимавшийся ремонтом авиационной техники. Первые бригады, в основном женские, приступили к разбору завалов. Постепенно были восстановлены цеха первой необходимости, школа ФЗО,

создано подсобное хозяйство, обеспечивавшее работников продуктами в условиях острого дефицита. В 1944 – 1945 годах завод №64 значительно расширил производство, выполнял заказы по крыльям Ил-2 и сборке Ил-4, а к Победе подошёл с полностью восстановленной производственной структурой.

К 9 мая 1945 года оба предприятия – эвакуированный завод №18 и восстановленный завод №64 – внесли значительный вклад в вооружение Красной Армии, обеспечив фронт сотнями новых и восстановленных штурмовиков и сыграв ключевую роль в общем деле победы.

В послевоенные годы поступили репарационное оборудование из Германии, были восстановлены цеха и учебные места, вновь открылась школа, возобновилась подготовка специалистов. Завод активно развивал гражданское самолетостроение, производя самолеты Ил-86, Ил-96-300, Ил-96-Т, Ил-112, а также комплектующие для самолетов Airbus A-320, A-380 и российского «Суперджет» (RRJ). Важную роль завод сыграл в социально-экономическом развитии Воронежа: за десятилетия было построено 238 жилых домов, школы, детские сады, больницы, культурные и спортивные объекты, что сделало предприятие градообразующим.

Современное состояние и инновации. С 2003 года завод приступил к подготовке производства Ан-148, а в 2005–2006 годах изготовил для Кубы три самолета Ил-96–300. В 2009 году был собран первый серийный Ан-148, совершивший первый рейс с пассажирами в декабре того же года. В 2013 году состоялся первый коммерческий рейс Ил-96–400Т в США. В ноябре 2013 года завод посетил министр обороны РФ Сергей Шойгу.

В 2013 году на предприятии проходили съемки четырех серийного фильма «Человеческий фактор», а ранее в 1981 году — фильма «Особо важное задание». Эти события свидетельствуют о культурной значимости завода в жизни региона.

Современная деятельность завода включает полный цикл серийного производства и сервисного обслуживания самолетов Ил-96, участие в проектах по легкому военно-транспортному Ил-112В и развитие семейства пассажирских Ил-96. На производственной площадке создан центр специализации «Мотогондолы и пилоны», выпускающий агрегаты для современных авиадвигателей. ВАСО сохраняет высокий научно-технический потенциал, внедряя поточные линии, современное оборудование и инновационные методы управления производством. За вклад в развитие отечественного авиастроения завод был награжден многочисленными государственными наградами и премиями. Коллектив отмечен правительственными и отраслевыми почетными грамотами, а предприятиями авиационного комплекса РФ признан ведущим центром научно-технического прогресса.

Образовательная работа завода ведется совместно с Воронежским авиационным техникумом и университетом, где студенты проходят практику и получают профессиональные навыки на базе реального производства. Это

обеспечивает непрерывное пополнение кадрового потенциала предприятия квалифицированными специалистами.

Сегодня ВАСО продолжает быть стратегически важным предприятием для экономики России, выполняя государственные и оборонные заказы, участвуя в международных кооперациях и развивая гражданскую авиацию. Завод сохраняет традиции советского самолетостроения, одновременно внедряя современные технологии, что делает его одним из лидеров российской авиационной промышленности.

Заключение. Сегодня Воронежский авиационный завод остаётся крупнейшим центром отечественного авиастроения, продолжая традиции высококвалифицированного производства, внедряя инновации и готовя специалистов для будущих поколений самолетостроителей. Его история является примером успешного сочетания науки, инженерного мастерства и стратегической промышленной политики России.

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